Fossil Pollen Evidence of Bronze Age Vegetation in Jerusalem, Israel

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INTRODUCTION

- Pollen grains are an extremely durable organic material providing scientists with an easy way to identify vegetation from the past.
- Pollen can be extracted from ice cores and sediment samples to reconstruct plant invasions, vegetational responses to climate change, and forest dynamics.[2,3,4]
- This study is based off a core sample taken from the plaster lining of a Bronze Age water channel in the City of David, Jerusalem.
- This water channel was fed by the Gihon Spring in the Kidron Valley, capturing the pollen from surrounding vegetation.
- A statistically standard 200-grain pollen count was conducted to gain knowledge of the environmental plants of Jerusalem during the late Bronze Age.

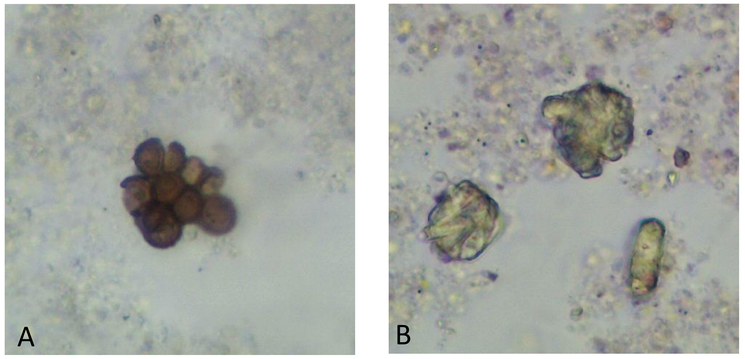

Figure 1A: An aggregate of *Cyclamen* pollen from the plaster sample.
Figure 1B: Various diatoms from the plaster sample.

METHODS

- A chemical separation was performed to loosen the pollen from the plaster sample.
- The pollen was floated free from the matrix by placing it in a solution of Zinc Chloride.
- Pollen was extracted and placed in a glycerol medium.
- *Lycopodium* spores were added to determine pollen concentrations and the medium was mounted on individual slides.
- Pollen was identified using a compound microscope and a digital reference collection.[5]

RESULTS

Table 1: Results of the 200 grain pollen count

Type/Species	Amount	Type/Species	Amount
Hydrophyte (water):	**Total: 76 (38%)**	**Cultivar (crop)**	**Total: 71 (35.5%)**
Cyperus sp.	19	*Allium* sp.	15
Populus alba	2	*Amygdalus sp.*	5
Salix sp.	30	*Cerealia*	25
Scirpus sp.	21	*Linum sp.*	1
Ulmus sp.	4	*Mentha sp.*	1
		Olea sp.	17
		Vitis sp.	7
Arboreal (tree)	**Total: 29 (14.5%)**	**Indicator**	**Total: 24 (12%)**
Eucalyptus	1	*Cyclamen sp.*	10
Myrtle sp.	12	*Echinops sp.*	5
Pinus sp.	1	*Liguliflorae*	3
Quercus sp.	15	*Tubiliflorae*	4
		Umbelliferae	2

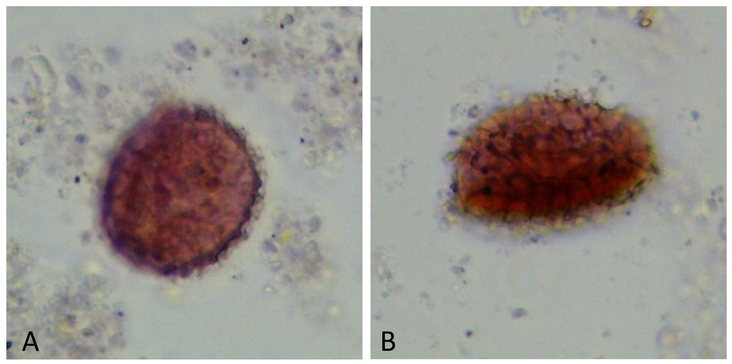

Figure 2 A,B: Modern-day *Lycopodium* spores found in the sample.

RESULTS

- The majority of the hydrophyte plants were *Salix* (15%), *Scirpus* (10.5%) and *Cyperus* (9.5%).
- The majority of the cultivars were *Cerealia* (12.5%), *Olea* (8.5%) and *Allium* (7.5%).
- The majority of the arboreal plants were *Quercus* (7.5%) and *Myrtus* (6%).
- There was a large number of diatoms and *lycopodium* spores in the sample.

DISCUSSION

- The high number of *Cerealia, Allium* and *Olea* is most likely due to the cultivation of these plants by humans.
- The presence of indicator species is likely due to the creation of foot paths during the cultivation.[1]
- This pollen assembly provides evidence of human interaction with the environment in the form of cultivation of economic plants such as grains and olive.
- The assembly also shows the types of plants that would have been found along the Gihon Spring and in the surrounding hills during this time period.

ACKNOWLEDGEMENTS

Special thanks to Patrick Geyer for advising this project and providing the digital reference collection used in this research. I would also like to thank Emily Miller for her constant support in the lab.

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