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Archaeobotanical Finds from the *Boverel* Quarter, 'Akko

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Introduction

During excavations within an Ottoman building located in the Old City of 'Akko, remains of an underlying Crusader-period building (thirteenth century CE), destroyed and collapsed by intense fire, were exposed. An intensely burned layer containing charred wooden beams was discovered on the floor of the building. Two parts of the room (L13, L17), separated by an unexcavated balk, exhibited different burned layers, raising the possibility that a wooden partition may have separated the eastern and western parts of the room (Stern 2010; this volume).

The 'Akko region is characterized by a typical Mediterranean climate and vegetation. The mean annual precipitation in the region is 548 mm (as measured at 'Akko Govt. Farm, 158/260, 32.56N, 35.06E, 10 m elevation; *Israel Meteorological Notes* 1967). *Quercus calliprinos* (Kermes oak)—*Pistacia palaestina* (terebinth) was the native arboreal climax vegetation that dominated the Mediterranean region of the Land of Israel in antiquity, since the beginning of the Holocene. Prior to the massive impact of man on the environment, *Olea europaea* (olive) was one of the components of this association, although in low percentages. Following the beginning of olive cultivation in the Early Bronze Age, olive orchards became a dominant component of the arboreal landscape, constituting 50–70% of the Kermes oak–terebinth association (Liphschitz 2007:46–48, 166–169).

Today, the 'Akko region is urbanized to a great extent, and the arboreal cover of the hilly region to the east is characterized by the *Quercus calliprinos–Pistacia palaestina* association, by Olea europaea orchards, and also by the *Pistacia lentiscus–Ceratonia siliqua* association (Waisel, Pollak and Cohen 1978).

The Finds

Six charred wood samples were collected for botanical identification. Pieces of 0.5 cu cm were taken from each sample, treated in absolute ethyl-alcohol, dipped in celloidin-clove oil solution for 24 hours, rinsed in absolute ethyl alcohol and transferred to 55°C paraffin in the oven for four weeks. Blocks were made in paraffin. Cross, longitudinal, tangential and radial sections were prepared by a rotary microtome. Identification of the wood samples up

to the species level, based on the three-dimensional structure of the wood, was conducted microscopically from these sections. Comparison was made with reference sections prepared from systematically identified recent trees and shrubs, and with anatomical atlases.

As can be seen from the results (Table 1), five of the six samples are of conifers: *Pinus halepensis* (Aleppo pine) and *Cedrus libani* (Cedar of Lebanon). The sixth sample is of *Pistacia* sp. (pistachio), which could be identified only to genus level due to its poor state of preservation.

Pinus halepensis and *Cedrus libani* did not grow in Israel, and they were most probably imported from Lebanon for roofing purposes. The typical Mediterranean trees that grew natively in the ʻAkko region, namely *Pistacia palaestina* (terebinth), *Pistacia lentiscus* (lentisk) and *Quercus calliprinos* (Kermes oak), and the *Olea europaea* (olive), had low and curved trunks that could not supply long straight logs. The *Pistacia lentiscus*, moreover, is usually a shrub (Liphschitz 2007).

Today there are still *Cedrus libani* groves that grow natively on Mount Baruk in Lebanon, near Beirut. However, the trees that have survived, have a twisted trunk as all the specimens with the characteristic straight, tall trunk have been cut down over the ages; all the old quarters of the cities in Israel, including ʻAkko, were roofed with Cedar of Lebanon down to the end of the Ottoman period. These *Cedrus libani* trees were up to 40 m tall, with a trunk diameter of up to 2.5 m (Liphschitz and Biger 1998; Liphschitz 2007).

The native distribution of *Pinus halepensis* is complicated. It is native to the western Mediterranean region, from Morocco and Spain to southern France, Italy and Croatia and east to Greece, northern Tunisia and Libya, with an outlying arboreal population in Syria and Lebanon. Today there are a few groves in central Lebanon near the village of ʻEin Terez, and north of Beirut in the region of Jebeil. Although these trees grow there today, they probably originated from planted specimens and since grow naturally. A few grooves are scattered north of Mount Hermon. In Syria, the *Pinus halepensis* is very rare, and it is found in one grove in the Ansarian Mountains. *Pinus halepensis* is a small to medium-sized tree, 15–25 m tall, with a trunk diameter up to 0.6 m, and rarely up to 1 m (Liphschitz and Biger 1998; Liphschitz 2007).

Table 1. Tree Species used in the Construction of a Crusader-Period Building in ʻAkko

No.	Locus	Basket	Tree species
1	17	131	*Pinus halepensis*
2	13	114/1	*Pinus halepensis*
3	13	114/2	*Pinus halepensis*
4	13	113	*Cedrus libani*
5	13	114/4	*Cedrus libani*
6	13	114/2	*Pistacia* sp.

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