A short history of almond cultivation in Apulia (southern Italy): Its rise and decline

Godini A.

in

Oliveira M.M. (ed.), Cordeiro V. (ed.).
XIII GREMPA Meeting on Almonds and Pistachios

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 63

2005
pages 207-214

A short history of almond cultivation in Apulia (southern Italy): Its rise and decline

A. Godini
Dipartimento di Scienze delle Produzioni Vegetali
Università degli Studi di Bari, Italy
angelo.godini@agr.uniba.it

SUMMARY – According to Cato (the Censor) and Virgil, almonds were grown and known in Italy in the first century BC. In Apulia, almond paper and soft-shell varieties were grown and known in the first century AD. In Apulia region the crop achieved an impressive development during the sixteenth (L. Alberti, 1577) and eighteenth (De Salis Marschlins, 1789) centuries. The almond industry attained its absolute maximum extension between the two World Wars when the crop replaced wine and table grapes, seriously damaged following the phyloxera invasion. The lack of competition in Europe made the Apulian almond industry very profitable, but did not stimulate the improvement of the standard cultural methods consisting in growing almonds under rainfed conditions on shallow, poor and arid soils. The very low unit yields were unable to withstand the increasing competition mainly by the USA almond industry, which expanded tremendously starting from the 1960s.

Key words: Almond, Apulia history, expansion, reduction, market.

RESUME – *"Bref historique de la culture de l'amandier dans la région des Pouilles (sud de l'Italie) : grandeur et déclin". D'après Caton (le Censeur) et Virgile, les amandiers étaient cultivés et connus en Italie lors du premier siècle av. J.C. Dans les Pouilles, des variétés à coque fine et extrafine étaient cultivées et connues lors du premier siècle après J.C. Dans la région des Pouilles les récoltes ont connu un développement impressionnant pendant les XVIe (L. Alberti, 1577) et XVIIIe siècles (De Salis Marschlins, 1789). L'industrie de l'amandier a atteint son étendue maximale absolue entre les deux Guerres Mondiales lorsque cette culture a remplacé les vignobles de vin et de raisin de table, qui avaient subi de sérieux dommages suite à une invasion de phylloxéra. Le manque de concurrence en Europe rendait l'industrie amandière des Pouilles très rentable, mais n'a pas stimulé une amélioration des méthodes culturales courantes qui consistaient à cultiver les amandiers en sec sur des sols peu profonds, pauvres et arides. Les très faibles rendements par unité n'ont pas pu supporter la concurrence grandissante de l'industrie amandière des Etats-Unis principalement, qui a connu une très grande expansion à partir des années 60.*

Mots-clés : *Amande, histoire des Pouilles, expansion, réduction, marché.*

The almond cultivation in Apulia during the Roman time

It is not clear if the almond, originating in Central Asia, was spread throughout the Mediterranean basin by the Phoenicians or the Greeks. It is well-known, however, that not only was the almond present, but it was also well-known in Italy during the first century BC.

The first direct reference can be traced to that era and it was Cato "the Censor" (95-46 BC), who wrote about this species in "*De Re Rustica*" calling it "*nux*" or "*nux graeca*" (i.e. "nut" or "Greek nut"). In the same century, in "*Georgica*" (Book I: 257-259), Virgil (70-19 BC) stated "*Contemplator item, cum se nux plurima silvis induet in florem et ramos curvabit olentis*" (Mark to, what time the nut in the woods with ample bloom shall clothe her, and bow down her odorous branches). One might doubt that the author intended to refer to the walnut or hazelnut rather than the almond, but it is obvious that the abundant and showy flowering can only refer to the latter.

The consumption of almond kernels should be habitual in Pompeii as testified by the finding of nuts buried in the ashes of the Vesuvius eruption and undoubtedly belonging to *Amygdalus communis* L. (Fig. 1). The different nut shape indicate that the varieties were at least two. Incidentally, the eruption of Vesuvius to which we refer occurred in AD 79.

Fig. 1. Almond nuts buried in the ashes of the Vesuvius eruption (find No. 9315). Courtesy of Dr. A.M. Ciarallo, Monuments and Fine Arts Service, Pompeii (Italy).

The first written reference regarding the presence of the almond in Apulia is that of Pliny "the Elder" (AD 23-79), who died just during the eruption of Vesuvius: in Chapter XXIII of Book XV of the "*Historia Naturale*", the author cites the presence of the almond, clearly referring to the shell hardness of two cultivars grown in the province of Taranto: "*Nunc Thasiae et Albenses celebrantur et Tarentinum duo genera, fragili putamine ac duro*". As Taranto was the most important and well-known Apulian city of that period, the phrase by Pliny might be translated as: "At the present Taso and Alba are renowned, as well as two Apulian soft- and hard- shell almonds". Apulian almond industry kept long time such a fame that "soft shell" was assumed as epithet for indicating the weak character of Taranto inhabitants, as written by A.T. Macrobius in the 4th century AD ("*De Saturnalis*", Chapter III).

With regard to more "technical" literature from antique Rome, it is necessary to attend the arrival of the "Spaniard" L.G.M. Columella (AD I) who, in his book "*Liber de Arboribus*", demonstrated his extensive knowledge of the species, such that he even furnished suggestive information about the technique of seeding almonds to obtain trees.

Moreover, in "*De Re Rustica*", Columella first used the name *amygdalae* instead of *nux* or *nux graeca* including almonds among the melliferous fruit crops (Book IV), and also described grafting techniques (Book XI) and the recipe for the production of "*caseum gallicum*" or "Gallican (French) cheese" (Book XII).

The most compromising statement of Columella concerns the indications of the most suitable environment for the almond. In fact, in Book V of "*De Re Rustica*", Columella writes: "*Nucem Graecam serito circa Kal. Febr. quia prima gemmascit; agrum durum, calidum, siccum desiderat*". In English, the above sentence would be more or less as follows: "Saw the almond at the beginning of February, since it sprouts very early in the spring; it wishes raw, hot and arid lands". We used the adjective "compromising" because undoubtedly the criteria indicated by Columella have been followed to the letter from that period to the present by growers in the Mediterranean area in general, and in Apulia in particular.

The almond cultivation in Apulia during the modern times

After the fall of the Western Roman Empire and the lengthy silence of the "Dark Ages", it is necessary to wait for modern times to find literary references pertaining to the presence and importance of the almond in Apulia. A critical selection of the numerous writings leads us to emphasize three authors because of the importance attributed to the almond industry in the province of Bari and the accuracy of their observations.

According to F. Leandro Alberti from Bologna, author of a "*Descrittione di tutta l'Italia e isole pertinenti ad essa"* ("Description of Italy and pertaining islands") (Fig. 2) written in the sixteenth

century, the almond was particularly diffused in the province of Bari. In fact, Alberti (page 243) describes "large orderly cultivations of olive and almond trees". On page 245, the author states that: "You can see numerous almond trees planted in orderly arrangements and it is wonderful to think that all this was realized by man. The inhabitants earn a great deal with their fruit which is sold throughout Italy and also exported." L. Alberti mentions several cities in the province of Bari with precise indications regarding the presence of almond orchards and, remarkably, these are exactly the same cities where almonds are still grown today, such as Andria, Bari, Bisceglie, Bitetto, Bitonto, Corato, Giovinazzo, Molfetta, Modugno, Palo, Polignano, Ruvo, Terlizzi, Trani.

A leap of two centuries brings us to a book describing a journey to Southern Italy in 1789, written by C.U. De Salis Marschlins and entitled "*Viaggio nel Regno di Napoli*", ("Trip to the Kingdom of Naples"). With a few remarks, the author, a Swiss nobleman, illustrates the optimum level reached by the almond orchard design and pruning techniques, and emphasizes the care taken in eliminating suckers and managing the soil: "The almond trees appears to be well-trained, as the crown is correctly cleared of branches so that air can circulate freely; the shoots which are too vigorous are cut away and the soil is often tilled around the trunk " (page 87).

Intriguing attention should be accorded to a book written by the Sicilian G. Bianca entitled "Manuale della coltivazione del mandorlo in Sicilia" ("Handbook of Almond culture in Sicily") which appeared in the second half of the 1800s. This volume describes 559 almond varieties, 46 of which from the area of Trani in Apulia. The Apulian varieties all have Latin or Greek names, such as 'Allisa', 'Altilinea', 'Ampullacea', 'Apula', 'Arvicola', 'Caninacea', 'Contorta', 'Crispisulcans', 'Daunia', 'Dealbata', 'Dissulca', 'Drepanoptera', 'Extuberata', 'Flaccida', 'Fulgens', 'Fumosa', 'Galeata', 'Granulosula', 'Helvola', 'Inclyta', 'Incrustata', 'Levicula', 'Limula', 'Loculosa', 'Longipes', 'Mamilliana', 'Marginata', 'Oocarpa', 'Ornata', 'Pallida', 'Petimenosa', 'Peucetia', 'Procurrens', 'Pterocarpa', 'Pulla', 'Recurva', 'Recutita', 'Saccata', 'Scarificata', 'Scissilis', 'Strigosa', 'Traniensis', 'Tuberiformis', 'Turgida', 'Undulata', 'Vulturina'. The origin of the name of the above varieties is unknown. Indeed, Greek and Latin names are quite distinctive and often refer to the external characteristics of the nut and sometimes to the area of origin. However, no correlation is possible between the above-mentioned names and the names with which these varieties could be still grown today. Among the varieties described, 36 were hard-shell and 10 soft-shell; 42 were sweet kernel and 4 bitter kernel.

Fig. 2. From left to right: Cover of the books by L. Alberti, C.U. De Salis Marschlins and G. Bianca.

The almond cultivation in Apulia in the 20th century

From the writings of the above authors it can be deducted that the cultivation of almonds during the 16th-18th centuries in Apulia was extensive, well-managed and particularly concentrated in the Bari province. This is confirmed in 1928 by V. Rivera who wrote: "Even if the climatic and soil conditions of Apulia in general are appropriate, the almond orchards have their own particular area, which in this case is the area surrounding Bari and extending for a range of about 100 kilometres". The first reliable

data regarding acreage and yields confirms that, in Apulia, the almond was particularly centralized in the Bari province; in fact, between 1936 and 1938, the total acreage of almond orchards exceeded 100,000 hectares, 81.4% of which was concentrated in this province (Ricchioni, 1942). In addition, from the reports of various authors during the first half of the 20th century, such as Scano (1902), Vivarelli and Marchio (1924), Rivera (1928), Fanelli (1939) and Petino (1944), we can deduct that the almond production in the Bari province underwent a great impetus after the end of the First World War.

At the beginning of the 20th century, the spread of phyloxera (*Viteus vitifoliae* Fitch) throughout Europe also appeared in Apulia and began to destroy the local vineyards. As a consequence, beginning in the 1920s, the Apulian farmers abandoned the viticulture and turned to olives and also to almonds, which reached the maximum expansion before the Second World War (Table 1). It has been reported (Petino, 1944) that something similar happened at the same time in Spain: in this case, it was the white mulberry which was substituted by the almond due to the crisis of the silkworm industry.

Table 1. Almond acreage in Apulia, average 1936-1938 (Source: V. Ricchioni 1942)

Province	Acreage	
	Hectares	%
Bari	89,328	81.4%
Brindisi	8,392	7.6%
Foggia	3,187	2.9%
Lecce	589	0.6%
Taranto	8,249	7.5%
Total	109,743	100.0%

In addition to the necessity of finding an alternative to the vineyards, the almond rush in Apulia may be also explained by the economic benefits of the product. In the 1930s, the exportation of almonds from Apulia was extremely important. Bari was the main Italian almond market (Fanelli, 1937; Petino, 1944) with high quotations on the commodities market. The Californian product with its high productive yield and highly competitive prices was not yet a reality.

In fact, the price paid on the Bari market for almond kernels was approximately 20,000 £/t. When applying the correct exchange rate (x 1367.6628), it results that the quotation for almond kernels corresponded to about 14,000 €/t of today's currency, i.e. a value 4 to 5 times higher. The main importing countries of that period are reported in Table 2 and it is worthwhile to point out that USA is on that list.

Table 2. Export of shelled almonds from Bari: average 1932/34 (Source: Petino, 1944)

Destination country	t	%
Germany	5743	59.2
Switzerland	822	8.5
Great Britain	767	7.9
France	475	4.9
The Netherlands	440	4.5
Sweden	393	4.0
India & Ceylon	366	3.8
Norway	159	1.6
USA	77	0.9
Other	460	4.7
Total	9702	100.0

The classic model of Apulian almond cultivation has always respected the above-mentioned statement of Columella even after 2000 years: limited to the poorer and arid soil of the region, almond orchards have always been excluded from the advantage of irrigation techniques. Consequently, the Apulian almond productivity has always been extremely low, as evidenced by Table 3.

Table 3. Average yield of Apulian almond orchards

Source	Variety	Nut (kg/ha)	Approx. shelling (%)	Kernel (kg/ha)
Ricchioni (1937)	Mixture	406	0.30	122
Fanelli (1939)	Mixture	463	0.30	139
D'Amati (1967)	Mixture	504	0.30	151

Up to the 1950s, local writers praised the capacity of the almonds to exploit the more arid and poor soils of Apulia, even going so far as to declare the practice of irrigation damaging to the survival of the trees. In fact, in 1902 G. Scano stated: "The almond does not necessitate particular soil requirements, but rather, it prefers a dry, calcareous soil; it can thrive even on rocky hilly areas" (page 95). In 1928 V. Rivera wrote: "When an almond orchard is irrigated, it often happens that many trees die within only a few years" (page 202). In 1937 V. Ricchioni remarks that "There are many reasons for the large diffusion of almond trees in the province of Bari. Above all, their limited environmental requirements. In addition, irrigation of the almond will cause a rapid deterioration, ending in destruction" (page10).

After the Second World War, R. Pastore (1954) writes: "Unfortunately, the cultivation techniques of the almond still depend on empirical criteria and therefore the unitary yield is quite low. It explains, or justifies, the tendency among the growers of certain regions to eliminate almond trees in favour of vineyards" (page 34). Therefore, Pastore is the first to become aware of a turn-about regarding the almond industry in Apulia and to indicate the distressful tendency in the middle of the 1950s.

None of the above authors cited provided even the slightest hint of how to increase the almond productivity by means of improving cultivation techniques, beginning with irrigation. The first, timid reference to the advantages derived from the transformation of the almonds from a rainfed into an irrigated crop can be found in D'Amati (1967) who stated: "To increase almond productivity, one must keep in mind the contribution which could be provided by irrigation which would concern vast areas of our region" (page 35). Actually, after the Second World War the availability of water for agricultural purposes rose in Apulia and irrigation became an important tool for increasing the yield of important crops for the fresh market, such as vegetables, table grapes, peaches, citrus, but not almonds.

After the 1940s, the almond import markets enlarged but the production costs in Apulia also started to rise and, at the same time, almond quotations began to decrease due to the competition from other Mediterranean and extra Mediterranean producer countries. During the 1960's, the decline in the Apulian almond industry became a reality. The regional acreage dedicated to almonds fell at a constant rate from more than 100 thousand hectares in 1936/38 to slightly more than 30 thousand hectares in 1999/2001, with a two-thirds loss when compared to figures before the war (Fig. 3).

To analyse the acreage reduction, we took into consideration and compared three crucial three-year periods: that of 1936/38 corresponding to the peak expansion of almond production in Apulia, that of 1969/71 corresponding to the consolidated regressive tendency and the current period of 1999/2001. According to the data presented in the figure, it is evident that there is an acreage reduction of more than 80,000 hectares (74.3%) between the first and the third period. In absolute terms, the greatest acreage erosion took place in the province of Bari with a loss of 65,650 hectares in the last 65 years, which has determined the loss of its primacy with regards to acreage and production among all almond produces Italian provinces.

The basis of the decline in the almond cultivation in Apulia, and in particular in Bari, was due to the low productivity per hectare, unable to make the sector competitive on domestic and international markets when faced with the fierce rivalry of the foreign product. The persistence in considering the almond a longevous species beyond every reasonable limit, and to judge it unsuitable for growing in deep, fertile and irrigated soil, is the main factor determining the ageing and consequent decrease of

the almond in Apulia. In other words, the "kingdom of the blind where the one-eyed man is king" was over.

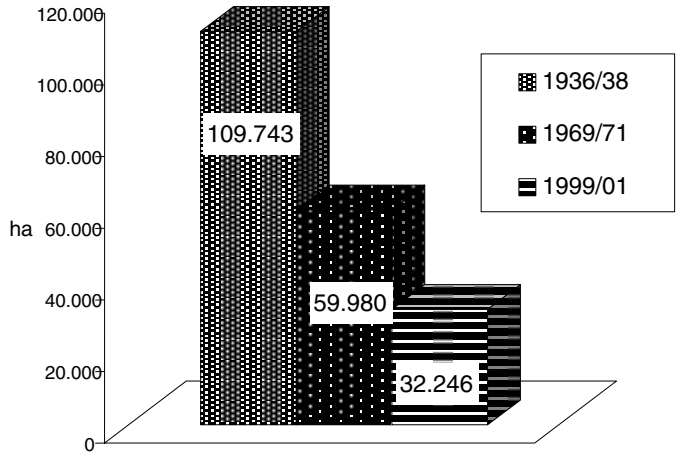

Fig. 3. Variation of Apulian average almond acreage between 1936/38 and 1999/01 (source: ISTAT).

To have an idea of the productive standards of the irrigated Californian almonds, we can refer to the writings of Moulton (1996), who reports that the average yield of the Californian mature and irrigated commercial almond orchards, planted with a density of 250 to 300 trees/hectare, amounts to 1,373 pounds of shelled fruit per acre, or 1.56 tons of kernels per hectare, which is 10 to 15 times the average Apulian yield.

All the authors cited agree that the peak diffusion of the almond cultivation in the area of Bari was in the first twenty years of the 20th century, as a substitute for vineyards which were destroyed by the phylloxeric invasion. The high earnings, due to the lack of competition in the 1920s was the strong point of the Apulian almond marketing during that period. When, after the Second World War, foreign product started circulating on the international markets at distinctly lower prices, the previous advantages of the Apulian almond marketing became its weakness.

The decreasing trend was not a peculiarity of Apulia. When considering the productive aspects, Fig. 4 shows that in all the Italian almond producer regions, yields showed a continuous and constant increase between the 1930s and the 1960s, after which they began to decline in an equally continuous and constant manner. Nevertheless, the tendency was more evident in Apulia.

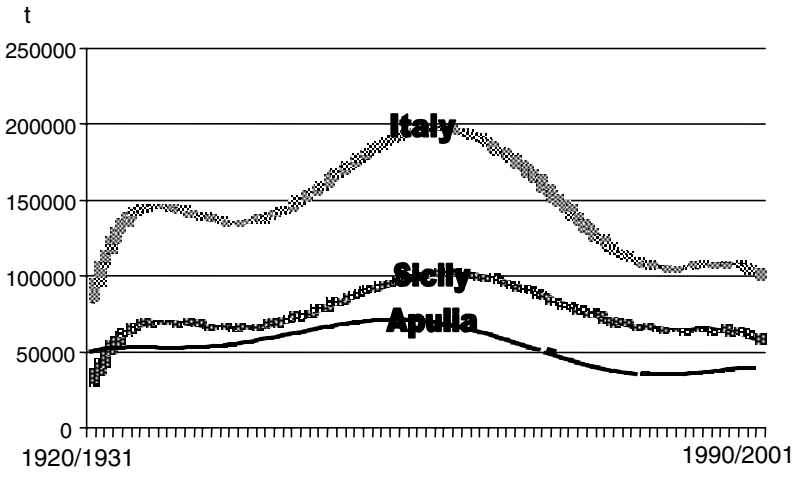

Fig. 4. Trend of inshell almond yield (t) by eleven-year periods mobile average (1920/1931-1990/2001).

Since the 1970s, the Apulian production of almond nuts has remained at 30,000 and 40,000 tons of almond nuts, that is, 9,000-12,000 tons of kernels (average shelling ≅30%).

There is no doubt that the small average acreage of almond farms has played and continues to play an important role regarding the difficulty to relaunch and up-date the almond culture in the area of Bari. The 2001 agricultural census revealed that the average acreage of the almond-growing farms in the province of Bari is less than 1.5 hectares and everyone knows that such small farms cannot justify the necessary investments aiming to reduce the production costs by means of the mechanization of cultivation practices.

In the golden age of the Apulian almond production, the commercial sector flourished and kernels were classified, probably a bit too specifically, into various marketable categories and with differential quotations being fixed for each category. The severe reduction of the almond acreage and the consequent reduction in yield determined the same amount of reduction in the number of marketable types. From 7 sweet and bitter shelled standard types in 1939, the number decreased to 3 types in 2001; the in-shell group disappeared, as also the category "optional types".

The decline in production also negatively influenced the commercial sector and consequently, the diminished production also resulted in a decreased number of exporters. The number of handlers dealing in the export of almonds fell from approximately 20 in the 1950s at the beginning of the decline in almond cultivation to 7 in 2002.

Table 4. Marketable classification of Apulian almond kernels and nuts

Year	Standard types			Optional types	
	Shelled		In-shell	Shelled	
	Sweet	Bitter	Sweet	Sweet	Bitter
1939	4	3	3	7	1
2001	2	1	–	–	–

Despite the severe drop in acreage and production, there are three timid positive aspects concerning the future of almond industry in Apulia. The first aspect concerns the varietal choice: in the past local growers were used to train several dozen varieties. The present generation of growers definitely prefers a limited number of native varieties late blooming, preferably self-compatible, producing low doubles and endowed with shell hard enough to protect kernel from birds, NOW and aflatoxins producing fungi. Among the most interesting Apulian varieties we do remember 'Cristomorto', 'Falsa Barese', 'Genco', 'Tuono' and the French-Apulian 'Ferragnès', in that 'Cristomorto's' daughter. The second aspect is the plant production: the regional nurseries continue to produce and sell between 30,000 and 50,000 almond plants yearly, the percentage of grafted plants sold tend to raise constantly and the French peach x almond hybrid GF 677 is on the point of becoming the main rootstock. Finally, the regional government of Apulia has included the almonds among fruit crops receiving funds from the "POR Apulia 2000-2006" project, subordinating the financing only for new orchards employing irrigation.

Acknowledgements

The author wish to thank the Monuments and Fine Arts Service of Pompeii for kindly furnishing the almond nut photographs.

Research funded by the Ministero delle Politiche Agricole (MiPAF), special Grant Progetto Finalizzato "Formulazione di liste di orientamento varietale dei fruttiferi e dei portinnesti". Paper No. 230.

References

Alberti, L. (1577). *Descrittione di Tutta l'Italia*. Gio. Maria Leni, Venice.

Bianca, G. (1872). *Manuale della Coltivazione del Mandorlo in Sicilia*. Stamperia di Giovanni Lorsnaider, Palermo.

Cato, M.P. (2001). *De Agricultura*. Edizione Utet, Turin.

Ciarallo, A.M. (2002). *Il Giardino Pompeiano*. Electa, Naples.

Columella, L.J.M. (1977). *Liber de Arboribus*, Chapter XXII. Edizione Einaudi, Turin.

Columella, L.J.M. (1977). *De Re Rustica*, Books IX, XI, XII. Edizione Einaudi, Turin.

D'Amati, N. (1967). Aspetti della mandorlicoltura pugliese. *Agricoltura*, aprile: 33-36.

De Salis Marschilins, C.U. (1789). *Viaggio nel Regno di Napoli*. Translated into Italian by Ida Capriati ved. de Nicolò, 1979. Edited by G. Donno, L. Capone Editore, Cavallino di Lecce.

Fanelli, L. (1939). L'importanza de Mandorlo in Puglia. *Nuovi Annali dell'Agricoltura*, 90-124.

ISTAT. *Annuari di Statistica.* ISTAT, Rome.

Macrobius, A.T. (1977). *De Saturnalis*, Chapter III. Edizione Utet, Turin.

Moulton, K.S. (1996). Marketing. In: *Almond Production Manual*. University of California, Publication 3364, pp.3-9.

Pastore, R. (1954). *Coltivazione del Mandorlo*. Vallecchi Editore, Florence.

Pliny, G.C.S. (1984). *Historia Naturale.* Book XV. Edizione Einaudi, Turin.

Ricchioni, V. (1937). *La Coltura del Mandorlo in Terra di Bari.* Casa Editrice Tip. Cressati, Bari.

Ricchioni, V. (1942). *L'Economia del Mandorlo in Italia.* Annali della Facoltà di Agraria dell'Università di Bari.

Rivera, V. (1928). *Oro di Puglia*. Vallecchi Editore, Florence.

Scano, G. (1902). *Colture Meridionali*. Biblioteca Agraria Ottavi, Tip. Lit. C. Cassone, Casale.

Vivarelli, L. and Marchio, M. (1920). *Il Mandorlo e la Sua Coltivazione*. Editrice Dott. Francesco Vallardi, Milan.

Virgil, P.M. (1993). *Georgica.* Book I. Edizione Einaudi, Turin.