CHAPTER 8

Viticulture versus Arboriculture
A Matter of Choice

The previous chapter has offered an overview of the changes that occurred, in terms of agricultural practices and plants cultivated, in the Iberian Peninsula and the Gallic territories during the Roman era. While I have tried to trace the evolution of arboriculture and, more generally, horticulture, we have seen that in these provinces the two most important commercial crops that started to be cultivated more widely in the Roman era were the grape and the olive.

The growth of viticulture and oleoculture in the Iberian Peninsula and in parts of southern Gaul occurred quite swiftly in agricultural terms; within only a few decades these territories were exporting oil and wine in large quantities. A newly planted olive grove needs a bare minimum of ten years for the plants to mature enough before starting to bear commercially viable fruits, and grape vines equally need several years before they start producing appreciable crops. After a few decades, by the end of the Flavian period, the agricultural exports from Hispania Citerior and Baetica had reached a massive scale. A vast literature exists on different aspects of the wine and oil production of the Iberian Peninsula and Gaul – the diffusion of villas and farms, the organization of production for the amphorae, the installation of presses, the social and commercial ties among the various actors as revealed by the stamps and *tituli picti* – but the fundamental practicalities linked to this remarkable agricultural development tend to be left out of the discussion: how would one go about starting a vineyard or olive grove, in other words, where would one get the plants and/or the cuttings/saplings needed? What were the conditions that might lead a new landowner to also add the commercial cultivation of fruit trees and vegetables? How would new settlers go about establishing distribution networks for their products?[1] These are crucial questions, and different

[1] A first attempt at addressing these issues when comparing indigenous and colonial farmers is in Marzano 2015.

strategies for tackling the issues according to the varying means of the settlers (in terms of financial possibilities and social networks) can be inferred from interesting studies on some colonial farms in the south of France which I discuss later in this chapter. These strategies may well have had a wider occurrence in a number of provincial settings.

In the case of olive and grape cultivation, because the installations associated with the production of wine and oil – the presses, the large terracotta containers where the produce was stored, and the amphorae used in transmarine shipments – are very durable, it is easier to assess the spread of these cultivations, the degree of investments in related infrastructure, and also to see the introduction of technologies and methods from outside a specific region. As I have mentioned in the previous chapter, it is in the early Augustan period that many farms and villas in parts of the Iberian Peninsula first display dedicated spaces for presses and for *cellae vinarie* with *dolia defossa.* Both the types of press used in Hispania and the types of wine fermentation technique were typical of Italy; the legionary veterans (the Roman legions in this period were still recruited predominantly from Italy) and other Italic settlers brought with them the knowledge of agricultural practices with which they were familiar and applied them in their new estates. The change in wine-making techniques is most visible in areas previously under Punic influence: in the Punic tradition, wine fermentation occurred directly in the amphorae and not in sunken *dolia*.

In the context of commercial agriculture, focusing on the cultivation of the grape vine and olive tree made sense only because wine and oil, for which there was great demand, could also be traded extra-regionally; in addition, compared to cereals, these products had a greater added value. In the context of Roman Campania, it has been calculated that in average years a vineyard yielded 900 sesterces per *culleus*, equal to 3,600 sesterces per hectare, whereas 1 hectare cultivated with wheat would have yielded only between 440 and 1,100 sesterces per hectare (assuming an average yield of 1,000 kg/ha and a price of 3–7.5 sesterces per *modius*).[2] Adding as much extra value as possible by focusing on the production of quality wines allowed to offset the investments made during the years the plants were not yet productive. Alternatively, if quality was not possible, the cultivator had to aim for quantity. By the mid first century AD there were

[2] De Simone 2017, 48; Erdkamp 2005 for a study of the grain market and the economic, political, and social influences that shaped it.

at least seventy-one types of grape and fifteen of olive.[3] Farmers in colonial settings had to decide which cultivars to use. What the cultivator was, ideally, looking for when deciding what type of grape to plant, is clearly spelled out by Columella: 'when our interest is in the wine, a vine is selected which is both heavy in yield and strong in wood . . . But such a vine is especially good if it does not put forth leaves too quickly, if also it casts its flowers very early in the season and does not ripen too slowly; moreover, if it easily withstands frosts and fog and blight, does not rot in rainy weather, and does not shrivel up in times of drought.'[4] After recognizing that it is not possible to know all the variety of grapes that exist and their names, which vary from region to region, the advice Columella gives, on the good authority of Cato and Celsus, is that *nullum genus vitium conserendum esse nisi fama, nullum diutius conservandum nisi experimento, probatum* ('no kind of vine should be planted except that approved by common report and that none should be kept for any length of time unless proved by test').[5] *Experimento probatum*, proven by personal experience and trials, are key concepts in the world of the ancient farmer, as is the common accumulated knowledge on specific cultivars.

Whether dealing with grape, olive, or other fruit, important considerations these settlers had to make from the start concerned the selection of cultivars for the new cultivations which would require investment and labour over many years before bearing full fruit. It was not only the agronomists who were well aware of the different types of soil and of their variable suitability to the cultivation of certain types of crop, and of the characteristics of different cultivars which could make them more suitable to being grown in a given environment rather than in another. These were the practical considerations of any farmer. Common awareness of the considerations about quality of soils and location of a farm that found their way in the works of the Latin agronomists is confirmed by archaeological studies. For example, a study conducted in the middle and lower Rhône basin, which considered 900 sites (over the period 500 BC to AD 600), concluded that the first stage of Roman colonial settlements in the area at the end of the first century BC / start of the first century AD occupied the best soils/locations ('sheltered locations on low, gentle slopes oriented towards the southeast, south or southwest, and easy to plough, well-drained, soils'),[6] in relative proximity to the major communication

[3] As inferred from Pliny's text, see White 1970a, Appendix A.
[4] Columella, *Rust.* 3.2.3–4 (trans. H.B. Ash, Loeb edn). [5] Columella, *Rust.* 3.2.31.
[6] Van der Leeuw and The ARCHAEOMEDES team 2005, 18.

route. It was only when the later settlers arrived, later in the course of the first century AD, that less favourable locations were occupied: first higher up the slopes or places that captured less sun, and later the alluvial plains, with heavy, poorly drained soils requiring considerable manpower to drain.[7]

In the context of so many colonial foundations being pursued by Caesar and then by Octavian/Augustus in the provinces, it is only normal that interest in the suitability of various cultivars to the new territories should increase, at every level, from the small farmers to the big wealthy proprietors. Elite landowners, who in some cases were also intellectuals writing for their peers and who had always had an interest in agriculture, land ownership being the basis of societal order, had in this period an additional reason to write agricultural treatises in which the qualities and yields of various cultivars, largely of grape, were considered.

As discussed in Chapter 3, to judge from the surviving information on lost agricultural works, the Augustan era was a period of intense activity in this respect, with the appearance of treatises which, instead of covering agriculture and husbandry as a whole, focused on viticulture or horticulture specifically. Regardless of whether such authors were members of the 'Romanized' provincial elite who found social advancement in the Roman system or Romans who had acquired properties in the provinces, they were all addressing the same fundamental issue: how to best manage their landed estates. Obviously, in the case of colonists and new landowners, decisions such as these did not happen in a vacuum. The territories whose land was being parcelled and assigned to newcomers in the context of colonization were not places void of population and local agricultural practices. In many cases the settlers received land which had already been planted with grape vines, olive trees, and fruit trees; what was already growing on a parcel of land may, therefore, have influenced the farmer's future cultivation strategy, at least in the short term.

Two Farms near Béziers

The choices made by small and medium farmers regarding what cultivations to grow on the estate is not easy to reconstruct. However, the fact that even in proximity of an urban centre, to be viable, large-scale arboriculture needed a notable aggregated demand and that viticulture was felt

[7] For example, the Tricastin and Lunellois plains: Van der Leeuw and The ARCHAEOMEDES team 2005, 18.

to be a financially more rewarding choice in the long run is nicely illustrated by the discoveries made at the site of Gasquinoy, just outside Béziers in southern France. Béziers was the ancient *colonia Urbs Julia Septimanorum Baeterra* founded in 36 BC by Octavian to settle veterans of Caesar's *Legio* VII *Gemina*. In advance of building works, archaeologists were able to excavate two medium-sized farms and their environs, which had been under cultivation in Roman times in the Gasquinoy area.[8] The two Gallo-Roman farms, in use during the first and second centuries AD, were only 200 m apart.[9] Primary cultivation of the grape vine on these estates and wine making are attested by thousands of vine plantation marks and by the associated drainage ditches; by the presence, at both farms, of wine cellars with *dolia defossa* and possible wine-making areas (though there is no evidence for wine presses); and by abundant waterlogged archaeobotanical remains comprising many grape pips, pedicels, undeveloped berries, and other material. The investigators of these sites report that at least 15 ha (37 acres) of the 20 ha they could investigate archaeologically were occupied by vineyards in the first century AD. These farms were part of an intensively settled rural landscape: other farms were identified within a 1 km radius, suggesting that each farm controlled 10 to 30 ha (*c.*24–74 acres) of land.[10] Both the architectural typology of these farms and the size and unit of measure used for the plots indicate that these were the farms of the colonists settled there by Octavian/Augustus.[11] The modest size of these rural establishments contrasts with the amount of work that had been required to bring under cultivation this predominantly waterlogged land.[12] However, while vine/grape constituted the majority of the archaeobotanical taxa recovered,[13] other cultivated plants were present too. Fruit trees that were likely cultivated at these sites are fig, either sweet or sour cherry, sloe (*Prunus* type *spinosa*), walnut, apple and/or pear, stone

[8] Figueiral *et al.* 2010a. Farm A covered an area of 750 m², Farm B occupied at least 800 m².

[9] Farm A seems to have had a shorter occupation span than Farm B, which was abandoned well into the third century. The reasons for the abandonment of the sites are unclear, but it is a phenomenon well known from various parts of the western empire: in the late second and third century AD, smaller rural sites tend to be abandoned while larger villas continue to thrive. A variety of explanations are possible, and they are not mutually exclusive, such as consolidation of the land in the hands of fewer landlords and demographic contraction due to the Antonine Plague: see Marzano 2013b. For trends regarding villas in Gaul: Buffatt 2018; for a general discussion of the impact of ecological changes on the Roman world: Harper 2017.

[10] Figueiral *et al.* 2010a, 140. To the east of Béziers, closer to Pézenas, only pottery workshops are known, and no traces of cultivation have been detected; it is believed that this area was forested in antiquity: Figueiral *et al.* 2010b, 410.

[11] Buffatt 2018. [12] Cayn *et al.* 2017, 35.

[13] 22,442 uncharred plant remains were found, largely in two wells associated with the farms.

pine, and hazelnut. For all these fruits and nuts, local cultivation rather than import is suggested because for the first three plants both seeds/fruits and waterlogged branches/twigs were found, whereas in the remaining cases, in addition to the seeds/fruits, charcoal from the wood of those plants was identified. Hazelnut could have also grown spontaneously in proximity of the site. Fragments of endocarp of plum (*Prunus insititia*) and peach (*Prunus persica*) were also found and could have been cultivated nearby.

The evidence recovered from these two early imperial farms reveals important details on crop choices and how the cultivation was organised. It indicates that the fruit trees were only sporadically planted alongside the vine cultivation, which represented the real commercial crop of these estates. The cultivation of the fruits, possibly together with condiments such as coriander, celery, and fennel, whose seeds were identified among the taxa, was for internal consumption, at most for small-scale sale at nearby markets. Certainly, these farms did not engage in large-scale fruit cultivation of the type we have seen in the case of the San Giovanni in Laterano site in Rome (see Chapter 5). Cereals were the other crops that were probably grown together with the vines, again present in so small a quantity in the archaeobotanical record to indicate cultivation for internal consumption on the farms. Cultivation on the spot is suggested by the recovery of remains of rachis elements for barley (*Hordeum vulgare*) and bread wheat or emmer wheat (*Triticum aestivum/turgidum*), together with weeds which normally grow among cereal crops. Within the area featuring pits and trenches for vine cultivation, the excavation also revealed an area with no traces of any plantation where the cereal cultivation probably took place.[14] In sum, the archaeological evidence shows that these farms were primarily vineyards, and their land was intensively allocated to that purpose.

Other sites identified in the Mediterranean portion of Languedoc show a similar general dominance of vineyards from the very start of the first century AD, alongside some degree of cereal cultivation, animal rearing, and horticulture.[15] For example, evidence for viticulture, including trenches for vines, vats for wine making, and a possible press (fragments of pedicels and berries were recovered), was identified at Renaussas and Mont Ferrier. A well equipped with a water-lifting device (shaduf type) pointed to irrigation, while archaeobotanical taxa recovered from the well suggested a range of fruits, vegetables, and spices which may have been

[14] Figueiral *et al.* 2010a, 148. [15] Cayn *et al.* 2017; Figueral and Séjalon 2014.

cultivated locally.[16] The significant frequencies of *Arundo* and/or *Phragmites* (reeds) at Gallo-Roman rural sites in the Languedoc region is another likely indication of the cultivation of the grape vine.[17] Reeds had various possible uses on an ancient farm, but a common one was to utilize them as cross bars to support the vines (in combination with wooden posts) or, in the absence of posts, the reeds could be used also as vertical props.[18]

When cultivation of a specific plant like the grape vine is so prevalent and has so much economic value, it is normal that the technical knowledge circulating at any one time is the result of compounded small improvements and 'discoveries' made by a range of individuals. The Gallic provinces contributed to this technical knowledge in a number of ways, including the development of specific tools and equipment. As mentioned in Chapter 4, literary texts refer to a Gallic auger used in grafting vines according to bore-grafting technique.[19] Does this qualifier refer to an origin from Narbonensis or another one of the Gallic provinces? We do not know the answer to this question, but the name under which this tool was known, if not commonly, at least to first-century elite writers of the likes of Columella, points to the fact that someone on some Gallic estate had first made or used such a tool to carry out that specific grafting technique for vines. This 'discovery' had then been disseminated and become common knowledge among viticulturists in different parts of the empire. One could speculate whether early written mentions of the Gallic auger were to be found in the viticultural treatises of Iulius Graecinus and Iulius Atticus, who we have seen were from Gaul.

Growing Wild Grape: The Hallmark of the Small Farmer?

The results from the investigations at the Gasquinoy farms suggest something else of notable importance: how grape cultivation was related to the mechanism of establishing viticulture in the provinces following veteran

[16] A single shaduf, the least efficient among the water-lifting devices, can provide *c.* 2.7 m^3 of water daily, enough to irrigate 0.4–1.5 ha: Hodge 1993, 249. Carpological taxa found in the well, some or all of which may have been cultivated *in loco*, included: almond, fig, apple/pear, olive, stone pine, walnut, wheat, barley, beets, celery, fennel, coriander, linen, black mustard, opium poppy, thyme, savory: see Figueiral *et al.* 2010b, 410–11.

[17] Figueral and Séjalon 2014, 36.

[18] Varro, *Rust.* 1.8; Columella, *Rust.* 4.30. Indications in literary texts for planting and care of reed beds are frequent, e.g., Cato, *Agr.* 6.3–4; Columella, *Rust.* 4.32; *de Arb.* 29; Plin. *HN* 17.144; Palladius 3.23.

[19] Columella, *Rust.* 4.29; *Arb.* 8; Plin. *HN* 17.115–17.

assignations, as well as how investment in viticulture was a socially layered phenomenon. The analysis of the many grape pips discovered has indicated that on these two farms the vines planted were a combination of *wild*, *intermediate*, and *cultivated* grape vines simultaneously.[20] This is quite surprising, because it indicates that the cultivators of these colonial farms were operating both *with* and *without* the type of counsel found in the agricultural treatises which devoted large amounts of space to discussing the propagation of the vine by layering, cuttings, and grafting. The simultaneous presence of vine plants at three different states of cultivation – wild, intermediate, cultivated – indicates that domestication of the grape vine in parts of southern France was a longer process than previously thought, not much facilitated by available written knowledge or by contact with more sophisticated farmers or by good sources of cuttings. The cultivation of wild, intermediate, and cultivated varieties has also been documented in the case of olive trees via morphometric studies of olive stones from the Genil Valley in Spain.[21] Modern studies have confirmed that wild grape vines were well established in Languedoc at the start of the Holocene period.[22] We can speculate that the seedlings of wild grape vines, which displayed some interesting characteristics, were transplanted to the Gasquinoy farms. In addition, the fact that 50 per cent or more of the pips examined were ascribable to wild grape suggests that vine propagation from seed was regularly practised, rather than vegetative propagation from cutting or layers.[23] The archaeobotanical finds from the site at Rec de Ligno (see discussion later in the chapter) also seem to show the contemporaneous presence of both cultivated and wild grape; a similar cultivation strategy as the one identified at Gasquinoy may have therefore been followed also at other locations and been common among farmers of modest means and veteran colonists.

The reasons for this practice of growing grapes from wild species at the Gasquinoy farms are not clear. One suggestion is that it had to do with the reproductive biology of the ancient cultivated varieties: modern grape varieties are hermaphroditic and self-compatible, but wild varieties have

[20] Bouby *et al.* 2013. The study examined grape pips from another 16 Roman rural and urban sites, and the presence of morphologically wild to domesticated grape, including various intermediate forms of the grape vine, was found in every case, with varying percentages.

[21] Bourgeon *et al.* 2017. [22] Bouby *et al.* 2010, 135.

[23] As noted by Bouby *et al.* 2013, 9: 'in grapevine, like in many other fruit trees, due to its high level of heterozygosity, progeny originating from seed segregates into a diversity of forms, including some looking like wild forms, even when seed is taken from elite clones'. Note that since this article is published in an open access online journal with no pagination, the page numbers given refer to the page of the downloaded PDF version of the article.

female plants that produce fruits only if pollinated by male individuals nearby. How many hermaphroditic and self-compatible varieties of the grape vine existed in Roman times is not possible to know, but it may be that 'pollination and fruiting were favored by diversity and more especially by the presence of primitive forms in Roman vineyards, which in return could have slowed down the generalization of hermaphroditism'.[24]

On the other hand, not far from Gasquinoy, a wine-making establishment built at the start of the first century AD, so at about the same time as the Gasquinoy farms, presents secure evidence for propagation of vines by layering. Preventive archaeological investigations carried out at Renaussas within the project for motorway Pézenas-Béziers have identified four plots of land planted with vines; the southern plot had oblong planting pits and archaeological clues showing that the vines were being propagated by layering.[25] Not only does this rural establishment indicate a different strategy than the Gasquinoy farms when it comes to propagation, maybe showing better horticultural knowledge, but it also shows a more diverse approach to cultivation strategies applied to viticulture. The north plot had vines planted in long trenches (*sulci* in Latin) set more than 4 m apart. Such distance suggests intercropping, probably with cereals and/or pulses needed to feed the farmer. Intercropping must have characterized the first period of establishment of cultivation on this property, a phase during which the vines may have not been yet at full regime and when the farmer did not have reserves, financial or otherwise, allowing him to overcome difficult times. With time, though, polyculture on this land plot was progressively abandoned, in favour of a more intensively planted vineyard, which can be taken as a sign that the wine-making enterprise here had gained some resilience, allowing the cultivator to move away from intercropping. Compared to Gasquinoy, the Renaussas site suggests that the owner had better means. The wine-making facilities here included a press, and the making of barrels to be used in the commercial distribution of the wine has been posited because of the discovery of iron tools for woodworking, including a tool to mark wooden casks.[26]

The situation registered at the Gasquinoy farms may not simply have been the outcome of botanical difficulties or of veterans-come-farmers lacking adequate skills and expertise in viticulture: there might have been practical and social reasons too. Getting plants from the wild is not the

[24] Bouby *et al.* 2013, 11. [25] Figueiral *et al.* 2010b, 410–11.
[26] Figueiral *et al.* 2010, 411. The wine-making complex at Renaussas was abandoned in the third century AD.

mark of a sophisticated horticultural culture, but it may be a mark of the resourcefulness of farmers who have a plan in mind for their future crops. Could this simultaneous wild-intermediate-cultivated vine situation at Gasquinoy be due to the difficulties faced by small/medium farmers like the owners of the two farms at Gasquinoy in establishing their vineyards with vine types suited to the local environment? Could the presence of *wild* varieties suggest that, in the face of failure of the plants propagated by layering and cuttings, they had no other possibility to acquire young vines from somewhere else? Or did they seek local wild grapes thinking them better suited to that specific environment? Although it is not possible to answer these questions, it is worth considering these possibilities: we might have here a tangible indication of the difference between the resources available to *wealthier* owners of large estates and those of *poorer* small and medium farmers.

It has been noted that veteran colonists and their descendants were less successful than the inhabitants of the great cities of Vienne (which grew very fast) and Nîmes,[27] despite the likes of Agricola and Iulius Graecinus hailing out of Fréjus. Access to plant stock, which affected the productivity and hence the commercial viability and competitiveness of an agricultural estate, may have played a role. Access to plant stock and cuttings is important and it can be expensive: poorer producers will figure out how to get them more cheaply from nature than their richer counterparts, who might go to a nursery, their other estates, or their socially equal friends or relatives. Columella attests to the fact that vines could be purchased (and also reproduced from seed) from commercial nurseries, although he warns that acquiring plants in this manner gives no guarantee of the quality of the vines, since 'it is doubtful whether the vendor took pains in the selection of the seeds' (*seminibus*).[28] He also refers to the issues with acclimatization, writing that a plant which is brought from a distance and not properly acclimatized to a specific soil, thrives only with difficulty. His advice is to instead establish a nursery on the farm, where the vineyard is to be created, so that *sic enim sciet cuius generis vitem posituru*s *sit* ('in this way one will know what kind of vine he is going to plant')[29]. If one had no other estates or network of friends from whom to acquire the vines for the new

[27] Possibly, this success was the outcome of the participation of the Allobroges and the Arecomici in the military expeditions of the first century BC and the ability of their leaders to mobilize a considerable number of men and control land, which led to personal ties with powerful figures in Rome: Goudineau 1996, 476.

[28] Columella, *Arb.* 1.3–4. [29] Columella, *Arb.* 1.3.

vineyard – as postulated in the case of the Gasquinoy farmers – the wild vines in the natural surrounding landscape offered a good alternative.

The Evidence for Fruit Cultivation

If grape seems to have been the commercial crop of choice on new colonial farms of Hispania and the Gallic regions, what about evidence *on the ground* for the cultivation of fruit trees? In the previous chapter, we have seen that, based on archaeobotanical data, the end of the first century BC and the early first century AD were marked by greater horticultural diversity in southern Gaul and in Hispania. Do we have any archaeological evidence for commercial orchards?

Evidence for local cultivation of fruit and vegetables in close proximity of towns is starting to appear following more extensive excavation projects. In the immediate outskirts of ancient Nîmes, evidence for small-scale hydraulic infrastructure points to horticulture and intensive cultivation of the soil.[30] In this area, traces of viticulture dating to the early empire have been identified on dozens of hectares in various parts of the territory, even very close to the ancient town, but the scarcity in that same area of known wine-processing facilities raises the question of whether parts of these estates devoted to viticulture were actually producing grapes for the table rather than wine, together with the cultivation of other fruit trees.[31] Past chance discoveries in the area also include possible evidence for the existence of local nurseries and for propagation by layering: in the courtyard of what the excavators described as a peri-urban settlement of the early empire, seven *ollae perforatae* were found in situ.[32] The planting pots were placed 2.2/2.5 m apart and about 10 cm away from the wall of the courtyard, each pot placed in the centre of a planting pit.[33] The setting and cultivation technique here represented by this find is similar to what is observed in many instances in the Vesuvian area, including in the garden of the 'Casa della Regina Carolina' currently under excavation (Figure 8.1).[34]

[30] Cayn *et al.* 2017, 41. [31] Cayn *et al.* 2017, 37–8.

[32] Barberan 1993–8. *Ollae perforatae*, which are relatively common from gardens of Roman Italy, are attested at various sites outside of Italy, such as Richebourg, Eccles in Kent (a kiln site), Nikopolis, and Petra. These horticultural pots were normally locally produced and there are slight variations in typology depending on the geographic area of production: see Jashemski 2018b, 442–6; Macaulay-Lewis 2006.

[33] Barberan 1993–8, 69. [34] Barrett, Gleason, and Marzano 2020.

Figure 8.1 Pompeii, garden of the Casa della Regina Carolina (VIII.3.14): close-up of planting pot (*olla perforata*) in the middle of a planting pit during excavation in summer 2019.
© The 'Casa della Regina Carolina Project' / Parco Archeologico di Pompei; photo: Danielle Vander Horst.

In at least two instances of cultivated fields identified archaeologically the conditions needed to invest in more sizeable fruit cultivation instead of focusing prevalently on viticulture materialized at a later stage, sometime over the course of the second century AD.

The first example is the site of Rec de Ligno, near Valros, where a vineyard established around the middle of the first century AD/second century AD, also apparently including the cultivation of wild grapes, was at the end of the second century replaced by an orchard,[35] as attested by pits for trees, covering an area of 4.7 ha. However, it is not intensive fruit cultivation this orchard attests: the huge spacing between the planting pits, 15 m, indicates either a combination of arboriculture with pastoralism or intercropping, probably with cereals. The second example of fruit

[35] Figueiral *et al.* 2010b, 411: morphometric study of grape pips found in a well at this site shows it was wild grape; it was also possible to determine that the grape shows affinities with the modern cultivars Clairette and Mondeuse white.

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Figure 8.2 Aerial photo of the Roman orchard excavated at Champ Redon, near Valros, France, showing the rows of planting pits.
Photo: MRW Zeppeline-Inrap (Institut national de recherches archéologiques préventives), courtesy of Cécile Jung and Inrap.

cultivation was identified at the site of Champ Redon, also near Valros. Here, too, an earlier vineyard was replaced, towards the end of the second century or in the early third century AD, with hundreds of trees, at least 300 over 2 ha. The trees were planted in quadrangular planting pits measuring *c.*1.2 m, each 8 m apart. The presence in the planting pits of a soil different from the surrounding one indicates that the trees, with a clod of earth around their root balls, had come from a nursery (Figure 8.2).[36] The 8 m spacing between trees, although smaller than the 15 m recorded at Rec de Ligno, still suggests a high degree of intercropping, since this distance is much higher than what is attested in Italian orchards and recommended by Columella: 3 to 4 m apart when planting crops underneath the trees.[37]

It is interesting that such a radical cultivation switch from vineyard to orchard occurred at this point in time, the late second century AD. It

[36] Figueiral *et al.* 2010b, 416–18. [37] Columella, *Rust.* 5.10.5.

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appears that the orchard did not replace an 'active' vineyard, but that it was established in fields already undergoing some degree of abandonment.[38] Had the demand for wine collapsed? Did climate change affect the vineyards or was skilled labour scarce due to demographic contraction post-Antonine Plague? These are hypotheses which have been put forward by scholars in the past to explain why at some sites grape vine cultivation was abandoned.[39] Yet, contrasting data from another site in the same Valros area remind us of the difficulty in drawing general conclusions: at Renaussas (see p. 284) the cultivation of the grape vine evolved from an extensive mode to more intensive viticulture, with connected increase in wine storage capacity, precisely in the late second century/early third century AD period.[40] Elsewhere too, the third century was not characterized by a drastic reduction of wine production: at the Codols villa, near Nîmes, in the third and fourth centuries AD, we find three wine presses and a wine cellar able to accommodate thousands of hectolitres of wine, a production capacity comparable with that of the large villas of the early empire. Be it as it may, the large new orchard of Champ Redon and whatever was grown in between the rows of trees show the implementation of good horticultural practices: the very abundant charcoal and pottery sherds found suggest regular manuring to enrich the soil.

The late antique farm with an orchard excavated in the Gallo-Roman nucleated settlement of Châteaubleau, in north-central France, some 80 km southeast of Paris, testifies the other chronological end in the story of the diffusion of horticulture and arboriculture in the Gallic provinces. This orchard, firmly dated to the fourth century AD, presents in the same garden enclosure the same combination of fruit and nut trees that I have mentioned earlier in the book when referring to the commercial gardens of Pompeii. The finds give good evidence of pruning practices, which match current arboricultural practices. Excavation of a garden / cultivated enclosure and a well in which waterlogged deposits were preserved revealed many archaeobotanical remains consisting of waterlogged wood. The wood comprised both plant branches and worked wood: twenty-five different species were recognized. Among the species, hazelnut, the *Prunus* group, the *pomaceae*, willow, birch, and dogwood are best represented in the deposit.[41]

[38] As indicated by the malacological study of the snails found at the bottom of the planting pits: Figueiral *et al.* 2010b, 411.
[39] An overview and brief discussion of these hypotheses is in Marzano 2013b.
[40] Cayn *et al.* 2017, 35–6.
[41] Pollen suggested an open environment and other botanical remains included herbaceous hydrophilous plants and aquatic plants: see Pilon, Maames, and Jedrusiak 2014, 100.

The nut and fruit trees, and most of the other trees attested, were relatively young plants, less than ten years in age (90 per cent of the cut branches found in the well), and 85 per cent had a diameter inferior to 2 cm.[42] One hundred and eight branches were studied in more detail, and these largely consisted of hazelnut and *Prunus* family trees. The branches discarded in the well clearly indicate pruning: two thirds of the branches were cut in autumn/winter, at a time outside the vegetative period of the trees, while the remaining one third were cut in the middle of the vegetative phase, in spring. These times of the year and the proportion between more abundant autumn/winter cuttings and less abundant spring cuttings, corresponds well to pruning practices for fruit trees. To shape and give strength to the trees, more severe pruning takes place before spring stimulates vegetation again, whereas in mid-spring the trees require very light pruning to make sure branches with the incipient fruits do not overlap and touch one another. Light pruning is also used when the small fruits are already present on the tree, to remove the ends of branches and their foliage, to give more strength and nutrients to the ripening fruits. The young hazelnut branches, which often presented signs of having been worked, may indicate suckers and/or coppicing practices. Here, as was the case in Pompeii, hazelnut seem to have been cultivated to obtain small branches, which, because of the strength and flexibility of the wood, had a variety of artisanal and domestic uses.[43]

As has been noted, the diversification in horticultural production registered by the archaeology in Gallia Narbonensis shows '*une accélération à partir de l'époque augustéenne, avec l'introduction de cultures fruitières bien attestées par les études archéobotaniques*'.[44] Therefore, even though the archaeobotanical data for the Iberian Peninsula and for southern France remain fragmentary, from the data presented in this chapter and in the previous one, a consistent picture emerges from these areas which matches the phenomena described in the earlier chapters for Italy: the Augustan age was a time marked by an increased variety of horticultural cultivations and by a higher dispersal of plant foods – new to the region, either from Italy or newly introduced into Italy (such as the peach), and thence to other

[42] The trees' age groups recurring most frequently were 1–2 years, 3–4 years, and 5–6 years. There were only a few branches in the *pomaceae* family which would have been much older than this, up to 35 years, but the diameter is never greater than 3.5 cm, as growth in these plants is very slow. Some old oak and beech were present.

[43] Pilon, Maames, and Jedrusiak 2014, 100.

[44] Cayn *et al.* 2017, 40: 'an acceleration starting from the Augustan era, with the introduction of cultivated fruit plants well attested by archaeobotanical studies'.

regions, or spreading from local sources to larger region cultivations. 'Romanization' is not only a phenomenon of law, language, religion, military presence, and the growth of cities and towns: it is also a phenomenon of food and the cultivation of new plants.

It is not only the archaeobotanical evidence for fruit and vegetables and the remains of cultivated horizons that contribute to the history of horticulture and arboriculture in Roman Gaul. Also the celebration of agricultural productivity as an element of elite self-representation that I have discussed in the first chapters for Rome and Italy can be traced all the way to the Tres Galliae. A famous early third-century mosaic discovered in 1890 in Saint-Romain-en-Gal, the ancient *colonia* Iulia Vienna, well encapsulates this. The large mosaic pavement from a luxurious suburban villa depicts a common subject in imperial mosaics, the four seasons, but it is unique in its composition and detail: a series of 'vignettes' – twenty-eight survive[45] – depicted the various agricultural activities of each season. Basically, the mosaic was a lavish illustration inspired by humble agricultural calendars,[46] with the seasons unusually depicted as *genii* mounted on four different animals. The number of scenes and range of tasks depicted make this mosaic floor unique. Some of the vignettes refer explicitly to arboriculture.[47] Under 'Autumn' one scene depicts the picking of apples and other fruit from the trees, whereas under 'Summer' the grafting of trees is shown (see Figure 4.1). To my knowledge, this is the only representation of grafting that survives from antiquity; for all the prominence it has in several of the surviving literary texts, its near total absence in iconographic depictions is surprising.[48] That such a rich and large mosaic floor adorning an important room in a residence of a wealthy individual should choose the rustic calendar as its subject says much about the endurance and dissemination, from the centre to the provinces, of Roman elite values. In the same way as the villas found across the empire share the same architectural vocabulary and represent a common lifestyle,[49] so do iconographic representations like this indicate how much

[45] There were originally seven scenes for each season; Winter and Autumn are complete, but for Spring only two scenes survive and for Summer only three.

[46] Cf. the *Menologium rusticum Colotianum* and *Vallianum*: *CIL* 1, p. 280 = 6.2305 = *ILS* 8745.

[47] The use of manure in cultivation is also alluded to. One of the scenes under 'Winter' shows the carrying of manure to a vineyard; this task is given for the month of December in the rustic calendars.

[48] Also in the case of the plants depicted in Roman wall paintings, while pruning is regularly and accurately depicted (see Gleason 2019), there does not seem to be any depiction of grafted trees.

[49] Marzano and Métraux 2018.

the ideological value attributed to agriculture continued to be a relevant phenomenon for both the centre and its periphery in the Roman world.

Comparing Iberian, Gallic, and Britannic Evidence

Despite the scattered geographical provenance and fragmentary make-up of the archaeobotanical data, as well as the evidence from projects that followed different recovery strategies (and are therefore difficult to assess comparatively), both general and specific conclusions can be posited. In the Roman provinces of the Iberian Peninsula and the Gallic regions, the number of fruits and vegetables cultivated and consumed locally started to increase in the late first century BC, with notable peaks in the early first century AD. Regions with more and larger towns, and where a new type of settlement hierarchy spread in the countryside following the arrival of colonial settlers, saw the appearance of commercial horticulture and new fruits and vegetables not attested in the area in the earlier periods. The need for the 'right' market conditions in order for large-scale horticulture to develop and the preference given to exportable products with longer shelf life are clear in the case of the colonial farms near Béziers: although modest in size, these farms engaged in intensive viticulture, even though the farmers had to show a high degree of resourcefulness and turn to wild species to overcome the probable difficulties they faced in acquiring cuttings and young plants to establish their vineyards. Dispersal of new plant foods increased in the south of France from the early first century AD onwards; major changes in dietary habits and access to these plant foods occurred largely in urban centres where 'Romanized' elite resided. Smaller rural centres were much slower in adopting such changes in diet or in fully participating in the 'dispersals of new plant foods', although the potential biases affecting the archaeobotanical record from this type of site that I mentioned earlier must be remembered.

The connection between the Roman presence and the appearance of new plant foods, first as imports, later as acclimatized, locally cultivated plants, is clear for the north and central regions of France. The incorporation of the region into the Roman hegemony saw changes in the local diet (as apparent from the evidence from urban centres) and impacted the cultivation of crops present in the region before the Roman conquest: the shift from husked to naked cereals was a specific response to exchange and processing systems centred on town and/or military settlements. Some of the vegetables and fruits that started to be cultivated from the first century AD onwards included plants native to the south of France like the walnut

and the chard, which were brought northwards. Others were proper imports, acclimatized and developed into various varieties over time, such as the bottle gourd and the peach. The data from sites such as Oedenburg, Le Bois Harlé, the two first-century AD farms of Gasquinoy, and the second-century Hoogeloon 'villa' suggest a picture in which the geographic mobility of individuals, particularly the military and veterans (both legionary and auxiliary veterans) settled as colonists, was a significant contributing factor in the appearance of these new fruits and vegetables in these provincial territories.

Cultivation usually equates with civilization, and horticultural and arboricultural changes introduced from Italy or elsewhere to northern areas could be 'read' as 'Romanization' or, somewhat simplistically, as one-way colonial encounters, with less agriculturally sophisticated passive local receivers. But such a formula is too facile, because sites in northeastern Gaul show that cultivation and gathering from the wild occurred simultaneously in fully Romanized contexts. Literary texts have some references alluding to the fact that some edible plants were exploited more as food, and also that the knowledge of these edible plants had emanated out of the provinces. For instance, when discussing wild plants used as food, Pliny mentions samphire which, he says, was also known to some as '*asparagus Gallicus*', suggesting that Gaul had been where this 'vegetable' had first been encountered.[50] The most remarkable fact about plant usage in far northern Gaul is the fact that 'gathering wild nuts and fruits seems to have persisted during the entire period. A previous study of the frequency of gathered products in Oss provided the suggestion that gathering became even more important during the Roman period.'[51]

In the past this datum was seen as possibly the result of men being removed from field work in order to work in the army, with women, children, and the elderly unable to cope with the tasks of arable agriculture and therefore falling back on gathering wild plants.[52] However, a very similar trend has been observed for Roman Britain: not only were a range of exotic plant foods brought into Britain in the Roman period, some of which were acclimatized and cultivated locally, but there was also an *increase* in the use/consumption of wild plants.[53] It seems, in other words, as if the *natural environment* was exploited to a higher degree in the Roman period, not only with the expansion of land brought under cultivation, but also in the gathering of wild plants. What were the causes?

[50] Plin. *HN* 21.86. [51] Bakels, van der Jagt, and Jansen 2017, 80.
[52] Van Driel-Murray 2008; Bakels 2014. [53] Van der Veen 2016, 817.

Attributing simultaneous advance of new cultivars and increase in gathering of wild food to men removed from arable farming is unconvincing. In the case of Roman Britain at least, the increase in the consumption of wild, native fruit occurred across the country, not only in the north and west, but also in the central-southern and eastern regions, areas where arable agriculture expanded notably in the Roman era and where positing any lack of adequate manpower is not a satisfactory explanation for the increased frequency of fruits collected in the wild.[54] Nor does this seem to be the consequence of increased social inequality among the population, with some being able to access new foods and other, poorer individuals having to rely on gathering in the wild: at Hoogloon, the 'villa' site discussed in Chapter 7 which showed the import of several new plant foods and of chicken, remains of gathered wild fruits were found in both the pre-villa and in the villa phase, when the diet of the inhabitants of the site included also land snails, oysters, and other 'luxury' foods. It seems that the diet of people in the Roman period became, on average, much more varied, including the consumption of wild plant foods that had been consumed more sporadically in earlier times.

For northern France in the Roman period, archaeobotanical data indicate there was a shift from husked to naked cereals.[55] This suggests that cereal production was geared towards urban centres where the processing occurred; military centres and the settlements that sprang up around them should be included in this group. Cultivation of naked cereals depletes the soil, and in consequence crop rotation with pulses or fodder plants is normally practised and favoured. The higher occurrence of pulses in the archaeobotanical record of northern Gaul for the first to third centuries AD must necessarily be linked to the prevalence of cultivation of naked cereals and suggests an additional change in the dietary habits of the inhabitants of the region.[56] Pulses were attested for the pre-Roman period, but the increased occurrence of these taxa in assemblages of the Roman imperial era both implies that pulses were locally consumed more frequently than in the earlier epoch and that their larger-scale cultivation might also have been intended to supply military settlements.

It is useful to compare the picture sketched for the Tres Galliae with the available information for Roman Britain, because the level and quality of

[54] Van der Veen 2016; on agriculture in Britain, see Allen and Lodwick 2017; Lodwick 2017b.
[55] Zech-Matterne *et al.* 2017, 45–6; on the (new) practice of growing naked wheat at Roman villa sites of the imperial age in some parts of the German provinces, see Groot 2020, 34.
[56] Zech-Matterne *et al.* 2017, 51.

archaeological investigations in that country, including environmental studies, set it apart from the type of evidence available elsewhere. In Roman Britain, the best evidence for the cultivation of fruit trees has been identified at rural sites on the upper range of the social spectrum, namely at villas and complex farmsteads, but even at such relatively impressive establishments, fruit does not appear to have been a major production of the estates.[57] Cereal farming was central to these agricultural estates, and the fruit orchards may have simply been destined for internal use.[58] For some herbs it is possible to see their trajectory from novel imports first reaching military sites right after the conquest and later towns, to widely cultivated plants at rural sites by the end of the first century AD, as in the case of coriander. As observed by Robinson, the widespread presence at roadside settlement sites outside towns may 'represent local entrepreneurs growing the flavouring for the more Romanised occupants of the town'.[59]

The recent analysis of archaeobotanical evidence from Roman Britain shows that bedding trenches for either vegetables or fruit cultivation were largely concentrated in the eastern and central belt of the country and not clearly associated with domestic settlements, namely villas, farms, and hamlets. These agricultural beddings largely date to the early and mid Roman period, so they were either a direct outcome of the 'conquest' (i.e., the movement of people with certain skills and tastes, and of seeds and plants with them)[60] or indirect horticultural intensification responding to the concentrated demand for fresh produce generated by military and growing urban settlements. In the latter scenario, we would have, on a much smaller scale, the same phenomenon observed for Rome that I have presented in Chapter 3 and well encapsulated in the words of Columella: the increased demand for vegetables made growing them a matter of interest for a larger number of people than before.[61]

Even in the case of vineyards, which are attested in Roman Britain largely in the eastern central belt region starting from the first century AD, but with a peak in the second century, it may be that their relative rarity is correctly characterized as 'opportunistic endeavours, undertaken by those with sufficient capital to purchase vines, knowledge of grape cultivation, and suitable access to consumer markets'.[62] The fields of Roman Britain remained mostly devoted to the production of cereals; more varied agricultural production including horticulture is attested at farmsteads in

[57] Allen and Lodwick 2017, 145. [58] Allen and Lodwick 2017,145. [59] Robinson 2015, 171.
[60] On migration and Roman Britain see, e.g., Eckardt, Müldner and Lewis 2014.
[61] Columella, *Rust.* 10, *praef.* 2–3. [62] Allen and Lodwick 2017, 45.

favourable micro-climates such as Kent and the Thames estuary: alongside rye and emmer wheat, the major crops, there was also cultivation of flax and pea/bean.[63] Pulses like pea and bean were common crops at sites on the Isle of Thanet (now a peninsula), the easternmost point of Kent, both earlier in the Iron Age and later in the Roman period.[64] It is probably significant that just across the island there was the important port and military settlement of Rutupiae (mod. Richborough): the inhabitants needed foodstuffs and the port was a gateway for both imports and exports. The Upper Thames Valley has evidence for agricultural diversification, with a range of agricultural plant food attested: coriander, cabbage, celery, dill, plum, cherry, and pear at the Claydon Pike settlements, or dill, coriander, broad bean, plum, and apple at Barton Court Farm.[65] Bearing in mind the preservation bias of the assemblages,[66] the fact that more varied plant assemblages and good attestations for pulses come from farmsteads rather than villas and roadside settlements suggests, in my view, not only that smaller farmsteads had a more diversified crop range because self-sufficiency was part of their cultivation strategy, but also that the supply of surplus horticultural produce (vegetables and pulses) was not systematically pursued by larger estates. The small farms did that, in the same way as, in my view, around the city of Rome and elsewhere in Italy and in the empire, many of the fresh vegetables arriving to market came from plots leased out to *small-scale* cultivators.

For Roman Britain, cereals were the major commercial crops. However, it seems that farmers did not have full control of when to release their produce onto the market, because the majority of farmsteads do not appear to have had specialist storage structures;[67] this suggests that they grew cereals for another purpose: to pay their taxes to the state and/or to pay their tenancy rents to their landlords. In other words, the maximization of production observed for the Roman period may have been caused by the extraction of taxation and/or rents in kind rather than by free market forces.[68] Both kinds of obligation are possible, and, in either case or both, large-scale commercial horticultural and arboricultural endeavours are extremely unlikely because these systems of payment-extraction would have favoured cereals for farmers to discharge their obligations.

[63] Allen and Lodwick 2017, 155.
[64] Allen and Lodwick 2017, 156.
[65] Allen and Lodwick 2017, 162.
[66] Allen and Lodwick (2017, 147) note that density values for charred plant remains are more consistently available in archaeological reports than waterlogged remains. Charred remains are predominantly made of cereals.
[67] Allen and Lodwick 2017, 173.
[68] Allen and Lodwick 2017, 173.

While the Roman era clearly increased the range of plant foods consumed and allowed the acclimatization of certain plants into Britain, the most active players in horticultural production were, by and large, small-scale famers. On the contrary, fruit cultivation beyond a few trees, just like viticulture, would have taken place on larger estates, whose proprietors had access to capital, technical knowledge, and markets with sufficient aggregate demand. As discussed in the earlier part of this book, the impression offered by the fragmentary evidence for Italy and the surroundings of Rome is that large-scale commercial fruit cultivation and technical advances such as the selection of new varieties occurred on larger estates, whereas cultivation of vegetables seem to have been more prevalent in the case of small-scale farmers and smaller plots entrusted to tenants. Whilst it is not possible to draw firm conclusions about the existence of this type of dichotomy also in the case of Gaul and Hispania, the prevalence of viticulture at modest farm sites of the type excavated at Gasquinoy and the size of the very few orchards identified archeologically tentatively suggest that also in this case large-scale arboriculture was a choice for larger, wealthier estates. Roman Britain, on the other hand, with its more abundant evidence, shows quite clearly that the overall pattern in the distant provinces was not so different from the heartland of Roman agriculture.