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The agro-biodiversity of Sicily in ancient herbaria and illustrated works

Abstract

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The biodiversity of the Sicilian plant heritage is examined as far as the occurrence of the cultivated plants of agricultural interest in ancient collections and illustrations is concerned. With this aim, collections dating back to XVIII and XIX centuries are taken into account, starting from the foundation of the Prince of Cattolica botanical garden, in 1690. The features of this heritage and their consistence with the past are considered referring to Arabian-Norman and previous times. Finally, the value of ancient collections in the agricultural heritage finding and conservation is examined.

Introduction

There are several reasons why the knowledge on the plant heritage of the past is presently needed. Among these there is that, in the general decline of the traditional practises, this patrimony, is rapidly disappearing being replaced by other plants suitable for new forms of agriculture. The requirement to undertake any adequate measure for conservation of these important genetic resources is to achieve their possibly complete knowledge.

In fact, as for the conservation of the wild ancestors of cultivated plants (Heywood 1997), the provisions could be more effective making more readily available the information included in Floras, monographs, ancient herbaria, catalogues and similar sources.

Accordingly a survey of the most reliable sources concerning the Sicilian heritage is provided here, mainly referring to ancient herbaria, iconographic tables and other historical or artistic finds and illustrations.

The review covers particularly the period from the late XVII century to the end of the XIX century, taking as starting point the Francesco Cupani's work (1696, 1713). In addition, some significant examples referring to previous ages are considered to outline the main evolutionary features of Sicilian agriculture while dominations were succeeding one another. In this context, these last data take their importance just referring to the time when they date back, the more ancient they are, the more the information is general. In particular, relating to the ancient times, among the peoples that in turn dominated the region, the contribution of the

Greeks, the Carthaginians, the Romans and Byzantines are based only on the illustrations of mosaics and similar sources.

As far as the dominations of Arabian-Normans in the IX-XIII centuries and of the Spanish around the discovery of America are concerned, both illustrated and written material are available.

Since the end of XVII century, when the foundation of the Hortus Catholicus by Cupani near Palermo established in 1690 the correspondence between the written or illustrated sources and both living and dried plant collections, researches at the variety level can be carried out too. Such date is taken into account as starting point in our analysis, which is illustrated below preceded by the outlines of the origins and evolution of the heritage in question.

Before 1690

The Greeks, that moved to Sicily during the VIII century B.C., used to represent their most important crops on the coins. Some of them bearing olive and vine minted at Himera (on the western northern coast) in the VI century, and some Punic ones bearing the date palm, are conserved in the 'Antiquarium' placed close to the ruins of the city that, founded around 630 B.C., was then destroyed in 480. In the same museum, some mosaics belonging to a Roman villa recently discovered along the coast near Cefalù, 20 km east of Himera, include an artichoke among the plants. These mosaics are coeval with the 'Villa del Casale' near Piazza Armerina in central Sicily (Carandini & al. 1982) and with several other settlements localised both in Sicily and N-Africa. Dating back to III-IV centuries A.D., they display dozens of crops and other cultivated plants among which very frequent are olive, vine, stone pine, fig, pomegranate and, moreover, citron and lemon as well as, probably, the lime, while the presence of orange is quite uncertain. On the whole, it can be stated that the plant heritage in the late Roman age was almost unvaried in comparison with the early imperial one, as testified by the paintings of Pompeii, buried by the Vesuvius eruption in 79 A.D., and with earlier periods, as attested by the extant II-century B.C. mosaics from Roman ruins in the Villa Bonanno (Fig. 1) in Palermo or by the encaustic paintings from Solunto near Palermo (Regional Archaeological Museum). All these renderings substantially include the same fruits above quoted that apparently were of either economical or social interest.

After the fall of the Roman Empire (476 A.D.), the agricultural heritage was preserved by the Arabians in the regions conquered, such as Seville in the southern Spain and Palermo in Sicily. Here they preserved and increased such patrimony with many exotic crops that brought about an economic expansion, unknown to the rest of Europe. Among the new crops introduced since X century there were cotton, sugar cane, mulberry and bitter orange that account for the general richness of Sicily in the following three centuries (Amari 1933-1939; Borruso 2002).

In this period just few plants are illustrated in the Norman mosaics. Although symbolic and stylised rather than verisimilar they are, nevertheless, in that historical context such figures really correspond to the plants in the field, for instance, the fig (Fig. 2) or the date palm in the mosaics of Monreale are likely to be the renderings of the Fredric II' gardens in Palermo. Besides some information on the crop consistency and diversity at that time

Fig. 1. Wheat, pomegranate, pine and other fruits in the outer frame of a mosaic with hunt scene. Roman excavations of Piazza della Vittoria (Palermo), dating back to the II century B.C.

can be found in poetry (Borruso 2002) and in the commercial sources such as, especially, a great number of contracts of sale and emphyteusis conserved in the notarial archives of Palermo (Amari 1933-1939; Bresc 1972). These documents, studied in detail by Bresc (1972, 1986, 1989, 1995), include several lists of plants grown in the orchards of Palermo and in the fields outside the city along the coast from where a large amount of both fresh and dry products was regularly exported to southern and northern Italy and to northern Africa as well. Among the most frequently quoted, beside cotton, sugar cane, silk and bitter orange, there are cabbage, onion, melon, leek, pumpkin, water melon, artichoke, nectarine, parsnip, wild radish, turnip, broad bean, roses, lemon, apricot, quince, pomegranate, peach, apple, almond, pear, fig, walnut, grape (raising), olive, coriander, lettuce, borage, asparagus, strawberry, fennel, date palm, mulberry, chickpea, curly, parsley, cherry, cumin, barley, anis, wheat, rice, azarole, aubergine, spinach, sesame and cucumber. Among the wild plants, capper, ash, willow, flax, holy oak, turkey oak, cork oak, tree heath, elm, birch, myrtle, rushes, poplar, chestnut, walnut, and hazel. Usually these plants and fruits are quoted with their vernacular names some of which are still extant, so that several varieties and local races could be recognised. On the whole, the lists analysed by Bresc (1972) clearly show that the present heritage was already firmly established at the Arabian-Norman times and stayed unaltered in the subsequent centuries at least until the America discovery. In fact, after this event, soon in the XVI century, under the Spanish domination, the prickly pears and many other cultivated plants from America were introduced into Sicily via Spain, and, even if cotton, sugar cane and other Arabian important crops started their decline since their cultivation was implanted in the new Continent, the agricultural heritage of the island had a further increase sustained by the botanical gardens and later by commercial roads.

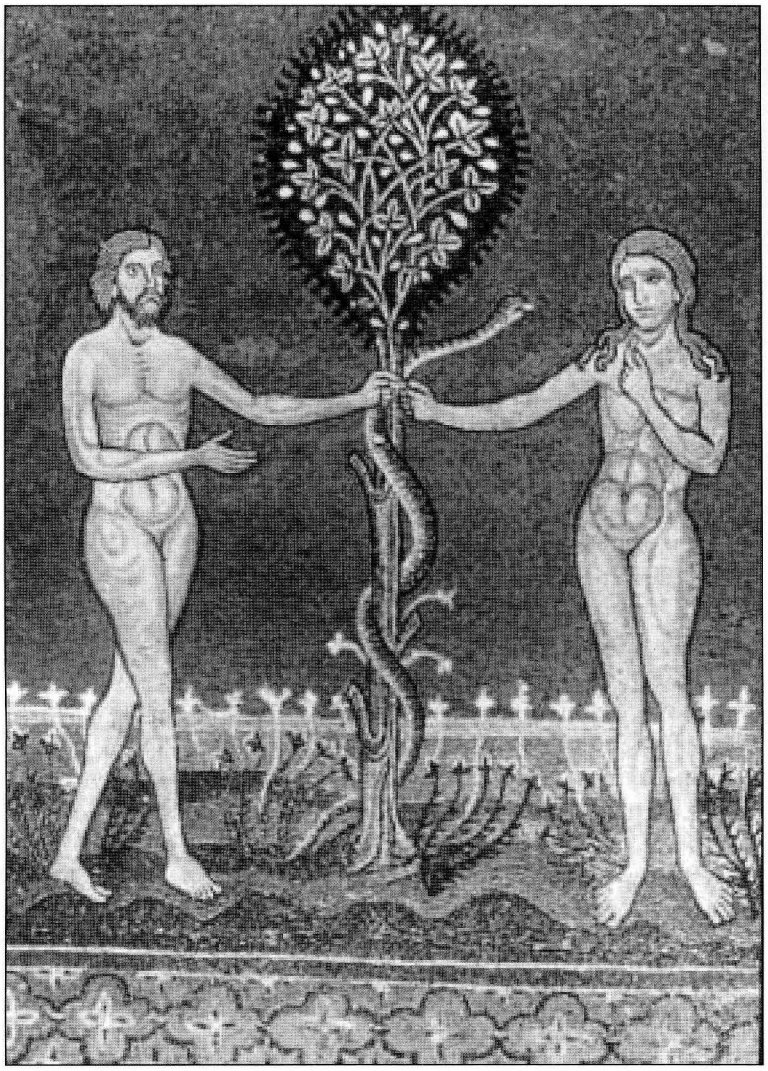

Fig. 2. The fig in the 'Temptation' in the mosaics of the Cathedral of Monreale (Palermo). The stylised illustration really corresponds to the widespread crop in the XII century context.

After 1690

The first comprehensive inventory of the Sicilian flora, including both wild and cultivated plants, was carried out by Francesco Cupani (1653-1710) which established the botanical garden of the Prince of the Cattolica and directed it between 1690 and 1710. There he studied many hundred of crops that were included among the 3000 wild and cultivated plants listed in the 'Hortus catholicus' (Cupani 1696) with both the pre-Linnaean

and the known vernacular names. Most of these plants were also engraved in the 'Panphyton siculum' (Cupani 1713), a large iconographic work consisting of 654 unpublished copper plates (another specimen consisting of 658 tables and, besides, other 168 and 198 plate proofs exist) containing all the plants, animals and other naturalistic subjects known from Sicily at that time. The basis of the 'Panphyton' was likely the Cupani's herbarium, dispersed except for two recently rediscovered volumes (Mazzola & Raimondo 1995) including, scattered among the wild plants, some varieties of *Citrus limon* (L.) Burm. f. (Fig. 3) , *C. sinensis* (L.) Osbeck, *Juglans regia* L., and not more than one dozen ornamentals. Among the about 260 crops illustrated in the 'Panphyton', the most represented are *Pyrus communis* L. (44 forms), *Malus domestica* Borkh. (39), *Ficus carica* L. (18), *Prunus domestica* L. (18), *P. armeniaca* L. (13), *P. avium* L. (9), *P. dulcis* (Mill.) D H. Webb (8), *Citrus sinensis* (6), *C. limon* (3); among the cereals, *Triticum* sp. pl (19) are concentrated in three attractive tables (Fig. 4), finally among the most represented of the vegetables there are *Capsicum* sp. pl. (32), *Cucurbita pepo* L. (4), etc... It is noteworthy that many of the varieties and forms quoted with their vernacular name were still widespread until some decades ago and that some of these names occur in the above mentioned mediaeval contracts too. Owing to his representation of the agricultural heritage, apart

Fig. 3. *Citrus limon* (L.) Burm. f. in the third tome of Cupani's 'Hortus siccus Principis Catholicae', bound in 1713 and recently rediscovered.

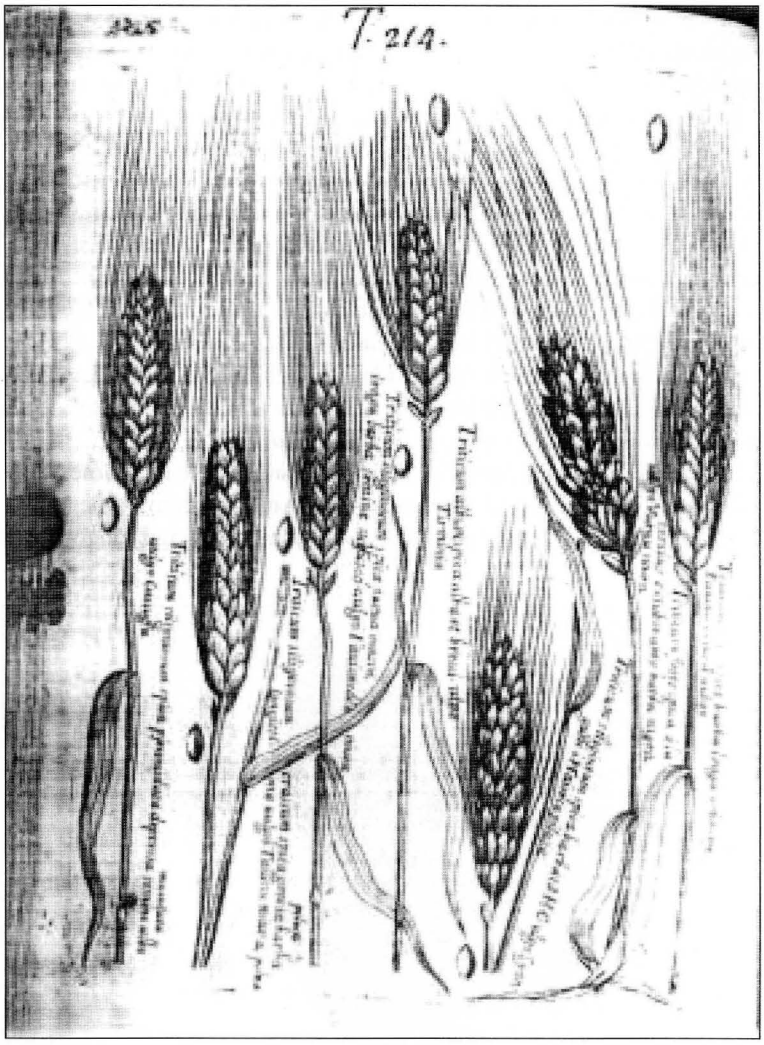

Fig. 4. Table with wheat in the Cupani's 'Panphyton' specimen kept in the former Jesuit Library now Biblioteca Centrale della Regione siciliana.

from his remarkable botanical contribution, Cupani is rightly placed among the most important forerunners of pomology in Italy (Martini 1960).

After Cupani's death, in 1710, his botanical garden underwent a gradual degradation, finally disappearing few years before the planning to found a new one in Palermo, in 1781 (Raimondo & Mazzola 1992). Related to this period, the last herbarium of the Misilmeri botanical garden, prepared with special care (Fig. 5) by the curator Giovanni Maria Lattini, includes *Lagenaria siceraria* (Molina) Standl., *Gossypium herbaceum* L., *Punica granatum* L., *Passiflora coerulea* L., *Ficus carica* L., *Cucumis sativus* L., *Solanum melongena*

L., *Phoenix dactylifera* L., and many other crops because of their more or less effective medicinal interest rather than agricultural. Nevertheless, independent medicine, 15 *Citrus* exsiccata concerning several varieties of *Citrus aurantium* L., *C. limon* (L.) Burm. f., *C. medica* L. and *C. lumia* Risso, reveal the important role played by the citrus culture in Sicily and the relevant biodiversity. Apart from these *Citrus* specimens revised by Riccobono (1906), and the first volume analysed by Mattei (1906), the main part of the Lattini herbarium, consisting of 8 voluminous tomes is still to be examined.

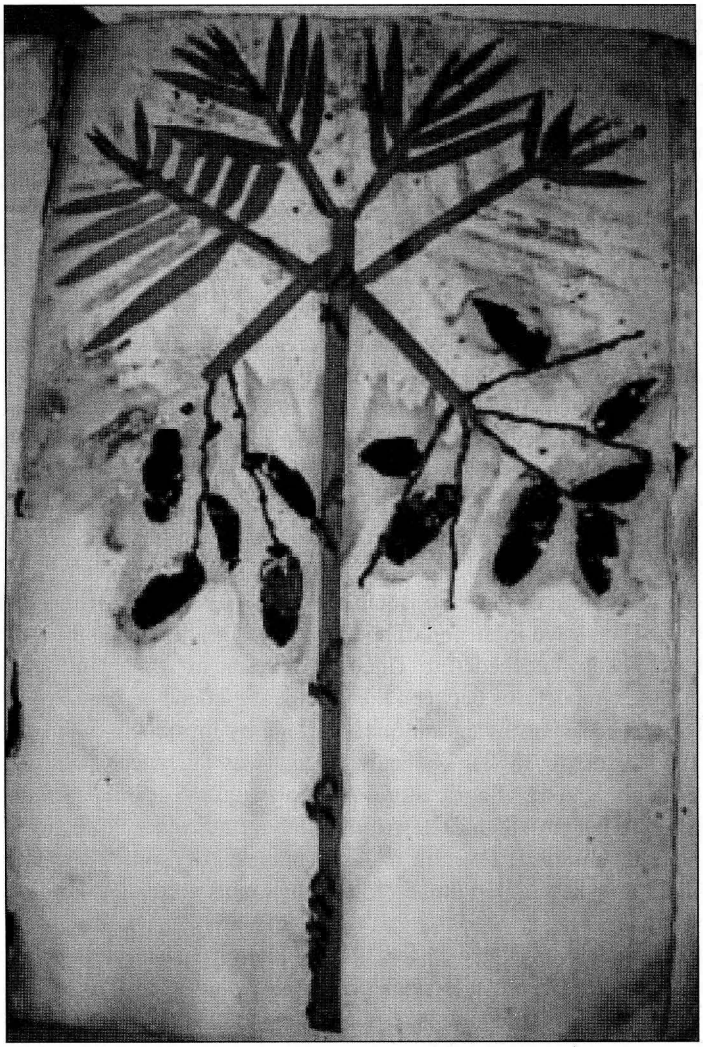

Fig. 5. *Phoenix dactylifera* L. in the Giovanni Maria Lattini's herbarium dating back to 1757. In the XVIII century the date palm had long been lost in Sicily as a crop, but it was still cultivated at the entrance of rural mansions, bearing a clear agricultural symbolism.

Between the end of the XVIII century and the first half of the following one neither herbaria nor illustrated material are available. This, partly because the botanists paid attention mainly to the wild flora and partly because materials concerning studies on new crops like mandarin (*Citrus deliciosa* Ten.) or loquat (*Eriobotrya japonica* (Thunb.) Lindley) and on many other exotic plants, whose experimental cultivation was carried out in the Botanical Garden of Palermo, were quite destroyed by fire in 1821. About the lack of crop exsiccata in the herbarium dating back to the following three decades, it is not clear why Vincenzo Tineo (1791-1856), the director of the Botanical garden in such period, despite his great experience did not implement any agricultural herbarium, while his pupils Giuseppe Inzenga (1816-1887), Agostino Todaro (1818-1892) and Francesco Minà Palumbo (1814-1899) gave a remarkable contribution in this field (Raimondo & Mazzola 1992). Inzenga collected a large amount of cultivated plants, mainly around Palermo and in western Sicily, and grew them in the experimental fields of the Istituto Agrario Castelnuovo (Palermo), he directed since its foundation in 1847. The herbarium kept in such Institute is mainly devoted to the agricultural plants and still today is almost unique to Sicily. Such collection consists of about 1500 specimens, two third of them referring to crops and vegetables. there are many educational specimens included that, independently of their poor scientific relevance, keep importance testifying their occurrence in the country. Among the most represented families there are *Cucurbitaceae, Umbelliferae, Cruciferae, Labiatae, Malvaceae*, *Compositae, Leguminosae,* etc. and *Rutaceae, Rosaceae*, and *Moraceae* as well. In addition, an interesting wood collection is well preserved. Furthermore, the collections made by Ferdinando Alfonso Spagna, the second director of the Istituto Agrario, who published two illustrated monographic works on the cultivation of tobacco (*Nicotiana tabacum* L.) and hazelnutt (*Corylus avellana* L.) in Sicily (Alfonso Spagna 1880, 1886), are to be examined in detail. Regarding the status of this herbarium, it needs to be revised and restored like the Istituto Agrario, which is no longer in function.

As far as the herbarium of Palermo Botanical Garden (now Herbarium Mediterraneum, PAL) is concerned, massive inclusion of specimens of agricultural and horticultural interest started when Todaro succeeded to Tineo as director, in 1857. Unlike his forerunner, Todaro stressed the connections between the botanical garden and the territory, taking care of improving and increasing the agricultural heritage by introducing several new crops in the Sicilian fields (Todaro 1863). The same policy was pursued by Borzì the following director, thus the collections of agricultural and horticultural or industrial concern mainly refer to the period between 1858-1920. Among them, interesting collections are the basic exsiccata for the taxonomical revision of *Gossypium* carried out by Todaro (1877) who also provided a fine iconographic illustration of the plants cultivated in the Botanical garden (Todaro 1877-1878).

In addition to their importance in the nomenclature of such genus (Fryxell & Earle Smith 1972), these studies gave an essential contribution to the restart of cotton cultivation in Sicily and other Mediterranean countries (Raimondo & Mazzola 1992). Other interesting exsiccata concern the species of *Citrus* cultivated in the botanical garden (Riccobono 1898) since this living collection mainly refer to the traditional heritage of Sicily.

Relating to areas other than the surroundings of Palermo, material of remarkable interest is included in the Herbarium gathered by Giuseppe Bianca (1801-1883) in the territo-

ry of Avola, between Siracusa and Ragusa (south eastern Sicily). Botanist and agronomist, he carried out studies on the carob, sugar cane and other crops (Bianca 1853, 1878, 1881). His most important contribution is an extremely detailed monograph on the almond cultivation which still characterises the local agriculture. In this work 752 fruit samples, belonging to *Prunus dulcis* and *P. webbii* (Spach) Vierh., this latter being native to this area of the region, are analysed. Of the relevant specimens, only 84 are extant and kept in Catania as part of the herbarium Bianca (Auricchia & Maugeri 1994). Another body of particular interest was made by Francesco Minà Palumbo, doctor of encyclopaedic culture who devoted his life to the Natural history of the Madonie mountains (central northern Sicily) and became the reference for all botanists, zoologists and other naturalists involved in the study of such area placed in the centre of the Mediterranean. his herbarium includes the wild flora of these mountains and an additional section with the varieties of almond, vine, manna ashes and olive that are the most important local crops. Like that of Bianca, the almond collection is made up of the fruits, more than one hundred samples that need to be revised. As for the rest, the olives are about 20 exsiccata referring to one dozen varieties each of them is provided with complete information on morphology, distribution, properties of the product, vernacular names, etc. These varieties still occur in the Madonie groves, being named as in the Minà herbarium. The same is for the ash and vine collections. Of these, the ashes consist of 44 specimens belonging to 15 cultivars of *Fraxinus ornus* L. and 16 of *F. angustifolia* Vahl subsp. *angustifolia*; the vines are 75 specimens possibly belonging to as many cultivars of *Vitis vinifera* L.. In addition to the herbarium material, 53 grapes taken from these specimens were painted with watercolours by Minà

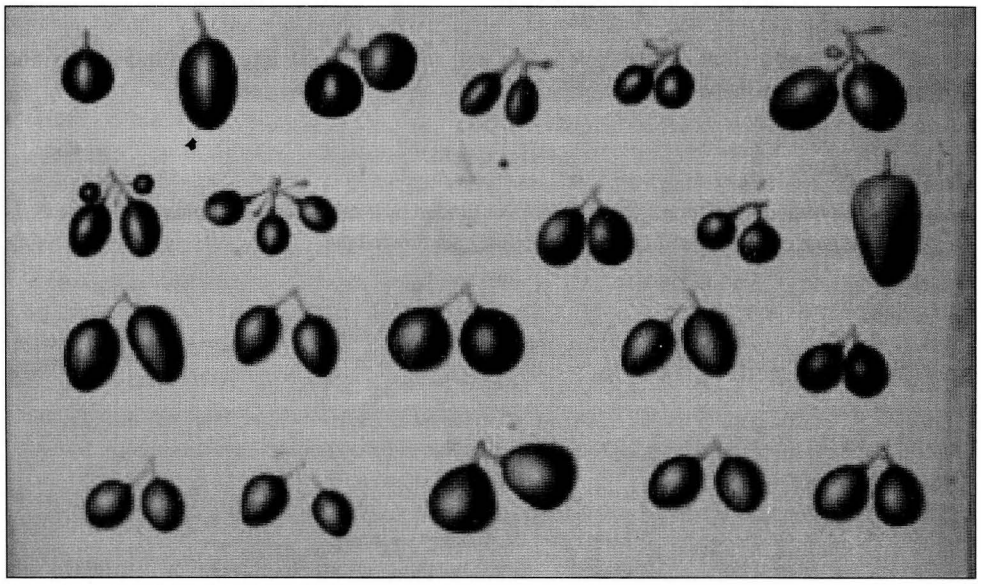

Fig. 6. The table with the black grapes in the Francesco Minà Palumbo's iconographic body. Illustrations combined with his herbarium collection could be greatly helpful in the possible finding and conservation of old and forgotten varieties of *Vitis vinifera* L. in the Madonie area (N Sicily).

Palumbo himself (Fig. 6) which, in such way, made much easier the distinction of the varieties. The value of these collections is in that they are dated around 1850, before the vineyards disappeared almost totally under the heavy pressure of the new American diseases. In fact, they are possible tools in rediscovering the *Vitis* heritage (Crescimanno & al. 1990). The same is for the ashes (Mazzola & al. 1990), whose cultivation for manna production is presently under serious risk of disappearing. Another significant contribution concerns the cultivation of *Pistacia lentiscus* in Sicily. On this subject Minà Palumbo (1882) published a complete report regarding taxonomy, distribution of both natural and cultivated plants, cultural technique, etc., and equipped the monograph with other 20 fine drawings.

Conclusion

It can be assumed that the evolution of the agricultural heritage of Sicily was consistently continuous since its origins and increased gradually in the Arabian-Norman age at least until about mid XIX century, variation being represented by a moderate addition of new exotic crops.

From the above survey in the herbaria and in the illustrated sources, the amount of crops and other cultivated plants of agricultural interest is much larger than expected. The characteristic features of this part of the plant heritage are outlined both by their consistence with the remote past and the frequency of elements whose present occurrence in the fields seems still possible. Referring to the territory, the material examined concerns Palermo, the Madonie and the extreme south-east, that are a small and delimited part of the region. Nevertheless the acquired information could be significantly extended, from the cultural and historical point of view, to Sicily and possibly the close regions. At a local scale, a detailed inventory of the single collections will result of great interest in the rescue and conservation of old and forgotten crops.

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