

BOTANICAL REMAINS FROM THE EXCAVATION ON THE SOUTHERN BEACH OF ASHDOD

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Carbonized remains of seeds and fruit mixed with sand were collected in Areas A and B of the thirteenth-century BCE site on the southern beach of Ashdod. The remains were received for sorting and identification in the archaeobotanical laboratory of The Mina and Everard Goodman Faculty of Life Sciences at Bar-Ilan University. The majority of the identified remains in both areas were of grapes (Tables 1, 2). Other species, represented by a few seeds, were identified; all except one were found in a refuse dump (Area A, L161).

Area A (see Nahshoni, this volume: Plan 1)

This area yielded occupation levels and installations associated with a wine industry. The bulk of the botanical remains, including grapevine (*Vitis vinifera*), were found in L161. Small amounts of such remains were also found in the rest of the loci (Table 1).

Locus 161.— This findspot is a refuse dump in the vicinity of the installations associated with the wine industry. Organic material was found in L161 together with fragments of large

Table 1. Fruit and Seeds Found in Area A

Latin Name	Organ	Locus								Total
		134	138	140	161	163	175	183	185	
Fruit										
<i>Vitis vinifera</i>	raisin	2		1	177	12				192
	pip	112	5		346	2	11	2		478
	grape pedicel				18					18
Legumes										
<i>Lathyrus</i> sect. <i>Cicerula</i>	seed				2					2
<i>Vicia ervilia</i>	seed				1					1
<i>Vicia faba</i>	seed				3					3
Wild Plants										
<i>Galium/Asperula</i>	mericarp				1					1
Gramineae	grain				3					3
<i>Hordeum</i> sp.	grain				1					1
Papilionaceae	seed				3					3
<i>Scorpiurus muricatus</i>	seed				1					1
<i>Silybum marianum</i>	achene				4					4
<i>Triticum/Aegilops</i>	grain				1				1	2
Unidentified				3	1				4	
Total		114	5	1	564	15	11	2	1	713

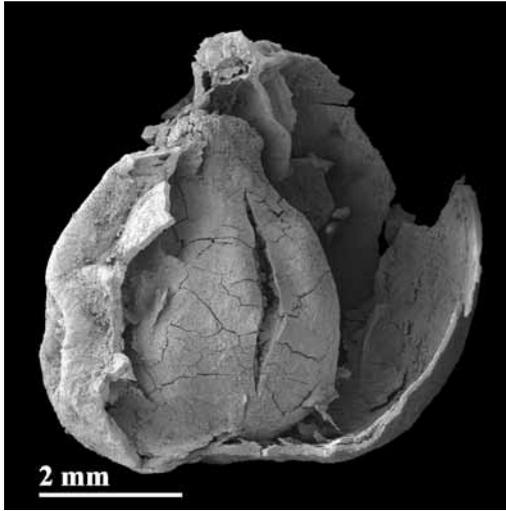


Fig. 1. Carbonized raisin (*Vitis vinifera*), inside view. The raisin was puffed, the crumpled fruit skin was exploded by the heat, and the cracked pip is exposed. Some crumples are still prominent at the left side.



Fig. 2. Carbonized pip of grapevine (*Vitis vinifera*), ventral view. The pip was cracked by the fire mainly along the raphe (in the middle). The beak is long and thick. The fossetes are prominent on both sides of the raphe.

pottery vessels and flint implements. Some of the material was sent for Carbon-14 dating (see Nahshoni, this volume) and some were brought to our laboratory for analysis. Among the samples received, we identified grape remains, as well as legume seeds and grass grains (Table 1).

The carbonized remains of grapevine include besides cluster fragments, grape pedicels, raisins (Fig. 1) and pips (Fig. 2). Some of these were undeveloped. Most raisins were broken, but several were preserved intact; most of these last were shriveled or puffed as a result of a nearby conflagration.

Five grass grains were found; however, it is unclear if they are cultivated cereals. Of these, half a grain of *Triticum/Aegilops* and two small fragments of barley grain (*Hordeum* sp.) were identified.

Four species of legumes were identified: broad bean (*Vicia faba*), bitter vetch (*Vicia ervilia*), vetchling (*Lathyrus* sect. *Cicercula*) and the wild two-flowered caterpillar (*Scorpiurus muricatus*).

The broad bean seeds were fragmented. Two of the fragments complement each other, forming a single seed, and four other fragments belong to two additional seeds. The reconstructed seed measures $6.33 \times 6.00 \times 5.66$ mm and corresponds with seeds of *V. faba* var. *minor*; which are also small. Finds of this variety of broad bean are known in Israel already from the Neolithic site of Yiftah'el, dated to the ninth–eighth millennia BCE (Kislev 1985), and from eighth millennium BCE Jericho (Hopf 1983).

The bitter vetch seed was not preserved whole; the conflagration left it without its testa. The seed was identified according to its pyramidal shape, its size, and the shape of the hilum depression, which is located near the radicle depression.

As a cultivated plant, this species is grown today in the Mediterranean countries and the Near East. Its numerous finds in Neolithic and Bronze Age sites in Turkey and the Balkans indicate that bitter vetch was already cultivated during these periods (Zohary, Hopf and Weiss

2012:92–93). The seeds of this species were eaten by domestic animals as well as by man in antiquity, and remained a source of food in draught years. Although the seeds contain toxic elements, effects of the poison can be considerably decreased by cooking. Bitter vetch appears in Israel and Jordan in significant quantities since the early Iron Age. Thousands of seeds were found in Deir ‘Alla (twelfth century BCE), located near the Jabbok River in Jordan (van Zeist and Heeres 1973), and inside storage jars at ‘Afula that date to the twelfth–eleventh century BCE (Zaitschek 1955). Hundreds of seeds were found at Tel Afeq, dated to the tenth century BCE (Kislev and Mahler-Slasky 2009). Additional finds of bitter vetch, but in smaller quantities, were discovered at Tel Keisan in loci dating to the eleventh century BCE (Kislev 1994). Single seeds were found at the Neolithic site of Netiv Ha-Gedud (Kislev 1997) and a few seeds in Naḥal Refa’im were dated to the Early Bronze Age (unpublished). This evidence for common consumption corresponds with the arrival of the Philistines in Israel, and their spread throughout the country. It seems, therefore, that the Philistines introduced the cultivation of bitter vetch to Israel. This is in accordance with a similar phenomenon of a crop following the Aegean migration, which has been recently reported for grass pea, *Lathyrus sativus* (Mahler-Slasky and Kislev 2010).

The distribution area of bitter vetch as a wild plant includes the Mediterranean countries and southwestern Asia. According to Zohary, Hopf and Weiss (2012:93), the distribution area of the wild ancestor of bitter vetch extends southward to Mt. Hermon, while in the other Mediterranean regions in Israel it is considered to be naturalized (Zohary 1972:200). However, the archaeological finds of single bitter vetch seeds from Netiv Ha-Gedud, Naḥal Refa’im and Deir ‘Alla, together with the finds from the southern beach of Ashdod, indicate that the species extended historically to all the Mediterranean parts of Israel and Jordan.

Therefore, one should reconsider whether the plants that were documented by Zohary (1972) as naturalized were not wild.

The two vetchling (or grass pea) seeds were preserved without their testa. The shape of the seeds, which resembles a triangular prism, is characteristic of the shape of the middle seeds in vetchling pods. The larger seed was entirely preserved, measuring $4.83 \times 4.83 \times 4.16$ mm. The smaller seed was apparently infested by an insect larva, and its length could not be measured. It is 4.16 mm wide and 4 mm thick. Based on their shape and dimensions, these seeds evidently belong to a wild species of vetchling. The seeds of cultivated species of grass pea (*L. sativus*) and dwarf vetchling (*L. cicera*) are rather similar, but they were grown in Philistia from the eleventh century BCE onward (Kislev and Hopf 1985). Other species of vetchling were sometimes eaten by man, but were primarily given to domestic animals. The seeds from the site, therefore, probably originated from a pod that was thrown into the refuse and its remains were consumed in the conflagration.

The two-flowered caterpillar is represented by a single seed. This Mediterranean species grows in bathas, herbaceous vegetation, roadsides and as a weed in fields (Zohary 1972:99; Danin 2004:145). The rough fruit is caught in the hair of animals and it is thereby carried from place to place; some of the fruit that remains in the fields falls off some time prior to the harvest and is gathered together with the grain (Zohary 1941:63). The dispersal unit is a pod composed of segments, each of which contains one seed. The release of the seed from the pod may have been mechanical, having occurred during threshing, or by means of the fire, which consumed the pod and left the seed carbonized. The dispersal unit of the two-flowered caterpillar probably stuck to the fleece of one of the animals whose remains were found at the site. Another possibility is that the seed reached the site as a weed within the crop and was discarded in the refuse heap.

Table 2. Grapevine Remains Found in Area B

Latin Name	Organ	Locus		Total
		238	252	
<i>Vitis vinifera</i>	raisin	20	48	68
	pip	5306	11928	17234
	grape pedicel	273	235	508
	unfertilized flower	28	15	43
Total		5627	12226	17853

Area B (see Nahshoni, this volume: Plan 5)

Three concentrations of carbonized grape-remains were found in the complex of rooms and courtyards in Area B (Table 2). One was inside a lump of sand that had solidified in Room 17 (L234) and remained untouched; the second came from inside a Canaanite jar with four handles (L238; see Nahshoni, this volume: Fig. 20:8), which was found smashed on the floor of Room 17 (L239); the third was from the ashes of a fire (L252). Remnants of sycamore syconia were collected in eight other loci, but they were found to be recent.

Locus 238.— The contents of a jar. Lumps of ash and sand were discovered inside a large jar (c. 27 liters; see Nahshoni, this volume: Fig. 20:8), found lying on its side. Within the lumps were the remains of grape-clusters, including parts of the panicles, thousands of pips, c. 20 raisins, dozens of grape pedicels and unfertilized flowers (Table 2). The contents of the jar were identified as raisins because whole grape skins were preserved, some of them puffed, others shriveled around the pips. The remains of the raisins were mixed with sand that had consolidated into small lumps. The consolidant was probably grape sugar (glucose) that had heated up and turned into a liquid in the course of the conflagration, and then dried and became brown. Evidently, raisins prepared at the site during the grape harvest were kept during the course of the year in containers, such as the four-handled Canaanite jar. The higher fraction of grape pips (thousands) with respect

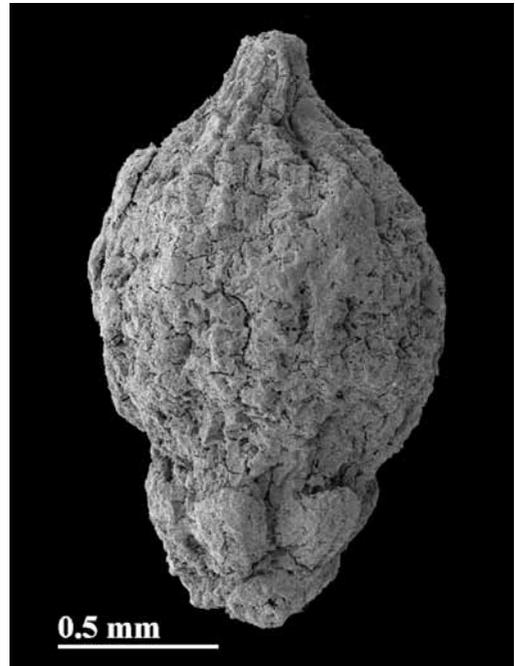


Fig. 3. Carbonized unfertilized flower of grapevine (*Vitis vinifera*). The nectariferous glands surround its base and the conical style is prominent as a tip on the upper part.

to grape pedicels (dozens) suggests that the pedicels were intentionally removed in order to improve the raisins for eating.

Locus 252.— Approximately 2100 cc of burnt ash from a fire were examined. The ashes, approximately 40 cm in diameter, were mixed with sand. The remains of grapevines were found, containing thousands of pips, dozens

of raisins, dozens of grape pedicels, panicles and unfertilized flowers (Fig. 3; Table 2). Here too, the remains were mixed with sand that was apparently bonded by the liquid exiting the raisins during the conflagration.

The source of the numerous remains of grape vine could have been the local fertile soil that today lies under the nearby sand dunes.

Remains of the ancient groves are located along the depressions between dunes covered today by thick layer of sands. These grove remains include, beside grapevine, other living fruit trees such as carob (*Ceratonia siliqua*), date palm (*Phoenix dactylifera*), fig (*Ficus carica*), olive (*Olea europaea*), pomegranate (*Punica granatum*) and sycamore fig (*F. sycomorus*) that are rooted in the underlying fertile soil.

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