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Grapes: Origins and Development

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Basic Species Information

It is difficult to discern the true wild ancestor of cultivated grape (*Vitis vinifera* L.) because the Mediterranean Basin has a wide variety of wild forms. These include escapees and seed-propagated weedy types growing in natural habitat, occurring mainly in disturbed surroundings and cultivated clones of the grapevine (Zohary & Hopf 2001: 152). Recent genetic studies have proven that cultivated grapevines growing in different regions have genetic diversity and heterozygosity which can only have been established through an influx of genes from nearby wild *V. sylvestris* populations (Imazio et al. 2006: 1009). *Vitis sylvestris* C. C. Gmelin is now considered to be the wild race of the cultivated grape and is indigenous to southern Europe, the Near East, and the southern Caspian belt (Zohary & Hopf 2001: 152).

Vitis vinifera (L.) (grape) is the sole Mediterranean representative of the genus *Vitis* (Zohary & Hopf 2001: 155). The plants are monosexual with the female flowers only ripening into grapes. *Vitis vinifera* is hermaphroditic and occasionally, with the escape of cultivated vines into the wild, reverts back to *Vitis sylvestris* (wild variety) in all characteristics except for being a hermaphrodite, and the seeds of these escapees remain much closer to those of the cultivated form. In terms of elevation, the plant can establish itself at a height of 400 m above sea level and is rarely found as high as 800 m. The cultivated *Vitis vinifera* has a more restricted distribution than its wild variety (Renfrew 1973: 125; Olmo 1995).

Timing and Tracking Domestication

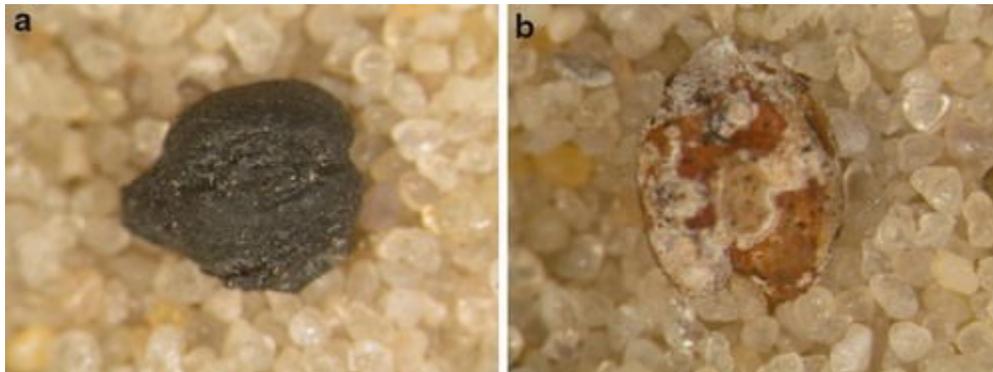
Using genetic studies, Imazio et al. (2006: 1003) have claimed to have found a unique domestication center for all the European cultivars of *Vitis vinifera* located in the Caucasian and Middle East regions, which was present around 6,000–7,000 years ago and is supported by historical sources. Molecular genetics has shown the existence of varietal exchange and propagation throughout Europe (Imazio et al. 2006: 1010). However, the process of domestication of the grapevine is still largely unknown.

Within the palynological record, *Vitis* is noted in several locations in northern Greece with an increasing presence, albeit patchy, both spatially and temporally, since the beginning of the Holocene. Around 3500 BP (1550 BCE) onwards, there is a rise in the pollen record that is believed to reflect human manipulation and cultivation of the grapevine (Bottema 1982 cited in Valamoti et al. 2007: 56). Recent archaeobotanical analysis has confirmed this complex interaction and spread of the grapevine through Europe and the Mediterranean region by humans with carbonized seeds of both *Vitis sylvestris* (*Vitis vinifera* ssp. *sylvestris*) and *V. vinifera* recovered from prehistoric sites throughout Europe (Renfrew 1973: 125; Zohary & Hopf 2001: 156; Terral et al. 2010: 443). The earliest archaeological evidence of the domesticated grape comes from Egypt and Syria during the fourth millennium BCE. In Palestine seeds of grapes date from 3000 BCE to Bronze Age sites in Jericho (Jashemski 2002: 174). Based upon archaeobotanical and historical information, it is known that domesticated grapevines appeared during the first half of the third millennium BCE in Minor Asia, Southern Greece, Crete, and Cyprus. At the start of the second millennium BCE, they have been recovered from the Southern Balkans, and during the second half of the second millennium BCE, they first appeared in southern Italy. Subsequently, during the second part of the first millennium BCE, the distribution extended to Northern Italy, Southern France, Spain, and Portugal (Riviera-Nunez & Walker 1989 in Imazio et al. 2006: 1004).

The fresh fruits of grapes are rich in sugar, containing 15–25 % sugar content. Practically, grapes can be easily stored as dried raisins in winter storerooms, and the juice can be fermented and made into wine. Viticulture is considered a risky agricultural enterprise compared with other non-staple crops that are suited to the Mediterranean climate. Fermented grapes were the commonest source of alcohol in the ancient world and probably the cheapest intoxicant available, as well as an extremely important trade item around the Mediterranean Basin (Brothwell & Brothwell 1998: 147; Zohary & Hopf 2001: 151).

The secure identification of cultivated versus wild grapes has proven problematic and has been a topic of heated debate among archaeobotanists for the last half century. Stummer (1911) initially pointed out that pips from *Vitis sylvestris* were small, short, and broad, whereas pips of cultivated grapes had longer stalks and were narrower in relation to their length (Renfrew 1973: 127-9; Runnels & Hansen 1986; Smith & Jones 1990: 317). Traditionally, the established distinction between archaeological specimens of wild (*Vitis vinifera* ssp. *sylvestris*) and domesticated (*Vitis vinifera* ssp. *vinifera*) grapes has been based on the overall dimensions and other morphological characteristics of the grape pips. Due to the fact that

there is considerable overlap between the cultivated and wild types, “pip shape cannot be regarded as a safe diagnostic trait for distinguishing between wild and cultivated *Vitis* remains in archaeological excavations” (Zohary & Hops 2001: 153). A number of studies on both cultivated and wild charred grape remains have demonstrated that the moisture content in the plant and fruit and the oxygen level present during the time of charring could potentially influence the final dimensions and morphology of the charred grape seeds and ultimately affect their preservation and survival in the archaeobotanical record (Margaritis & Jones 2006: 791-2) (Figs. 1–5).



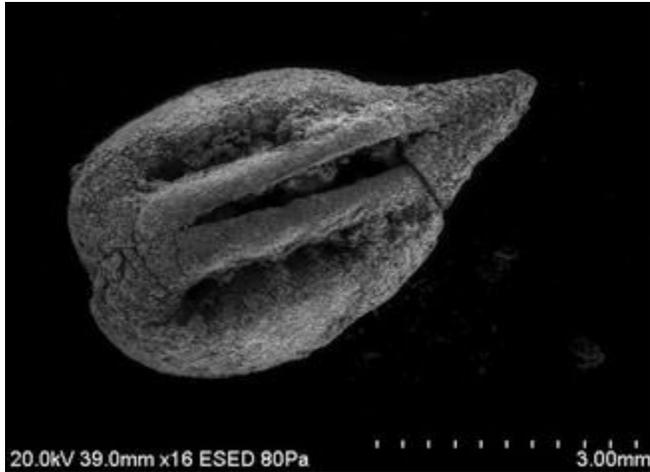
Grapes: Origins and Development, Fig. 1

(a) Carbonized *Vitis vinifera* (grape) pip and (b) mineralized *Vitis vinifera* (grape) pip (both dorsal view) from Insula VI.I, Pompeii, Italy (Photo by author)



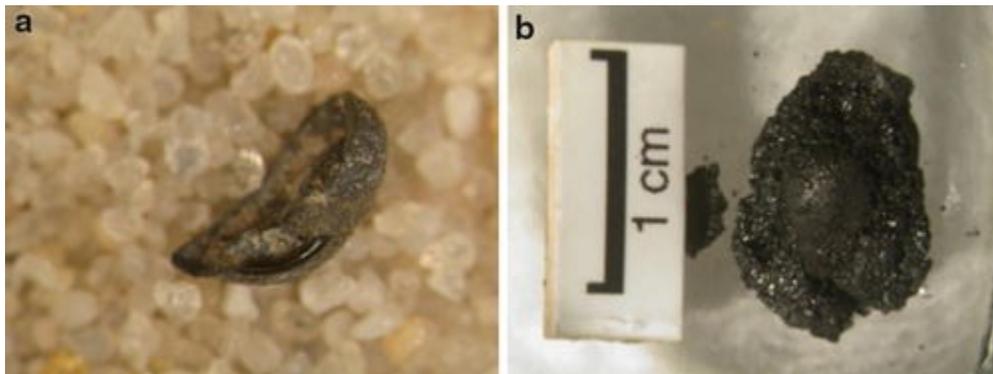
Grapes: Origins and Development, Fig. 2

(a) and (b) Carbonized *Vitis vinifera* (grape) pips and (c) mineralized *Vitis vinifera* (grape) pip (all ventral views) from Insula VI.I, Pompeii, Italy (Photo by author)



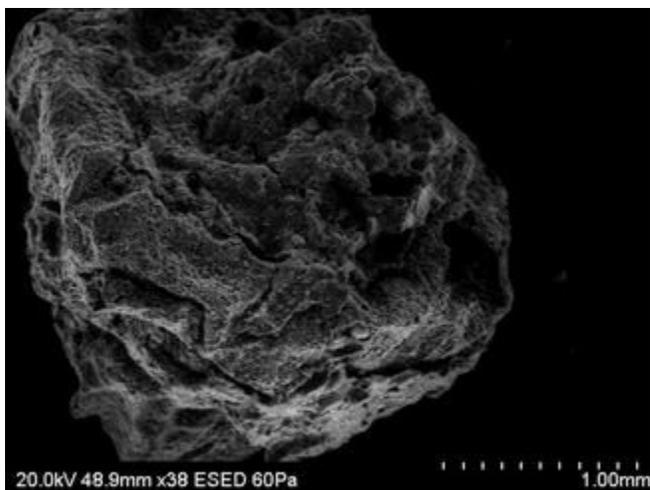
Grapes: Origins and Development, Fig. 3

SEM of carbonized *Vitis vinifera* (grape) pip from Insula VI.I, Pompeii, Italy (SEM by author)



Grapes: Origins and Development, Fig. 4

(a) Carbonized half fragment of *Vitis vinifera* (grape) pip and (b) carbonized grape pip embedded in mesocarp from Insula VI.I, Pompeii, Italy (scale in centimeters) (Photos by author)



Grapes: Origins and Development, Fig. 5

SEM of carbonized *Vitis vinifera* (grape) petiole from Insula VI.I, Pompeii, Italy (SEM by author)

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