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# Studies

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## ANCIENT HISTORY

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### ROMAN AGRONOMIC KNOWLEDGE OF VITICULTURE THROUGH LUCIUS COLUMELLA AND HIS UNCLE MARCUS IN HISPANIA

**Abstract:** Agriculture in the ancient world is the most important economic activity from a quantitative point of view. Within the ancient knowledge of the countryside, agronomy was the fundamental science, originally developed by the Romans and whose influence would remain well into modern times. In this article, we analyse Latin agronomic sources from three perspectives. First, we look at the sources and origins of these agronomists. Second, analysing the diffusion they would have among their contemporaries. Thirdly, to see the permanence of these sources in other historical moments, such as late antiquity, the Muslim and Christian medieval periods. We will focus on the case of Columella and the Lower Guadalquivir region in the southwest of the Iberian Peninsula. Columella was the most important author for viticulture, who has an important later influence and a source of information on his uncle Marcus Columella, a farmer from Baetica.

**Keywords:** *Ancient agriculture, roman viticulture, Columella, Agronomic literature.*

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#### INTRODUCTION

**R**oman culture has a great influence today, from laws, languages, to agriculture itself. The study of agronomy was developed in the Roman world, at the hand of Latin authors, who, although they started from the writings of Greek and Carthaginian naturalists, are those who have had the greatest influence over time in the Western world.

Briefly from a historiographical point of view, agriculture has been an economic process studied since ancient times, especially in the profuse literature we have from Roman agronomy.<sup>1</sup> From this development, we now have important reference works on the functioning of Roman agriculture,<sup>2</sup> and the mentality of the authors of these agronomic works.<sup>3</sup> In a detailed way, there are few books that are directly related to Roman agriculture, although in research that treats it as part of the whole we would have an infinite number of references, especially in those cases in which they are applied to the knowledge of the landscape and productive territory of various

<sup>1</sup> KOLENDO 1980, 222; REMESAL 2016, 27-39.

<sup>2</sup> MARTIN 1971.

<sup>3</sup> BILLIARD 1928; BELLINI 1948; GALTIER 1950; STEINER 1955; SIRAGO 1975.

population entities such as the villae.<sup>4</sup> There is a current trend to study ancient viticulture as a specific topic, doing comparative and quantitative studies.<sup>5</sup>

The integration of information gathered from archaeological surveys and excavations has greatly enriched our knowledge of Roman agriculture,<sup>6</sup> making it possible to compare local and regional changes to general theory. For the specific case of Hispania, and more specifically Baetica, there is reference research that has addressed these fundamental questions.<sup>7</sup> For the study area, several studies have been carried out by our team.<sup>8</sup>

In our case, to understand Roman agriculture, we have to start from the mentality, and not only from the data provided by these authors. The interest lies in the formal departure from the present day, especially in a change of paradigm, since the starting point is that ancient agriculture was poorly developed, where investments were not made and therefore yields were very low, with all production being based on the slave system. On the other hand, nowadays, we start from the industrialised paradigm, where economic profitability is what prevails. For antiquity, part of the investments that we can consider today are simply unnecessary, while the functioning of the economy itself does not have to be governed solely by supply and demand, this aspect being much more complex.

To this, it must be added that the economy does not function solely in the sense of supply and demand, but is largely regulated and controlled by what we might call the “State”, the *res publica*, institutions like *Annona* or simply regulated prices. Much of this economy could not yield significant profits, so investment in its improvement is low. In addition, what is called the “prestige economy” is that the real value of products does not prevail in the context of a society where networks of favours and patronage are what matter.<sup>9</sup>

Along with this issue, it is worth noting the sharp distinction between agriculture and livestock farming. These are entirely complementary activities, as they feed off each other in a sustainable system. It is therefore striking that in the Roman literature they are treated separately. Columella’s case of the sterility of the soil can be solved by a good rotation of the soil so that it is left to rest and the manure of the livestock is introduced.<sup>10</sup>

To advance in the knowledge of all these questions, a critical analysis of the classical agronomic sources must be carried out, starting from the origin and dissemination of these texts. Regarding the origin, it is important to stop and consider which are the sources of information, to what extent they are used, as they may be specific references and not applicable to all areas. Regarding dissemination, it

is interesting to know the level of dissemination of these authors among their contemporaries. Within this group, the poorest and least studied are of particular interest, as this dissemination may not be very effective. It is also interesting to see the subsequent transfer of knowledge, given that there is a permanence of texts in Islamic and medieval Christian times, selectively.

Within agriculture, we will focus especially on viticulture and therefore on Columella. Of the so-called Mediterranean triad, wine is one of the products of greatest economic interest, as it operates in several spheres. On the one hand, we will have a production focused on supply, which will circulate as part of the *Annona*. However, we cannot simply focus on wine without a brief contextualisation of Roman agriculture. Although there may be a monoculture vine production, we must start from the information we have for agriculture in general, having as a fundamental basis the literary sources.<sup>11</sup> In this article, we devote a section to analysing Columella as an agronomic author, as he is the main source of literary information on viticulture and the study of its sources of information. We believe that we have in his uncle Marcus Columella, a very important reference for the origin of the information of this author, something that is especially relevant for the analysis of the Lower Guadalquivir, the Roman province of *Baetica* in Hispania, an area of study where we have carried out several investigations and a monographic book.<sup>12</sup>

## ORIGIN

The Roman agronomic literature for the Mediterranean is mainly Latin. It is striking that there are hardly any treatises in Greek on this specific subject. The preceding Greek literature deals with nature, philosophy, astronomy, etc.<sup>13</sup> Moreover, Roman agronomy, born and nourished precisely from convulsive situations, in which the land is abandoned or suffers from neglect due to events such as wars, moments in which books are written that seek to teach and encourage the cultivation of the countryside.<sup>14</sup>

Therefore, Latin agronomy draws its origin from two groups of sources, external influence, especially from Greek and Carthaginian writings, as well as from specific situations or moments in its history. Columella gives us a list of his sources of information at the beginning of his work, so we can see what they are,<sup>15</sup> most of them are of Greek origin, however, we do not know of any works that deal with agriculture per se, beyond Hesiod’s *Works and Days*.<sup>16</sup> Undoubtedly, the knowledge of the nature of Greek scholars would be a fundamental basis for Roman surveyors, especially in those works related to agricultural work. In this sense, the precise knowledge of astronomy would be one of the tools that every good agronomist would have to know, as it is the way to be able to determine the agricultural calendar.

<sup>4</sup> CARANDINI 1989; MANACORDA 1994.

<sup>5</sup> MARTÍN 2015; VAN LIMBERGEN/MARÉCCHAL/CLERCQ 2020; DODD 2022.

<sup>6</sup> WHITE 1970; REES 1979; GOODCHILD 2013.

<sup>7</sup> SÁEZ 1987; ARIÑO/DÍAZ 1999; CARRETERO 2007; REMESAL 2011; CHIC 2012.

<sup>8</sup> LÓPEZ/RUIZ 2007; LAGÓSTENA 2010.

<sup>9</sup> CHIC 2006, 2012.

<sup>10</sup> APPLEBAUM, 1958; TRAPERO 2021B.

<sup>11</sup> CAPOGROSSI 1982; MAUNEE 2003.

<sup>12</sup> TRAPERO 2021C.

<sup>13</sup> AUSTIN/VIDAL 1986, 151-153

<sup>14</sup> VIDAL 1990, 61-65.

<sup>15</sup> Columella, *Rust.* 1.1.6-14.

<sup>16</sup> MIRALLES 1975; PÉREZ/MARTÍNEZ 1978, 11.

Unfortunately, many of these works have been lost and are not preserved today.

We can focus our attention on those that are, as part of the Aristotelian works which are, broadly speaking, the paradigm of knowledge of nature, to be followed by later authors. Also of special importance are the works of Aristotle's main disciple, Theophrastus. Among the many other works he wrote, two have been preserved, *De causis plantarum* and *De historia plantarum*, a very complete compendium on botany, which will only be surpassed from the Renaissance onwards.<sup>17</sup> This fits in with the fact that Roman agronomists had little interest in discussing botany since it is well summarised in Greek literature.

Alongside these Greek authors, Carthaginian agronomy stands out as a fundamental starting point for Latin authors.<sup>18</sup> The main agronomic work that we know of is that of Mago, called father of agriculture with several books that had a special interest in being preserved, since it was translated several times and saved from the destruction of the city of Carthage, after the Third Punic War.<sup>19</sup> Despite all these efforts, we only know a few references. Punic agronomy seems to be very important for authors from Varro onwards, precisely because of the application of cultivation techniques and the development probably of a production system focused beyond subsistence.<sup>20</sup> Many of the innovations coming from Latin agronomy were likely found in Punic experimentation, although this is a difficult line of research, given that it would have to be done from archaeology in areas of Phoenician and Punic influence.

We will briefly comment on the main Latin agronomic authors, both those whose complete writings have been preserved, and those whose writings are only partially known to us through other works.

- Marcus Porcius Cato the Censor (234-149 BC): *De Agri Cultura* is the first reference to agronomic studies in the Latin world. His work, more than a technical treatise, is above all a guide for the farmer's use, where agricultural tasks, cooking recipes, equipment, advice, sacred invocations, etc. abound. He is a widely known historical figure and therefore an exhaustive description will not be included in this study.
- The Saserna: father and son lived at the end of the 2nd and beginning of the 1st century B.C. Their work has not been preserved in its entirety and we only know part of it from fragments in later works such as Varro and Columella.<sup>21</sup> The style of these authors is similar to that of Cato, thus having both praise and criticism inserted in the treatises that followed them.
- Tremelius Scrofa: contemporary of Varro, he appears as a character in his work. The author was recognised not so much for his technical knowledge but his practical experience.

- Marcus Terentius Varro (116-27 BC): his work *Rerum Rusticarum* has survived, which is detailed but unevenly developed. He is the first author to bequeath complex agronomic knowledge (later improved by Columella). His main sources are Theophrastus, Magon, Cato and Scrofa. Of equestrian order, he was outstanding as a military man, although he never reached the consulship, and also as a man of letters, being chosen by Caesar and later Augustus as director of the public library in Rome, after being pardoned because he was on the Pompeian side. Within his military work, we are particularly interested in 76-71 BC, as he was legate in Hispania and legate pro-praetor of Hispania Ulterior from 50 BC until Pompey's defeat. His knowledge of the area of study is demonstrated in his work by his many quotations.
- Publius Vergilius Maro (70-19 BC): he is not an agronomic treatise writer, but in his poem *Georgica* he recounts the work of the countryside. Both Columella's Book X and Palladius' Book XIV are inverse in imitation of Virgil.
- Lucius Junius Moderatus Columella (date debated, 1st century AD): with his major work *De Re Rustica* and his minor work *De Arboribus*, he was the best treatise writer, the most complete and important for our study. He was born in Gades, having several references to this region.<sup>22</sup>
- Gaius Plinius Secundus (23-79 AD) the Elder: author of *Naturalis Historia* is not an agronomist as such, since the work is a much larger encyclopaedic work, but some of his books deal with agronomy. It is especially useful for collecting data from lost authors and for other knowledge and ideas that are interconnected with agriculture.
- Rutilius Taurus Emilianus Palladius (4th century AD): with his work *Opus Agriculturae* he created a true agricultural calendar. Although he had a great influence on later authors, he provides little data compared to Columella and is distant in time, so although he is a relevant author, he will not be the main one in our work, mainly resume previous works like *Gargilius Martialis*.
- Along with these authors, we should add Julius Hyginus, Cornelius Celsus, Julius Atticus, Julius Grecinus (before Columella) and Gargilius Martialis (3rd century AD), on whom we do not know much, only part of the work of Gargilius Martialis, *De hortis* and a fragment of a major book *Medicinae ex holeribus et pomis*, and *Geoponica*, a much later Byzantine compilation, are preserved.

The relationships between these authors can be seen in the ideas they contribute and in the quotations they make from earlier agronomists. For Cato, for example, the Greek works would be the main ones, among other things because he seems to be the first Latin author to deal with these questions. From there to Varro the changes are

<sup>17</sup> DÍAS-REGAÑON 1988, 264.

<sup>18</sup> Varro R.R. 1.1.10.

<sup>19</sup> DOMÍNGUEZ 2004, 83.

<sup>20</sup> MARTÍNEZ 2016.

<sup>21</sup> KOLENDO 1973.

<sup>22</sup> GARCÍA 2011; LARREA 1975.

substantial, also because of the passage of time from the first work to the second.<sup>23</sup> The case of Virgil is special since we are not talking about a specialist in the field, in the sense that he is a poet. However, the influence of his work must have served as an important starting point to generate awareness of agriculture, as reflected in Columella.<sup>24</sup> From this author onwards, we do not know which other authors touched on these fundamental questions, but apart from the work of Palladius, it seems that only Pliny the Elder, in his encyclopaedic work, was interested in transmitting and improving this knowledge. Probably, by this time, agronomy was not further developed, or at least we have no record of it, as a result of the advanced technical level it had reached.

Along with these questions, it is important to consider the knowledge of nature, because in antiquity there were quite advanced perceptions in this respect. Ancient society conceived plants as immobile objects, but with desires and sensations. It might seem that knowledge about what goes on inside a plant is a mystery to the ancients, but this is not the case. Rarely is the attention paid to the best author we know of in this respect, the aforementioned Theophrastus, who, with a simple reading of any part of his compendiums, will help us to understand the profuse agricultural knowledge that ancient societies would have had. Theophrastus was a primary source for several later Latin authors, such as Varro.<sup>25</sup>

The sources of the various Roman agronomists came fundamentally from three origins, readings of other agronomists, popular knowledge and their experimentation. We will see this in the case of Columella.

A closer reading of the agronomists allows us to differentiate certain aspects based on tradition. The transfer of knowledge must undoubtedly have taken place from this social elite to the lower strata, as well as the popularisation of these techniques throughout the length and breadth of the Empire. The best example of this is the use of these techniques discussed by classical authors, which are taken up by later agronomists, or even medieval and modern ones.<sup>26</sup>

## DIFFUSION

For the majority of less-educated farmers such as the peasants, for the majority of farmers, tradition and intuition were most likely the real foundations of peasant agriculture, rather than the information that reaches us through literary sources, which would undoubtedly be transmitted little by little from the upper echelons to other more humble ones.

In this respect, a question to be considered about agronomy is whether the precepts of personalities of social and political relevance, such as Cato, Varro, Virgil, Columella or Pliny the Elder, would later be followed by other farmers. The case of Columella is the most relevant in this sense, as the criticisms he makes of the agriculture of his time are very evident, and many of the ideas he defends are not followed by his peers. It was probably as a result of these agronomic works that contemporaries would learn the new techniques,

many of them not discovered by the agronomists, but disseminated by them.<sup>27</sup>

Agricultural knowledge was not standardised in the Roman world, as Columella himself says since there should be schools that taught this knowledge, being equal to or more important than others.<sup>28</sup> This means that, for the agricultural world in general, the starting point would be experimentation and tradition.

A much more detailed analysis of all these issues has been carried out by R. Martin, focusing on the perception of agronomists about their contemporaneity. The interests that these authors have in writing about agriculture are problematic, as a result of the reflection of their society, where there are a series of agricultural interests, which in general are not being fulfilled.<sup>29</sup> From the abandonment of the countryside at the time of Cato, after the Second Punic War and the passage of Hannibal through Italy, to the lack of a free peasantry and the concentration of land in the hands of a few, the time when Varro wrote.<sup>30</sup> Undoubtedly, the clearest example of all this is the work of Virgil, who, in his *Georgics*, precisely intends to popularise and teach in a very simple and direct way a series of teachings on the cultivation of the land. Columella, for his part, makes his intentions very clear in this respect at the beginning of his work, as has already been mentioned.

Thus, the agronomists' main aim is to teach good principles or at least to collect the best ones, showing which are the ideal methods to carry out agricultural work. This is why we continuously find criticisms, among different authors,<sup>31</sup> as if it were a bibliographical discursive process. This is very much conditioned by the different authors' own opinions and experiences, for example, Columella's liking for Virgil, or Pliny the Elder's apparent undermining of Columella.<sup>32</sup>

The point here is that the advance in "agronomic research" if we could call it that, has a significant change concerning the readings of these authors, but also of a very important accumulated experimentation, which is the work of other anonymous people. This idea raises the question of the concept of "progress" or "innovation" in agriculture. The knowledge of the countryside shown by the various agronomists throughout history has brought about countless changes, although if we look at them from a contemporary point of view, they are not great. It is not a question of comparing the yield of cereal production today with that of thousands of years ago, but it is a question of questioning the progress made in terms of a better knowledge of agriculture.<sup>33</sup> What does change from one author to another in the production model, as conditions are not the same from Cato to Columella, so we can see reflections of different chronological moments in the differences between the works.

<sup>27</sup> CAPOGROSSI 1982, 100.

<sup>28</sup> Columella *Rust. Praef.* 5.

<sup>29</sup> MARTÍN 1971.

<sup>30</sup> HOPKINS 2002, 73.

<sup>31</sup> KOLENDO 1973; DOODY 2007.

<sup>32</sup> MARTIN 1971, 375.

<sup>33</sup> HERMON 2004.

<sup>23</sup> MOURA 2017.

<sup>24</sup> ARIAS 1987.

<sup>25</sup> Varro *R.R.* 1.5.1-2.

<sup>26</sup> LAGARDÈRE 1997.

A closer reading of the agronomists allows us to differentiate certain aspects based on tradition. The transfer of knowledge must undoubtedly have taken place from this social elite to the lower strata, as well as the popularisation of these techniques throughout the Empire. The best example of this is the use of these techniques discussed by classical authors, which are taken up by later agronomists, or even medieval and modern ones.<sup>34</sup>

To this must be added the perception of the soil. Columella went against a very popular idea at the time, the sterility of the soil, defended by Tremelius Scrofa.<sup>35</sup> This was mainly based on the idea that the soil had certain qualities and that after intensive cultivation it became sterile. Columella, on the contrary, argued that, with good care, the land need not lose these qualities and that the real problem was the neglect of landowners and the huge estates that were not put to use. In this sense, it seems that the greatest gain is reflected in the greater size of the property, not in the means used to make it more productive. It seems logical that, if the land is very fertile, the expenditure produced on it to improve it will be less, than in the case of a land of poorer quality.<sup>36</sup>

This should not be treated as a question of disinterest on the part of farmers, but simply as a paradigm shift, where the economy did not work as it is currently understood. Undoubtedly the lack of investments leading to innovations goes hand in hand with the immense availability of labour, both wage and slave labourers and even settlers.<sup>37</sup>

Alongside this, it must be contextualised that the apparent immobility of Roman agriculture is based more on the very conception of the ancient economy than on the reality itself. Land tenure, especially in large *fundi*, is a remnant that ensures a certain wealth and social position. People who wanted to hold high public offices, such as those reserved for equestrians or senators, had to have a certain amount of wealth, in principle measured inland. A certain person with this purchasing power has an enormous concentration of property, so he or she does not need to maximise his or her productions, especially if the apparent ease of labour is included. This would not be the case for small or medium-sized landowners, and even in other areas such as seafaring and trade, where the idea of entrepreneurship would probably be much more developed.<sup>38</sup>

### PERMANENCE IN ANCIENT AND MEDIEVAL TIMES

The diffusion and permanence of agronomic knowledge over time have to do with chance and practicality. On the one hand, some documents are lost for specific reasons, and the damage caused is irremediable. But the majority of the writings that are preserved are reproduced because they are useful for the people of the time. Agronomy manuals are useful for the application in the field and if not

directly, they are collected by later authors who cite their sources.

From the Roman period, only the writings of Cato, Varro, Virgil, Columella, Pliny the Elder and Palladius are preserved in their entirety. These are probably the most important works, either because of the agronomic knowledge they possess or because of the category and importance of the person who wrote them.

The preservation and usefulness of Latin agronomy are based on the fact that many of its precepts are reproduced over time, almost unalterable. Proof of this can be found in Palladius, an author of the 4th century, whose work is an accessible and organised summary of that of Columella.

Innovation beyond what we find in Columella or Pliny the Elder, we only have it in specific cases. The geographical areas, with different climatologies, together with the discovery of new crops, means that the key to agronomy is precisely to provide solutions to the enormous variability of environmental conditions for crops. We found one case in Gallic agriculture, where it seems that there was a series of innovations in types of ploughs and machinery for cultivating fields, as a result of the interest in ploughing areas with difficult conditions.<sup>39</sup>

Moving into later times, we have little information about changes in agronomy. For example, we do not appreciate changes in types of products in legal and economic literature, like the *Edictum De Pretiis Rerum Venalium*.<sup>40</sup> For the Byzantine period, we have little progress, mainly represented by the anonymous work of *Geoponica*.<sup>41</sup>

Also, we can follow and say that after Columella, Andalusian agronomy<sup>42</sup> and later Castilian agronomy will follow a large part of these precepts, having an important base in the ancient world. Although Andalusian agriculture innovates in the aspect of irrigation and the introduction of new crops. The reality is that if we stick to the agriculture of the Mediterranean triad, the advice is very similar to that already given by Columella. This is probably due to the lack of knowledge about soil types, something that will advance well into the modern age.<sup>43</sup>

The same happens with Roman agronomy at the same time, where the changes produced among the different authors are qualitatively little important, beyond the profusion and detail in their explanations. The main changes, in turn, come from issues that do not directly imply an improvement. An example of this is the progressive aggrandisement of properties, *fundi* that occupies a larger area in the same hands, implying greater production or greater use of slave labour. This could be the main difference as to why the data provided between Cato and Palladius are different, beyond the great chronological difference, it is the different size of the properties and land tenure.<sup>44</sup>

<sup>34</sup> LAGARDÈRE 1997.

<sup>35</sup> Columella *Rust.* 2.1.5-6.

<sup>36</sup> MARTIN 1971, 86.

<sup>37</sup> CARLSEN 2013.

<sup>38</sup> DUNCAN 1990, 187.

<sup>39</sup> MARTÍN 1971, 83-91.

<sup>40</sup> FREIXAS 1962, 9.

<sup>41</sup> MEANA/CUBERO/SÁEZ 1998, 12.

<sup>42</sup> ÁLVAREZ 2002.

<sup>43</sup> TRAPERO 2021B.

<sup>44</sup> GARCÍA 1995, 43.

**Table 1.** Analysis of words referring to agricultural activities in various agronomic authors. In blue higher raw count, in the yellow percentage out of 1000 of the total number of words in the text.

	Grapevine/Vitis	wine/Vinum	Vinegar/Acetum	Vine/Vinea	Winegrower/Vinator	Vineyard/Vinetum	Grape/Uva	Wheat/Triticum	wheat/Frumentum	Oil/Oleum	Olive/Olea	Olive/Oliva	Grove/Olivetum
<b>Cato</b>	38	104	16	21	0	1	11	6	10	74	75	0	1
	2,40	6,57	1,01	1,33	0,00	0,06	0,70	0,38	0,63	4,68	4,74	0,00	0,06
<b>Varro</b>	32	23	3	25	0	6	21	14	26	25	24	0	12
	0,90	0,65	0,08	0,71	0,00	0,17	0,59	0,39	0,73	0,71	0,68	0,00	0,34
<b>Virgil</b>	17	4	0	2	0	3	7	0	7	5	5	5	0
	1,16	0,27	0,00	0,14	0,00	0,21	0,48	0,00	0,48	0,34	0,34	0,34	0,00
<b>Pliny</b>	157	1077	560	80	0	1	189	67	78	544	123	55	9
	0,39	2,64	1,37	0,20	0,00	0,00	0,46	0,16	0,19	1,34	0,30	0,14	0,02
<b>Columella</b>	251	266	94	178	15	36	156	35	60	202	41	17	112
	2,00	2,12	0,75	1,42	0,12	0,29	1,24	0,28	0,48	1,61	0,33	0,14	0,89
<b>Palladius</b>	139	103	29	56	0	7	29	18	27	86	24	13	15
	3,29	2,44	0,69	1,33	0,00	0,17	0,69	0,43	0,64	2,04	0,57	0,31	0,36

**THE CASE OF COLUMELLA AS THE FATHER OF AGRONOMIC VITICULTURE**

We devote an extensive section with a case study in Columella about the kind of agronomic knowledge that can be analysed by other authors. Columella is the main agronomic author on viticulture and the most extensive. This makes him a paradigmatic case to study the origin and diffusion of this author’s knowledge. There is an enormous amount of literature on him, in general, referring to different aspects of his work and person.<sup>45</sup>

We begin with a first analysis of the chapters that Columella devotes to viticulture, practically three of his books. We are interested in contextualising whether Columella is the main author of Roman viticulture. We have proceeded to measure the specific weight for viticulture using a word enumeration analysis with a programme called AntCont, which allows us to check the total number of results for a type of word, in this case, for a set of words, since the declension of each of them is used. It has been necessary to filter in certain cases, thanks to the context of the sentence. The raw Latin text is used in this analysis, which can lead to a small error in the percentages, especially due to the repetition of chapter titles and numbering, which is not eliminated for the total word count. This is a constant factor, which should not substantially alter the result, as it is similar in all the works. The first analysis consists in knowing the importance of Columella in comparison with other authors. If we analyse the appearance of certain words related to wine, but also oil or cereals, we can see the relevance of these authors in table 1.

<sup>45</sup> LAGÓSTENA 2007, 2010; ÉTIENNE 1979; CARANDINI 1983; CALÒ 2000; STEFANO 2000; GARCÍA/BERNABÉ 2000; SÁEZ 1983; TRAPERO, 2021C.

In the table we have an analysis of the total number of words cited in the various agronomic works, looking for specific terms with all their declensions, to check their specific weight. The first value in each table expresses the total number of mentions, while the second is a percentage out of 1,000 of the total text. The highlighted values are the maximum results per work. The works studied are *de Agri Cultura* by Cato, *Rerum Rusticarum* by Varro, *Georgica* by Virgil, *Naturalis Historia* by Pliny, *De Re Rustica* and *De Arboribus* by Columella, and *Opus Agriculturae* by Palladius. The most important results of each word are shaded. Columella is the most extensive for the subject of the vine, except in the case, for example, of *vitis* or *vinea*, which is in similar proportions to Cato or Palladius, although, quantitatively, Columella’s is superior, as his work is much larger. In the case of viticulture, specific words such as *vinitor* or *vinetum*, practically only Columella cites them, as he is interested in describing these matters, unlike other authors. Pliny the Elder, despite being much more extensive than Columella, does not devote so much space to viticulture issues, probably because it was already well studied by this previous author, who, on the other hand, had described olive production more briefly. Also, in the case of *Naturalis Historia*, an important part of the book is devoted specifically to types of products, hence there are many references to vinegar or oil. The same is true of Cato in proportion. Finally, Palladius also devotes part of his text to describing vine agriculture but referring to Columella.

It is sure from this brief analysis that the main reference for viticulture, statistically, is Columella. As a specific case study, we analyse the origin of this author’s agronomic knowledge, making special mention of his uncle Marcus Columella and the influence he may have had on this process.

**ORIGIN OF COLUMELLA’S KNOWLEDGE**

Despite his importance as an agronomist, little is known about the life of Lucius Julius Moderatus Columella.<sup>46</sup> Most of the references are given by the author himself in his works. Authors after him, although they make many quotations from him, tell us little or nothing about his life. The only source external to the Columellian writings themselves is a funerary epigraph found in Taranto, supposedly by our author “To Lucius Junius Moderatus Columella, son of Lucius, of the Galeria tribe, military tribune of the VI legion Ferrata”.<sup>47</sup> This epigraph provides us with little information beyond what we already know from the author himself, except that he was a military tribune in a legion that had a large Hispanic contingent and was stationed in Cilicia, a province that Columella himself claims, in his work, to have visited.<sup>48</sup> Likewise, his tribe, the Galeria, which is also the main tribe of Gades, is mentioned. Finally, a fact that has often been ignored is the praenomen of Columella’s father, which coincides with his own.

Columella’s life journey can be simplified as follows: he was born in Gades<sup>49</sup> or the surrounding area, where he learned much of his agronomic knowledge from his uncle Marcus; he moved to Rome to pursue a career at some point in his youth, after which he must have served in the legion Ferrata. During this stage of his life, it is plausible to consider another series of trips to other places, for his descriptions of Gaul,<sup>50</sup> or Egypt,<sup>51</sup> we only know of his maturity, the writing of these agronomic works and that he had some kind of relationship with Tarentum, for this epigraph. We have analysed in previous publications the importance of this author’s writings for understanding the viticulture of Roman Baetica.<sup>52</sup>

Generally, in these matters, the bibliography is divided into different opinions. As with the problem of the Ceretan fields,<sup>53</sup> which we will discuss later, there is no clear consensus on the time spent by Columella in Hispania and on his possible return journeys.<sup>54</sup> The fact is that it is not possible to reach an accurate conclusion on this issue, since we lack data on his own life.

We can suppose that Columella spent part of his youth in Baetic lands, if not in Cadiz. This is due to the enormous knowledge he has of this area and the number of very precise references he gives about it. We should add the positive reference he makes to his origins<sup>55</sup> and the praise he pays to his uncle, from whom he seems to have learnt much of his agricultural knowledge. He must have acquired this knowledge in his youth, since he always mentions his uncle in the past tense, although Columella’s work must have been written in his old age.<sup>56</sup> With all this, we can think

that a large part of our author’s education was based on his knowledge of agriculture in Baetica and that, later, it was complemented with other knowledge and readings, as well as practical experience in his Italian farms.<sup>57</sup>

The work contains numerous quotations from previous authors, which support the author’s agronomic knowledge. To this must be added a great deal of experimentation on his part. But there is one part of the work which can be difficult to describe, and that is the list of information concerning tradition: *veteres, perisque, maiores, quidam, agricolae, rustici, nonnulli*, etc. Many of these ideas are mentioned precisely to criticise them, but they show us the tradition of different places.

The quotations he uses are very varied and in the case of books III, IV and V, which are those dedicated to viticulture, not the entire quotes related to other topics. There are also some references in *de Arboribus* and some isolated quotations in books II and XII. The analysis has been made in these books, as it is the most interesting part of this thesis, it is interesting to know which are the author’s sources, on which knowledge he bases his agronomic ideas about viticulture (table 2).

**Table 2.** Author cited by Columella and quotes.

<b>Virgil</b>	3.1.1; 3.1.9; 3.2.29; 3.9.4; 3.10.18; 3.12.5; 3.15.4; 3.21.4; 4.11.1; 5.4.2; 5.5.7
<b>Varro</b>	3.3.2; 3.9.3
<b>Cato</b>	3.2.31; 3.3.2; 3.9.3; 4.11.1
<b>Celsus</b>	3.1.8; 3.2.24; 3.2.25; 3.2.31; 3.17.4; 4.1.1; 4.8.1; 4.10.1; 4.28.2; 5.6.22
<b>Atticus</b>	3.3.12; 3.11.9; 3.11.10; 3.16.3; 3.17.4; 3.18.1; 3.18.2; 4.1.1; 4.1.6; 4.2.2; 4.8.1; 4.10.1; 4.13.1; 4.28.2; 4.29.1; 4.29.3; 4.30.1-2<; 4.33.4
<b>Mago</b>	3.12.5; 3.15.4-5; 4.10.1; 5.5.4
<b>Scrofa</b>	3.3.2; 3.11.8; 3.12.5; 5.6.2
<b>Sasernas</b>	3.3.2; 3.12.5; 3.17.4; 4.11.1
<b>Graecinius</b>	3.2.31; 3.3.4; 3.3.7; 3.3.9; 3.3.11; 3.12.1-4; 4.3.1-2; 4.3.6; 4.28.2
<b>Hyginus</b>	3.11.8
<b>Authors</b>	3.10.1; 3.13.2; 3.17.1; 4.9.1; 4.13.1; 5.5.6

The last reference alludes to several authors, which he does not cite clearly. To these, we should add cases in which Columella relies on other authors and does not mention them, which could be the case. Therefore, a large part of the agronomic information on viticulture comes from these authors, especially Atticus, Graecinus, Virgil, Celsus and Magon. Of these authors, we can only contextualise the case of Virgil. As we can see, the citations to Cato and Varro are quantitatively minor, which may lead us to think: that part

<sup>46</sup> HOLGADO 1988.  
<sup>47</sup> C.I.L. IX 235.  
<sup>48</sup> Columella *Rust.* 2.10.18.  
<sup>49</sup> GARCÍA 1995, 89.  
<sup>50</sup> BOISSINOT 2001.  
<sup>51</sup> Columella *Rust.* 2.11.3, 4.33.6.  
<sup>52</sup> TRAPERÓ 2016; LAGÓSTENA/TRAPERÓ 2019; TRAPERÓ 2021C.  
<sup>53</sup> Columella *Rust.* 3.3., 3.9.  
<sup>54</sup> TOVAR 1975.  
<sup>55</sup> Columella *Rust.* 8.16.9-10.  
<sup>56</sup> Columella *Rust.* 12.59.5.

<sup>57</sup> LAGÓSTENA/TRAPERÓ 2019.

of Columella's text is his innovation or, especially, that much of the knowledge he mentions had already been compiled by other agronomic authors and, therefore, that it could have been in practice and popularised by the time of Columella. On the other hand, referring to the citations he makes to tradition, we have the following table 3.

**Table 3.** Other terms used by Columella in books III, IV and V.

<b>Betic</b>	3.2.19; 3.3; 9.6; 12.6; 4.14.2; 5.5.15
<b>Gallia</b>	3.2.25; 4.33.6; 5.5.16; 5.7.1
<b>Province</b>	3.14.2; 4.1.5; 5.4.1
<b>Nonnulli</b>	3.2.23; 13.4; 4.3.2; 29.10; 5.4.2; 5.16
<b>Rustici</b>	4.12.2; 24.4; 24.10; 5.4.1
<b>agricolae</b>	3.1.5; 1.6; 10.6; 1.15; 17.3; 4.1.5; 29.7; 29.15
<b>Quidam</b>	3.2.12; 13.5; 4.20.4; 21.3
<b>Maiores</b>	3.10.20; 13.11
<b>Plerisque</b>	4.5.1; 4.24.19
<b>Veteres</b>	4.29.15; 30.3

Table 3 compiles quotations made by Columella about tradition and other places, especially the province of Baetica, or simply references to other provinces, without specifying them. Of all the references, those to Baetica and Gaul stand out, as they show his knowledge of these areas. All these references can give us an idea that the author's experimentation is based first on a series of learned knowledge. Undoubtedly, for the cases in which he refers to Baetica or to the provinces in general (among which this one would be included), these are matters that can be assimilated into the area of study. Although this knowledge could be from the area we are studying, there is also the possibility that it could be from other areas, especially if we consider that Columella and more probably his uncle Marcus were citizens or colonists and part of this knowledge is from their place of origin, which is uncertain.

Within the influence that Columella has, it seems clear that the pattern he maintains is the classical Latin one, although he has a great knowledge of other Greek and Carthaginian sources. Despite this, the knowledge accumulated by the agronomist's practices and compiled in the first person is evident and demonstrated.<sup>58</sup>

### MARCUS COLUMELLA, BETIC FARMER

One of Columella's main sources was precisely his uncle. Maybe both could be first or second-generation settlers or Roman citizens who emigrated to one of these communities, whose first option would be *Gades* or the neighbouring colony of *Hasta Regia*<sup>59</sup> it would be interesting to analyse this, as it would demonstrate the suitability of many of the quotations for the area of study. In the same way, we do not know the origin of Columella's family and more specifically the relationship between Columella and his uncle, which could be more important than we think.

<sup>58</sup> JIMÉNEZ/GARCÍA 2006.

<sup>59</sup> TRAPERO 2019, 2021A.

The quotations made by our author to his uncle Marcus Columella are always in a tone of deep respect. It seems clear that much of the knowledge he expresses in his works is directly related to his early training as an agriculturist, which we suppose was during his childhood or youth with his uncle. If the figure of Lucius Junius Moderatus Columella is difficult to elucidate, the same is true of his uncle Marcus Columella. Of the latter, we only know the comments made by his nephew, who refers to him as a farmer with a profound knowledge of agriculture. Now, Marcus must have had his lands in *Gades* or the nearby cities,<sup>60</sup> although we do not know his citizenship, we can assume, a priori, that it is the same as that of his nephew.

In one quote,<sup>61</sup> we are told that Marcus Columella buys some wild rams from a neighbouring municipium in Africa, in the *municipium Gaditanum*, which were on their way to some *bestiae munerariis*. These games could take place in the city of *Gades* itself, which is supposed to have an amphitheatre,<sup>62</sup> although it could also be the redistributing port for another place where the game would take place. In any case, Columella is located geographically close to the municipality of *Gades*. This raises the first problem since we cannot assume his citizenship in *Gades*. Although Lucius Columella claims to be from Cadiz, he makes no such reference to his uncle, who describes him as a great Betic farmer. Therefore, Marcus Columella could well be one of these colonists who travelled in the late Republican period, at the beginning of the Empire, to municipalities or colonies. In either case, in the fragments of Marcus, we are certain that we are dealing with our approximate area of study, either in *Gades*, *Hasta Regia* or some nearby locality. Another of the quotations refers to the use of seawater to season the wine, a fact that may well give us an idea that the *fundi* of Columella's uncle could not be very far from the sea.

After this demonstration that the texts referring to Marcus have a direct bearing on the study area, two more relevant questions can be commented on. The first is about a possible closer relationship between uncle and nephew, and the second is about the city of *Tarentum*.

Lucius Columella receives his second *cognomen* from his uncle, Marcus Columella. We know that Lucius' father also had the same *praenomen*, from the epigraph of *Tarentum*, as we have already mentioned, and that his uncle is on the paternal side, as he describes several times, *patruus meus*. He probably received the first *cognomen* *Moderato* from his father, although it is true that both *Moderato* and *Iunii* appear in the area of the province of Cadiz and especially in the city of the same name. It is possible, given that there is no reference to his father in Columella's works, that his father died at an early age and that his uncle was the one who educated his nephew from early childhood, which would explain the second *cognomen* and the adoration professed by his relative.

This option would not be strange given the information available to us. To this, we should also add the

<sup>60</sup> LAGOSTENA 2010, 98.

<sup>61</sup> Columella *Rust.* 7.2.4.

<sup>62</sup> LOMAS 2005, 913.

question that his nephew could have inherited all or part of his uncle's property. This, which is difficult to verify, could lead us to think that at least part of Marcus's properties could have passed to his nephew, and, therefore, that they were reflected in some way in the estates that Lucius refers to in his work. Therefore, this hypothesis suggests that the quotations referring to Marcus Columella, which provide valuable information about the estates in the study area, may have been owned by Columella's nephew at the time of his writing.<sup>63</sup> Furthermore, if the Ceretan lands may correspond to somewhere in the area around Gibalbín and not *Caere*, this could indicate that they may be the same fields. We must analyse the properties that the agronomist could have had in *Baetica*, specifically in the controversial *Ceret*,<sup>64</sup> which historiographically has been located in several places, such as in *Caere*, actual Cerveteri in Italy,<sup>65</sup> and in Jerez de la Frontera or close to it, as in the hill of Gibalbín in the southwest of the Iberian Peninsula.<sup>66</sup>

If this hypothesis is correct, we would be looking at the reminiscence of some *fundi* that could well have belonged to Marcus Columella, provided that his nephew could have inherited part of his lands. If this were not the case, we could be dealing with the reality of properties that he would have obtained by other means. In any of the options, the references to the great productivity of wine may be related to the area under study, as long as we start from the idea of locating Ceret in a place close to Gibalbín. We know the name of the place from the numismatics of the area, as we have analysed, although this does not mean that a city existed at the time of Columella's writing. Instead, it is much more likely that it is a place name, which is related to it and designates a place such as a *pagus*.

## DISCUSSION AND CONCLUSION

We have made a historiographical summary of the sources and agronomic knowledge to lay the foundations on which to approach Roman agriculture about the origin and dissemination of these important sources. We can see that knowledge would be spread little by little from writers and researchers in agronomy to the peasants, always thinking of a model of land exploitation based on the *latifundia*. These models change over time so that we can know an example of the diffusion of the countryside at each moment. It is necessary to know the sources from which the knowledge of agronomic authors comes, so that we can see the evolution of ideas and the permanence or not of these ideas. We have focused mainly on the case of Columella, an author whose references to agriculture in general and viticulture, in particular, are closely related to the environment of the study area. Especially his uncle Columella refers to cultivation practices that turn out to be very specific and can apply to a GIS model.<sup>67</sup>

<sup>63</sup> LAGÓSTENA/TRAPERO 2019.

<sup>64</sup> Columella *Rust.* 3.3.3., *Rust.* 3.9.6.

<sup>65</sup> TCHERNIA 1986.

<sup>66</sup> TOVAR 1975.

<sup>67</sup> TRAPERO 2021C.

The continuity of agronomic texts can be analysed by looking at which texts are preserved and which are quoted by later authors. In the present case, there are no extensive changes in agriculture until well into the modern age, with most of the development and innovation focused on the introduction of new crops or adaptation to other terrains. As far as the improvement of a crop, such as viticulture, is concerned, there are hardly any changes since Columella.

This study of the origin of the sources allows us to propose that the lands of Marcus Columella were inherited by his nephew Lucius and, therefore, that the author's references to these fields are similar. This allows us to apply privileged information to the case study of the southwest of the peninsula. This region near *Gades* and the Roman colony of *Hasta Regia* is a privileged area to study these agronomic changes, as they have Phoenician-Punic, Turdetan and Roman influences.

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