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ORIGINAL ARTICLE

Sesamum indicum L. (sesame) in 2nd century BC Pompeii, southwest Italy, and a review of early sesame finds in Asia and Europe

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Abstract Six mineralised seeds of *Sesamum indicum* L. (sesame) have been found in a cesspit dating from the Samnite occupation (Republican period, 2nd century BC) of Pompeii in southwest Italy. This oil plant is of tropical Asian origin, and its occurrences in prehistoric Italy and more generally in the Mediterranean region are very scarce and only from sea ports. It thus raises the question about its role in long distance trade between the Italian Peninsula and Asia, in relation to the Roman conquest of the east including the near east which started in the 2nd century BC. The present contribution reviews the archaeobotanical evidence of early sesame in Asia and Europe and explores the potential routes of its spread to the west. The possibility of an introduction and acclimatization of the plant in southern Europe is also discussed in the light of archaeobotanical finds and ancient texts.

Keywords Sesame · Oil plant · Exotics · Pompeii · Long-distance trade · Samnite occupation

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Introduction

Archaeological investigations of the Fortuna Augusta temple in Pompeii were carried out from 2008 to 2013, under the direction of W. Van Andringa from the University of Charles de Gaulle—Lille 3, France (Van Andringa 2012a, b, 2013a). The excavation was located to the north of the forum, at the crossing of the Fortuna and Forum streets (regio VII, 4, 1–2). Before the building of the temple in the 1 years of the 1st century AD, a house and several shops occupied the excavated sector and all their foundations were observed in Sector 7 of the excavation (Fig. 1). The discovery of sesame is related to these pre-Roman levels, corresponding to the Samnite occupation of the city in the 5th century to 80 BC. In the 5th century, the Samnites conquered many towns in Campania, among them Pompeii, but after the Samnite Wars in the 4th century BC, Pompeii officially became an ally of Rome, maintaining nevertheless its linguistic and administrative autonomy. Whereas the occupation dating back to the beginning of the Samnite period is not well known or possibly was not well developed in Pompeii, during the 2nd and 1st centuries BC an intensive urbanisation process has been observed (Van Andringa 2013b). The city took part in the war started by Campanian towns against Rome, but in 89 BC it was besieged by General Sulla and became a Roman colony in 80 BC.

During the 2nd century BC, the excavated sector was part of an urban and densely built district. The archaeobotanical find reported here comes from a deeply excavated structure interpreted as a cesspit, located in the courtyard of a *domus*. Mineralised seeds of *Sesamum indicum* L. (sesame) come from two distinct layers of this structure, Stratigraphic Units (SU) 7232 and 7235.

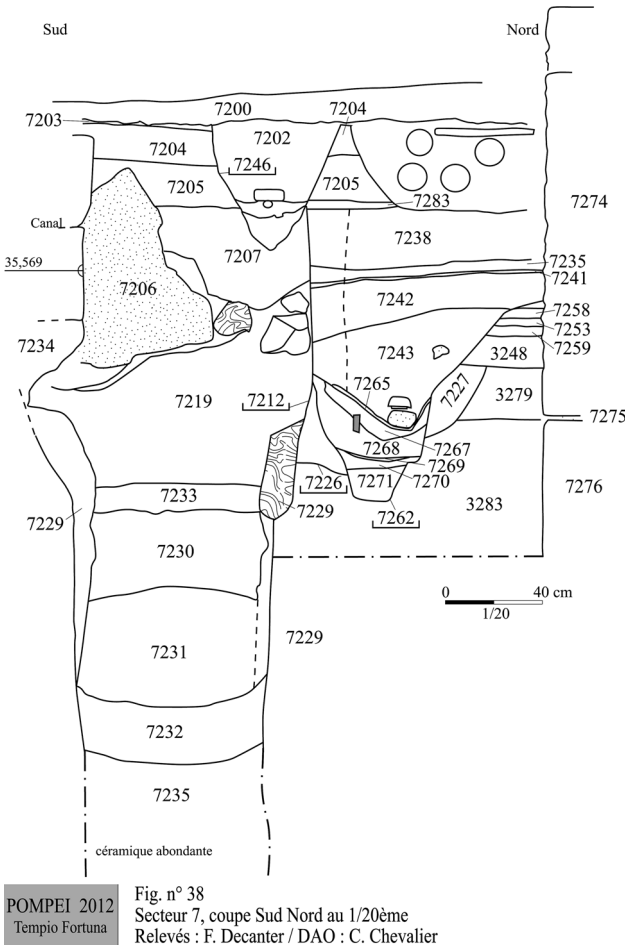

Fig. 1 Profile of the cesspit where the *Sesamum* seeds were found. It is located in sector 7 of the excavation. Drawing by F. Decanter/C. Chevalier

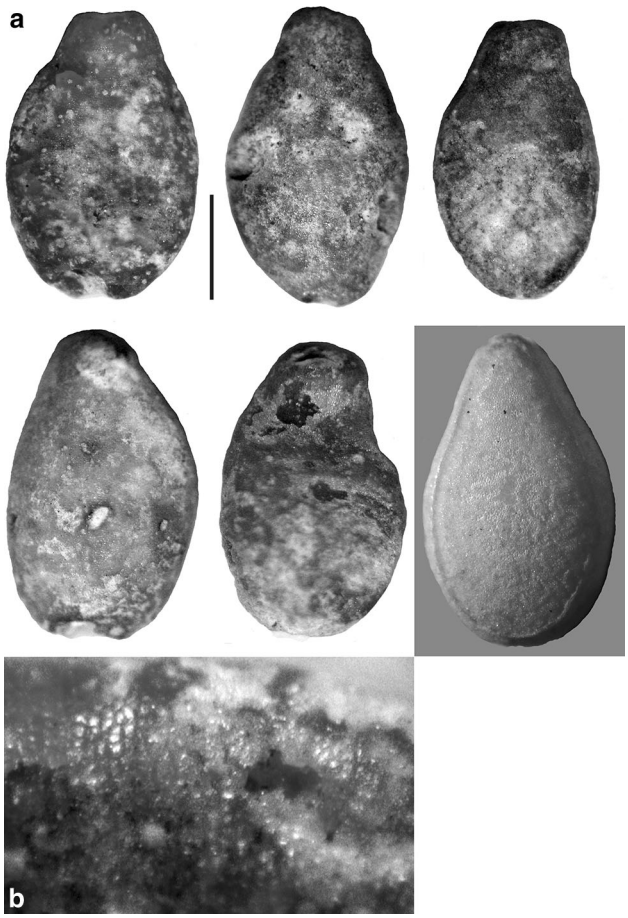

Fig. 2 **a** Five of the six mineralised seeds found in the Samnite levels, 2nd century BC, under the Fortuna Augusta temple in Pompeii, and modern seed (*below*, *right*), *scale bar* = 1 mm; **b** detail of the cell pattern of the epidermis of an archaeological sesame seed found in Pompeii; photos, V. Zech

Materials and methods

Bulk sampling in the seven sectors of the excavation produced a volume of 1429.5 l of sediment that was water-sieved on 2 and 0.5 mm meshes. A total number of 16,932 plant remains have been sorted under a stereomicroscope and analysed. Most of the remains are preserved by carbonisation, but two cesspits have been sampled as well and the material from these was mainly mineralised. The one of concern here is dated to the 2nd century BC. The bottom fill was composed of thin layers of human faeces, but it may also have served as a rubbish pit as indicated by the presence of a few carbonised remains (N = 8). For the two stratigraphic units studied within this pit, a total of 185 l of sediment have been water-sieved on a 0.5 mm mesh and 10,069 mineralised remains have been collected and identified (for the archaeological context, see Decanter, in Van Andringa 2012b).

Results and Discussion

Six mineralised seeds of sesame were found, two in SU 7232 and four in SU 7235. The two fills are well dated to 180 and 150 BC respectively, on the basis of the numerous pottery sherds discovered in the layers. Sesame represents 0.06 % of the remains, with six items out of a total of 10,069 remains. The fact that a cesspit provided the material confirms the dietary uses of the plant.

The archaeological seeds are of elliptic shape, with a slightly constricted, rounded top. The cross-section is somewhat oval and flattened. The thin groove that underlines the outline of the modern seed in frontal view is not visible on the archaeological specimens (Fig. 2a). A depression is present on the apex of the mineralised seeds. Their surface is distinctly marked with a thin and regular reticulate pattern (Fig. 2b). The dimensions of the ancient seeds are given in Table 1.

Table 1 Measurements of the five archaeological sesame seeds (the sixth one is incomplete)

	Length (mm)	Breadth (mm)
SU 7235	3.4	2.2
	3.5	2.0
	3.6	2.1
SU 7232	3.2	2.2
	3.2	1.8
Max.	3.6	2.2
Min.	3.2	1.8
Average	3.4	2

Table 2 Seed assemblages of cultivated plants found in the cesspit associated with the Samnite occupation under the temple of Fortuna, Pompeii (in brackets number of fragments)

Stratigraphic unit	7232	7235
Age	150 BC	180 BC
Sample volume (l)	50	70
Fabaceae sativae (fragment)	(3 testa)	2 (+14 testa)
Ficus carica, fruit	(36)	(14)
Ficus carica, seed	3,176	4,083
cf. *Isatis tinctoria*		3
Lens culinaris	8	5
Malus domestica		1
Pisum sativum	1	3
Prunus domestica	1	
Punica granatum	3	1
cf. *Pyrus communis*		1
Rubus sp.	1	1
Sesamum indicum	2	4
Setaria italica	46	893 (+250)
Vitis vinifera	350	710

The seeds were found together with other crops, among them mainly fig, grape and foxtail millet (Table 2). Due to the small size of the plot under investigation, it is difficult to characterize the aspect of the house and the social status of its occupants. However the cesspit also delivered faunal remains of fish, shell and bone fragments that shed some light on this last question. They testify to the consumption of very young piglets, lambs and various species of shellfish, together with the presence of deer and red coral (Tarek Oueslati, CNRS, personal communication). This could indicate that the structure had been used by rather well-off people. The question remains whether sesame is also to be considered as a luxury product because of its possibly exotic origin?

Description of the plant and its cultivation requirements

At present sesame is cultivated in hot regions in the Indian subcontinent, China, Africa, Central and South America and the southern United States.

The cultivated species, *Sesamum indicum*, belongs to the Pedaliaceae family. It is an annual herbaceous plant, growing up to 2 m high. It is mainly self-pollinated and potentially cross-pollinated by insects. The plant is propagated by seed and sown in spring. Two growing seasons are reported according to the moisture conditions in the soils: a longer one with early planting in mid March and harvest in mid July or a shorter one with planting in April to June and harvesting in late summer (Bedigian 1985). Even though sesame requires adequate moisture for its germination and early growth, the plant is very drought tolerant—a so-called survivor crop—in part due to its extensive root system (Bedigian 2011). Almost no current sesame cultivars are grown under high input conditions although yields can be greatly improved, for example by manuring (Langham 2007).

Even during cultivation the capsules of sesame have remained partly dehiscent and seed loss can be heavy before and during harvesting (Bedigian 2011; Cappers 2006). Regarding this persistence of a wild-type dispersal mechanism, sesame is not considered as a fully domesticated plant according to the usual understanding of the term (Fuller 2003). To prevent seed loss, the plants are therefore usually uprooted before ripening and left to dry at some distance from the fields (Bedigian 2004; Cappers 2006).

The dehiscent pods of ca. 3 cm length contain numerous flattened seeds, around 3 mm long. The lightly aromatic seeds contain approximately 50 % odourless oil and 25 % high-grade protein and they are also rich in vitamins A and E. The oil can be kept for a long period without becoming oxidised or rancid. The seeds are used in baking and other foods as well as in the manufacture of soaps, paints, perfumes, pharmaceuticals and insecticides. For an extensive overview of the properties and uses of sesame, see Bedigian (2011). Several methods are used for the extraction of the oil: the seeds are either pounded in a mortar or heated and crushed in a mill before the extraction of the oil. The residues left over after the pressing can be fed to cattle (Sarpaki 2001) and might therefore end up within carbonised dung cakes in archaeological contexts. The seeds may also have been exposed to fire during the heating process prior to pressing. Finally, as in our case, sesame seeds may have been consumed directly by humans and preserved in rubbish pits or in cesspits.

Table 3 Finds of *Sesamum* species in Asia and Europe

Site	Location	Dating	Remains	Reference
Naqada	Egypt	Predynastic Period (5500-3100 BC)	*S. indicum* or *S. alatum* pollen	Emery-Barbier 1990, p. 324
Abu Salabikh	Irak	Early Dynastic (3rd mill. BC)	Charred seeds	Charles 1993
Harappa	Pakistan, Indus valley	Mature Harappan period (2500-2000 BC)	"Lump of sesame"	Vats 1940
Miri Qalat	SW Pakistan, Makran	ca. 2500-2000 BC	*S. indicum,* 7 charred seeds	Tengberg 1999
Naqada	Egypt	First Intermediate period (2181-2055 BC)	*S. indicum* or *S. alatum* pollen	Emery-Barbier 1990, p. 324
Sanghol	India, Punjab	Late Harappan period (1900-1400 BC)		Saraswat and Chanchala 1997
Malhar	Ganges basin, northern Deccan	ca. 1600 BC		Tewari et al. 2000
Imlidh-Kurd	Ganges basin, northern Deccan	before 1300 BC		Saraswat 1993
Inamgaon	India, Maharashtra	Early Jorwe Period: 1500-1200 BC		Kajale 1988
Tell Atchana	SW Anatolia	Late Bronze Age ca. 1450 BC	1 seed	Cizer 2011
Qal'at al-Bahrain	Bahrain	Middle Bronze Age (1450-1350 BC)	*S. indicum*	Tengberg and Lombard 2001
Amarna	Egypt	Foundation ca. 1360 BC		Fuller 2003
Tutankhamun's tomb, Cairo IV, n° 4495+Carter n°495	Egypt	ca. 1325 BC	*S. alatum* ? dessicated seeds in a basket	De Vartavan and Asensi Amoros 1997; De Vartavan et al. 2010
Inamgaon	India, Maharashtra	Late Jorwe Period: 1299-900 BC		Kajale 1988
Tell Sabi Abyad	Northern Syria	Late Bronze Age ca. 1250 BC	6 damaged seeds	Van Zeist 1994
Tell Sheikh Hamad	Northern Syria	Late Bronze Age ca. 1250 BC	1 charred seed	Van Zeist 2001
Deir el Medineh	Egypt	Later New Kingdom (1200-1000 BC)		Bruyère 1937, p. 108
Narhan	Ganges basin, northern Deccan	Phase I: 1200-800 BC	*S. indicum*	Saraswat et al. 1994
Sringaverapura	Ganges basin, northern Deccan	1200-800 BC		Saraswat and Chanchala 1995
Senuwar II	Ganges basin, northern Deccan	1200-600 BC		Saraswat and Chanchala 1995
Bastam	NW Iran	1st mill. BC		Hopf and Willerding 1989
Sabir	Yemen	ca. 900 BC	Burnt storage, large quantities	De Moulins et al. 2003
Karmir-blur	Armenia, Yerevan	Iron Age (900-600 BC)	Jars containing carbonized seeds	Bedigian 1985
Deir ' Alla	Jordan	ca. 800 BC	200 seeds	Miller 1991; Neef 1989
Tell Sheikh Hamad	Northern Syria	ca. 750 BC	Charred seeds	Van Zeist 2001
Hulaskhera	India, Uttar Pradesh	Black-Slipped Ware: 700-500 BC		in Fuller 2003
Poros Island (Kalaureia)	Greece	Classical to Roman		Sarpaki 2001
Krania/Irakelion (Pieria)	Greece	375-225 BC	Charred seeds and "lumps"	Margaritis 2014
Hulaskhera	India, Uttar Pradesh	Early Historic: 250 BC-AD 250		in Fuller 2003
Sanghol	India, Punjab	Early Historic: 250 BC-AD 250		in Fuller 2003
Pompeii	SW Italy	c. 180 and 150 BC	6 mineralized seeds	Zech-Matterne and Tengberg, this paper
Pompeii	SW Italy	Late 1st. cent. BC	21 mineralized seeds	Ciaraldi 2007
Thessaloniki	Greece	1st. cent. BC to mid. 2nd cent. AD	About 57,000 fused seeds	Mangafa 1995 in Margaritis 2014
Mons Porphyrites	Egypt	1st-2nd cent. AD	1 dessicated seed *S. indicum*	Van der Veen and Tabinor 2007; Van der Veen 2011
Berenike	Egypt	1st-2nd cent. and 4th-5th cent. AD	Dessicated seeds	Cappers 2006, p. 124
Hund	Pakistan	Kushana Period: 1st-3rd cent. AD		in Fuller 2003
Chesters Bridge, Chollerford	Britain, Northumberland	AD 125-175	1 carbonized seed	Huntley 1993
Mons Claudianus	Egypt	Roman and Islamic Period	1 seed *S. indicum*	Van der Veen 2001; 2011
Quseir al-Qadim	Egypt	Roman-Main Islamic-Late Islamic period	57-40-2 seeds	Van der Veen 2011
Qasr Ibrim	Nubia	AD 300-500		Rowley-Conwy 1989
Ufalda	India, Jammu-and-Kashmir	mid 1st mill. AD		in Fuller 2003
Paithan	India, Maharashtra	Early Medieval		in Fuller 2003
Gordion (identification reviewed)	Turkey		Seeds in a jar	Miller 1991, p. 153, re-identified as *Linum* (Miller 2010, p 48)

Could sesame have been grown locally in Italy or was it imported?

The discovery in Italy of the seeds of a species of tropical origin raises the question of its introduction or import. As a warm climate plant, intolerant of frost, sesame is not very well adapted to local cultivation and the seeds are thus usually considered to have been traded as an oil-rich product, maybe as a seasoning for bread or cereal mixtures.

The conquest of the Near East by the Roman armies that started in the 2nd century BC did indeed open up a new wide area for exotic food trade, a situation from which the population of Pompeii benefited due to their allegiance to Rome. Evidence for the importing of products from a long distance is, for example, represented by the discovery of five mineralised seeds of a citrus fruit of the *Citrus medica* type in a well related to the Samnite levels, located under the temple of Venus (Pagnoux et al. 2013). Sesame could similarly have been imported. In any case, it has been found very rarely in the archaeobotanical record from this period and the find from Pompeii only represents its second occurrence in prehistoric Italy and, more generally, is one of the few finds of the plant in Europe.

While trade seems the most plausible reason for the presence of sesame in Republican Italy, its introduction and local cultivation in the southern Mediterranean area cannot be entirely excluded. Indeed, the plant is reported to have been cultivated on a small scale 50 years ago in Calabria and Sicily in southernmost Italy, where conditions are warmer and more arid than in Campania (http://www.agraria.org/cotivazionierbacee/sesamo.htm). Indeed, temperatures above 23 °C (73 °F) favour growth and yields (http://eol.org/pages/484896/details). In Sicily, the plant was used for intercropping and sown after early winter crops or after a spring crop failure. Sowing did not take place until early May as the plant is highly sensitive to late frost (Azienda Agricola Martea: http://www.martea.it/?Prodotti/Sesamo).

Below, we review the occurrences of sesame during prehistoric and early historic times in Asia and Europe, before discussing potential trade routes as well as its possible acclimatization.

Domestication and early spread towards the west

Wild species of sesame are found both in India and Africa. On the basis of interspecific hybridisation (Bedigian 1984, 1988; Patil 1999) India is considered as the most likely primary domestication area, an assumption corroborated by the wide genetic diversity found there (Bedigian et al. 1986; Bhat et al. 1999). Cultivated sesame derives from wild populations which are native to the western Indian peninsula, or the Punjab and parts of Pakistan. *Sesamum indicum* ssp. *malabaricum* Bedigian is proposed as the crop progenitor (Bedigian and Harlan 1986; Bedigian 2003a, 2004, 2014).

We have compiled the available archaeobotanical evidence for sesame from sites in western Asia and in Europe (Table 3).

The map associated with this table provides an overview of the distribution of archaeological finds of the species, from the early cultivation area in India to the Mediterranean (Fig. 3). Early finds seem to be located in India, the Arabian Peninsula and Egypt. Sesame subsequently spread to the east and to the west. Few specific patterns of diffusion can be observed at this stage of research. Greece and Italy seem nevertheless to have played a role as intermediate relays on the road of the species further westwards. The geographical and chronological distribution of archaeobotanical finds however relies equally on the hazards of preservation and the state of archaeological research.

Sesame was already cultivated in the Indian subcontinent by the time of the Harappan civilisation in the 3rd millennium BC (Bedigian and Harlan 1986; Fuller 2003). Out of the Indian subcontinent, sesame is first found in Harappan levels at the site of Miri Qalat in the Makran region of southwestern Pakistan (Tengberg 1999) as well at 3rd millennium BC Abu Salabikh in southern Mesopotamia (Charles 1993). These early finds probably reflect the long-distance trade networks that existed between the Indus Valley, the Indo-Iranian borderlands and Mesopotamia during the early Bronze Age. However, the plant may have been acclimatised to the hot, irrigated plains of southern Mesopotamia at a relatively early date as suggested by cuneiform sources, even though the precise meaning of the Sumerian *(še-)nesš-I* and Akkadian *šamaššammū* have been subject to some debate (Powell 1991; Stol 1985, 2010). Together with other summer crops such as millets and in the context of the development of new irrigation schemes, sesame seems to have been more generally introduced into local agrarian systems in the Middle East during the late Bronze and Iron Ages (Riehl et al. 2012). It also appears as a product of irrigated date palm gardens in the first millennium BC on the island of Bahrain in the Persian Gulf (Tengberg and Lombard 2001). Discoveries of sesame seeds in cooler regions include Armenia and northeastern Iran (Bedigian 1985).

According to Herodotus, sesame was the only oil plant known in Babylonia (1, 93). Strabon reports the same information (*Geography* 16, 1, 4) and further tells us that the Nabataeans used it instead of olives (16, 4, 26) (all cited in Gallant 1985), even though recent research has shown that olive was indeed cultivated at Petra and Hegra (Bouchaud 2011).

In Egypt *Sesamum* is only found very sporadically before the Roman presence, in the form of pollen and seeds. The most consistent find is a concentration of sesame seeds

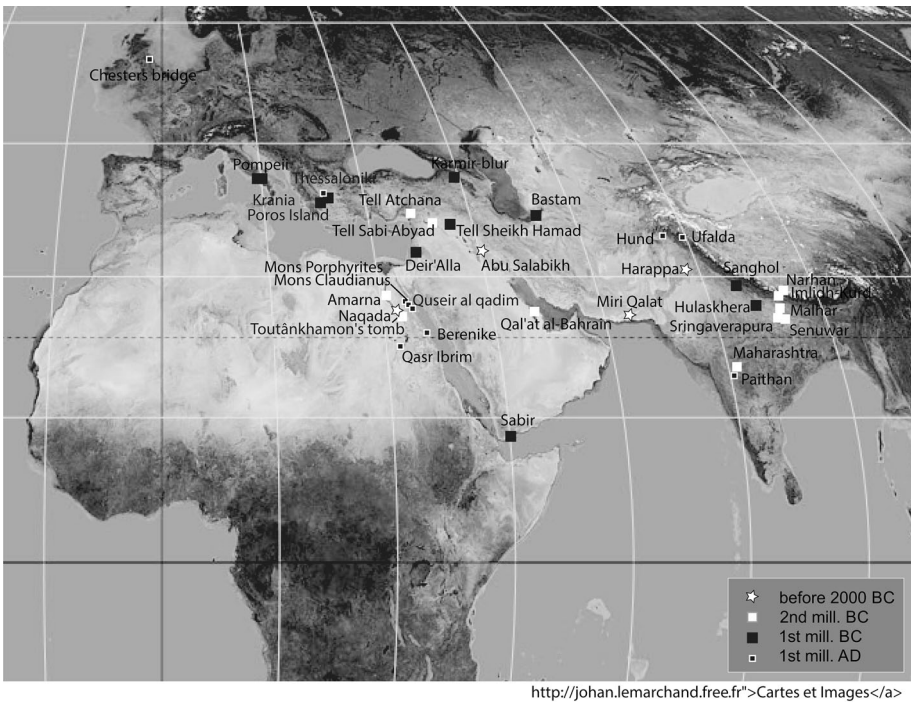

Fig. 3 Map of the sites where sesame has been found; map: http://johan.lemarchand.free.fr" > Cartes et Images ; data V. Zech/M. Tengberg

found in a basket in the antechamber of Tutankhamun's tomb (De Vartavan 1990). According to the author, the surface ornamentation of the seeds rather resembles that of the wild-growing African species, *S. alatum*. However, a second examination of the seeds by D. Bedigian and J. Harlan attributed them to *S. indicum*.

Several references in the Greek and Latin literature suggest that the plant was grown in Egypt during classical times (Van der Veen 2011). In the Ptolemaic period (305-30 BC) sesame was considered as an important crop and during Islamic times it was still referred to as the preferred oil plant. From the Roman and early Islamic periods, archaeobotanical finds of sesame are reported from several sites located in the Eastern Desert and on the Red Sea coast, among them Myos Hormos, which was directly involved in trade with the Indian subcontinent across the Indian Ocean (Van der Veen 2011).

Early sesame in the Mediterranean world

The presence of sesame cultivation in the Mediterranean region is difficult to establish from the archaeobotanical and documentary records. The small number of seeds discovered in Pompeii tends to establish sesame as a luxury product in Italy during the Samnite period. A second find is reported for Pompeii but is dated to the late 1st century BC. Twenty-one mineralized seeds of sesame came from two drains and a cesspit related to the House of the Vestals (Ciaraldi 2007, Table 16). New investigations in 1995–2006 were conducted on this house and the *insula* where it belongs, but despite 198 contexts being analysed from the house, sesame was not found again (Murphy et al. 2013).

Except for the finds from Republican Pompeii discussed in this paper, a discovery of ancient sesame seeds has been reported from Akrotiri, Thera (1600 BC), but not confirmed. Additionally A. Sarpaki has recently reported the presence of sesame at Poros (Kalaureia), in the sanctuary site of Poseidon (Sarpaki, personal communication). Unfortunately, the context of the discovery is not precisely dated and could be attributed to the Classical or up to the Hellenistic or even to the Roman period. Two other finds from Macedonia in Greece concern the seaport towns of Krania and Thessaloniki. In Krania, two pure concentrations of sesame seeds derive from the destruction layer of a public bar or tavern, which served food and drink to the boat crews and the ordinary people passing by the harbour (Margaritis 2014). The two samples come from a small room where food was kept in storage vessels. They consisted of 1491 and 595 charred loose sesame seeds and lumps of seeds fused together, which are dated from the late 4th century BC to the beginning of the 3rd century BC. While most of the samples contained discarded remains from the preparation of food in the tavern, sesame was only present in two of them. It is likely that it was not widely used for cooking, but maybe saved for special occasions (Margaritis 2014). One other mass find consists of approximately 57,000 fused seeds, from a public building in Thessaloniki. It is dated to some time between the 1st century BC and the middle of the 2nd century AD (Mangafa 1995, in Margaritis 2014).

The only discovery so far from northern Europe comes from a military context associated with the Roman

Hadrian's Wall, which was constructed from AD 122 in northern England (Huntley 1993).

The classical authors cite the plant among other oil crops without explicitly mentioning its cultivation in the Mediterranean area. Still, in his *Enquiry into Plants* Theophrastus (ca. 371–287 BC), who displays a good knowledge of the morphology of sesame (*sesamon* in Greek) repeatedly mentions the plant together with two other summer crops, broomcorn millet and foxtail millet, in discussions of sowing periods, watering and the risk of soil exhaustion (Amigues 2010, pp. 295, 304, 309, 310, 319). In these descriptions he does not once point out sesame as an exotic species and this leaves an ambiguity as to its local cultivation in Greece. At the same time, he mentions the difficulties in germination of sesame and how its cultivation had an impoverishing effect on agricultural soils.

In Italy, Plautus (ca. 254–184 BC) is the first author to cite sesame, but this does not imply that the plant was cultivated there at this time (*Poen*. 326, Riley 1912). Pliny the Elder specifies that the plant has its origin in India and evokes its use in Arabia. He describes the way the seeds were prepared for human consumption by boiling, drying and soaking them in cold water, the repeated immersions rendering them edible (*H.N*., 18, 22) (André 1960–1972; Ernout 1949–1956). Sesame is further cited in a compilation of cooking recipes dating to the 4th century AD and attributed to Apicius (André 1974). The seeds appear among the primary spices and kitchen herbs that should be available in any wealthy house according to the *Excerpta* (exc. 1) (André 2009).

Interpretation of the find from Pompeii

Despite the study of hundreds of samples from the five sites where sesame has been identified, it was only found in seven of them. Considering the abundant food preparation waste found at these sites, sesame does not appear to have been an ingredient frequently used for cooking. Sesame was a rare plant and remained rare. Its occurrences never increased, which could also have been the case if the plant had been acclimatized and grown locally. Furthermore, one must highlight that the archaeobotanical finds from Greece and Italy, including those from Pompeii, come only from seaport cities that played a major role in foreign trade and the circulation of merchandise through their local markets and shops. Regarding the scarcity of the evidence of sesame and its find sites, these finds must probably be considered either as luxury products, or as imports.

Moreover, during Roman times, sesame appears in general in the textual sources as an exotic product resulting from import. No mention is made of its possible cultivation in the western Mediterranean zone.

Finding sesame seeds in two archaeological contexts in the same latrine dated to 180–150 BC is thus a valuable testimony to the vitality and importance of Italy in the large amount of Mediterranean trade, already in the first half of the 2nd century BC. The find is perfectly contemporary with the transformation and the general urbanisation of the area which was later occupied by the temple of Fortuna Augusta (insula VII, 4, see Van Andringa 2012b, 2013a). The period of the aftermath of the second Punic War indeed marks a turning point in the economic and social history of Campania, also an unprecedented development of the cities in the area. The city of Pompeii was undergoing urban growth now well characterised by archaeology, as shown by the construction around the same time of the first large houses of the Faun, of Ariana, of the Vestals and many others (Ellis 2011a; Pesando 2006; Van Andringa 2013b). This urban development was accompanied by the establishment of local industries such as the production of *garum* sauce, of which remains have been identified from the gate of Stabiae (Ellis 2011b). The city also acquired in the 2nd century a true urban adornment with the construction of the theatre and baths of Stabiae and the monumental organisation of the forum, the main temples being restored, rebuilt and embellished (Apollo, Minerva, Dionysos/Loufir, Herentas/Venus; Guzzo 2007, p. 85 ff). Its status of allied city obviously involved Pompeii in the Roman conquest of the east and consequently in the opening of eastern markets, ensuring then the enrichment of local elites. In this context, the seeds can probably be seen as markers of the transformation of the local food culture. This finding also confirms the strengthening, from the first half of the 2nd century BC, of trade with the Orient and as far as India. Contacts with the Alexandrian city that controlled commercial access to India have been ascertained. Spices and herbs with sesame seeds were exported from India, passing along the two major traditional ways, the land route to Syria and Palestine led by the Nabatean caravans, and the maritime route through Egypt, controlled by the Ptolemies. There is little doubt that some of the goods of long distance origin were landed in the harbour of Pompeii or the main cities of the Bay of Naples, Pozzuoli and Naples. Sesame seeds discovered in SU 7232 and 7235 confirm then the participation of Pompeian elites in the Mediterranean trade from the first half of the 2nd century BC, at a time which was also decisive in the transformation of the city and local society.

Conclusions

Due to its drought resistance, sesame may have become established early on as a useful crop in semi-arid regions in the Middle East. In the Mediterranean region, its

cultivation is not established with certainty, even though certain writings, notably by Theophrastus, mention sesame together with other summer crops.

The six sesame seeds from Pompeii were embedded in the layers of a cesspit dating back to the Samnite occupation and are thus considered as food residues. In this context, sesame could represent a seasoning or part of the garnish of a loaf of bread, as cereals and starch products do not survive the mineralisation process very well.

In Republican times, there is no evidence of the cultivation of sesame in the Italian Peninsula. The five archaeobotanical finds of *Sesamum* from Greece and Italy, including the ones from Pompeii, come from seaport cities and do not suggest the local growing of the plant. On the contrary, both textual sources and the rare archaeobotanical finds suggest that the seeds were imported from regions connected to Rome by long-distance trade, either directly from India or from intermediate regions such as Arabia and Egypt.

Clearly, further work is needed to establish commercial relays for the importation of exotic goods towards the Mediterranean and their potential acclimatization in the area before the extension of the Roman Empire.

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