LEVANT XXV 1993

Import of an Aegean Food Plant to a Middle Bronze IIA Coastal Site in Israel

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The discovery of L. clymenum *at the Middle Bronze IIA settlement at Tel Nami, Israel is reported. Archaeobotanical evidence is presented in order to show the Aegean origin and demonstrate the peculiarities of this exotic food crop. The archaeological context of the discovery and its implications indicate that maritime contacts existed between the Aegean and the southern Levant during the first quarter of the second millennium* B.C.

Introduction

259 charred seeds of *Lathyrus clymenum L.* (Spanish vetchling) were found *in situ* in four storage jars as well as scattered on the floors of two storerooms dated to the Middle Bronze IIA period (MB IIA, *c.* 1950–1750 B.C.) at Tel Nami near Haifa, Israel. Together with these seeds, plant remains of other crops such as chickpea and grapes were found and will be discussed elsewhere.

The site

Tel Nami (Israel map ref. 1433/2296) is located on the southern Carmel coast midway between the ancient sites of Atlit and Dor (see Fig. 1). Since 1985 the Tel Nami Land and Sea Regional Project, directed by M. Artzy, has undertaken a multi-disciplinary study of the Mediterranean coastal area of the Me^{c}arot river basin (see Artzy 1986, 1989 and 1990). Geomorphological investigations indicate that the ancient outlet of the river, which was located near Tel Nami, could have served as an estuarial anchorage (Raban 1985, 19–20, Figs. 8 and 13; Artzy 1986). Three settlements inhabited during the second millennium B.C. have been located in the region: Tel Nami, Nami East and Site 104–106 (Fig. 2). Excavations at Tel Nami and Nami East have revealed the following chronological sequence: MB IIA, hiatus, Late Bronze IIA period (fourteenth century B.C.), Late Bronze IIB period (thirteenth century B.C.). A surface survey of Site 104–106 indicates that this area was inhabited during the MB IIA period and then, much later, in the Byzantine period. Tel Nami, which forms a peninsula jutting some 150 m. into the sea, may have served as the seaward outpost of the settlement

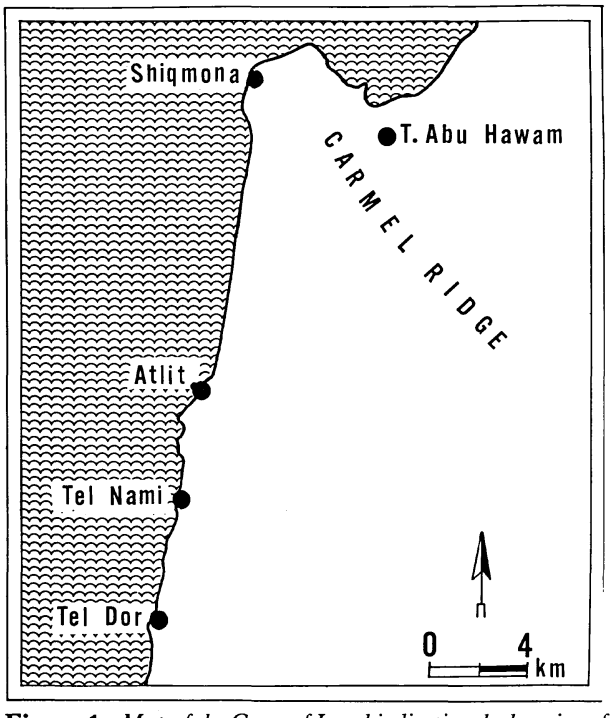

Figure 1. *Map of the Coast of Israel indicating the location of Tel Nami.*

area, guarding the entrance to the anchorage and controlling access to Nami East and Site 104–106.

The greatest horizontal exposure (approximately 56 m.^{2}) of MB IIA habitation has so far been attained in area D (excavation supervised by E. Marcus) on the south-eastern edge of Tel Nami (see Fig. 3). Two

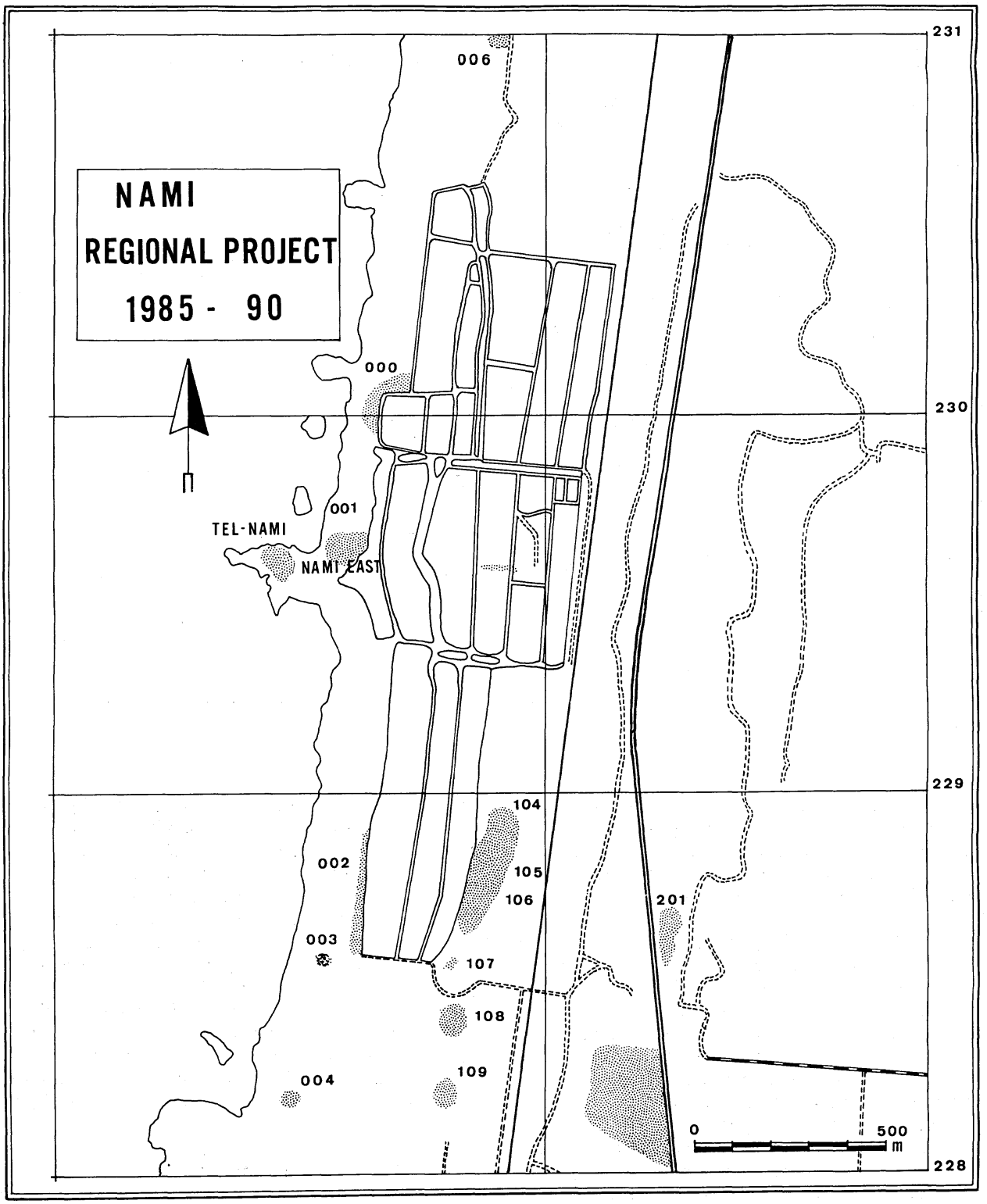

Figure 2. *Map of the Tel Nami Survey area.*

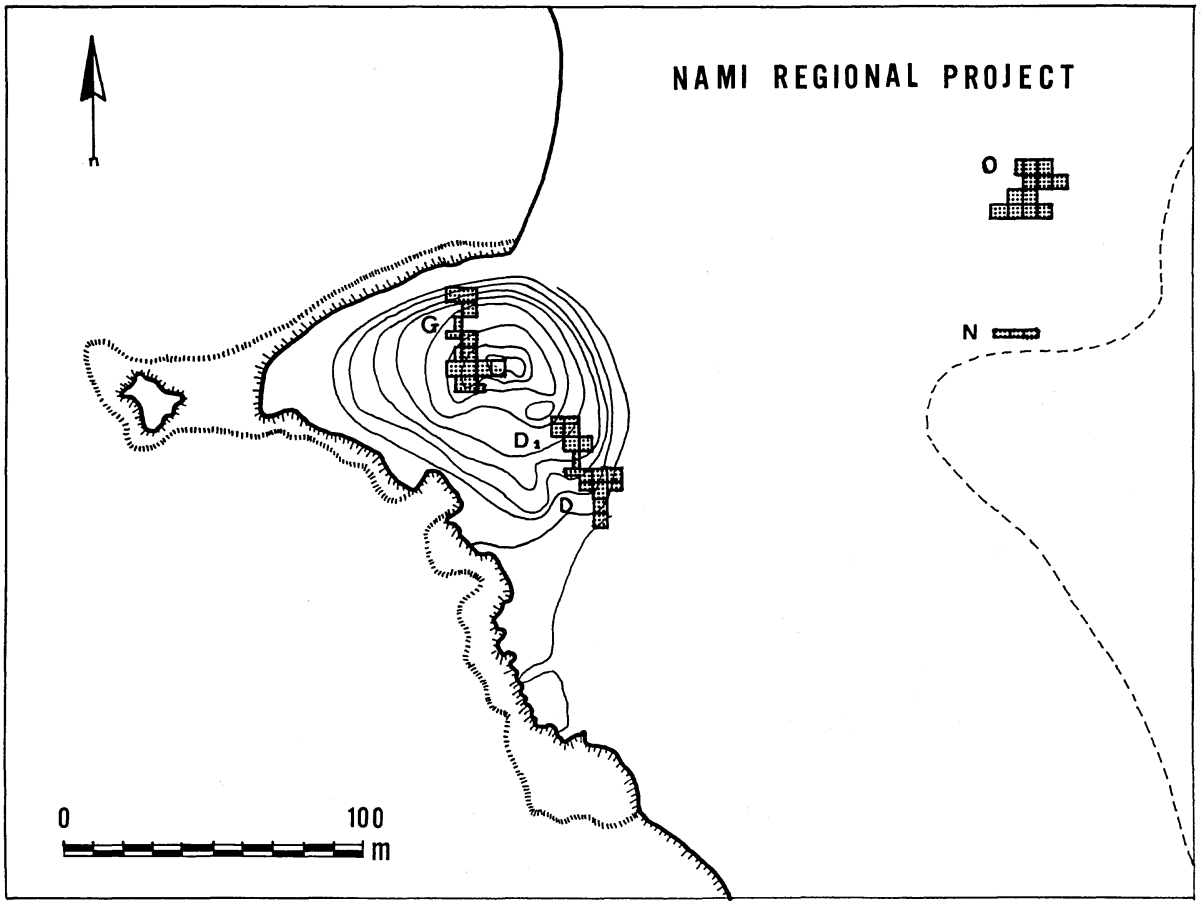

Figure 3. *Site plan.*

distinct architectural phases of this period have been discerned, both following the same general orientation, but with minor differences in building plan. *Lathyrus clymenum* has been found, so far, in the second, final phase of the MB IIA habitation in two rooms: C_1 and C_2.

Room C_1 is a partially stone-paved, roofed room measuring approximately 3 × 2·60 m. Room C_2 appears to be an open courtyard of similar dimensions adjacent to room C_1. More than 25 ceramic vessels of various types (e.g. storage jars, bowls, kraters, cooking pots, juglets) were found placed on the floor of Room C_1 or adjacent to it. The charred organic remains were found in a number of storage jars in room C_1 and scattered on the floors of both rooms (see Fig. 4). Room C_1 was burned in an intense fire that caused the roof to collapse sealing the contents of the room under a layer of debris that included charred roof material. Following the destruction of this phase there is no evidence of habitation in Area D until the LB II period. This chronological gap is evinced stratigraphically by a layer of sand 0·70–0·80 m. thick. This sand layer appears to be a general phenomenon on the tell. As there is no evidence of later intrusions into this room, the entire locus including the organic remains should be treated as a single, sealed assemblage dated to the MB IIA period. Preliminary ceramic analysis places this assemblage within the range of the later phases at Tel Aphek (Beck 1975 and 1985), which probably span the nineteenth century B.C. Further discussion of the nature of the settlement, its precise chronological position in the MB IIA sequence, will be provided in future publications of the excavation (*inter alia* Marcus 1991). A representative sample of pottery from room C_1 is provided in Fig. 5.

The find and its significance

The *Lathyrus clymenum* seeds are mostly complete, in a rather good state of preservation, but without the seed-

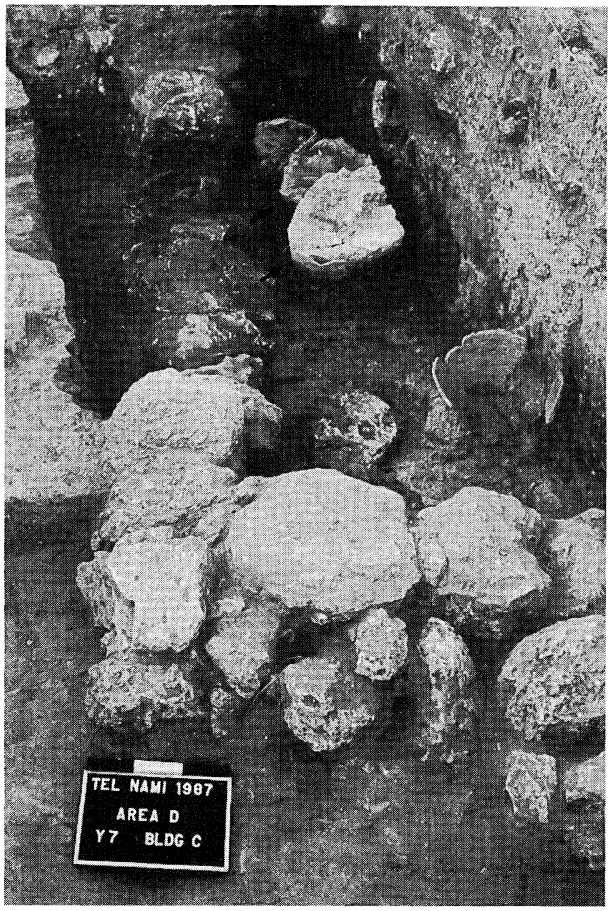

Figure 4. *South-western corner of room C_1 as it was found in 1987; the initial discovery of L. clymenum was made in the jars indicated by the arrow. Note the dark charred destruction layer.*

coat and the radicle tip which was removed by the action of the fire (Fig. 6). They are recognizable by their compressed oval-oblong shape, although their dimensions are quite small (the average of 50 seeds is 4·44 × 3·63 × 2·82 mm.). The small size is partly explained by the shrinkage that occurs during the charring process. The seed identification was made by comparison with modern material from Portugal (two samples) and Bulgaria, received from the seed bank in Southampton (nos. 845016, 855007 and 810362 respectively); and from Crete and Morocco, received from Gatersleben (Lat 121/85 and Lat 130/83 respectively); identification was confirmed by Dr Glynis Jones, Sheffield. The charred seeds are most similar in shape to the sample from Crete (Fig. 7). Undoubtedly seeds of cultivated strains are generally larger than the wild types due to a long-term amelioration. The species is reported very rarely in economic, agricultural or archaeobotanical literature from Greece and western Mediterranean countries. The find of *L. clymenum* in a coastal site in Israel suggests that the seeds were shipped from the west. However, the relations between man and this particular pulse are essential for understanding the meaning of its long distance transport. Therefore, a more detailed description of *L. clymenum*, the reason for its use, and some of its disadvantages are presented.

The plant and its cultivation

Lathyrus clymenum is native to the Mediterranean islands, southern Europe and northern Africa, from central and north-west Anatolia to the Iberian peninsula and from north-east Libya to Morocco. It is, however, absent from Cyprus, Egypt, Syria, Israel and Jordan (Davis 1970, 365; Greuter *et al.* 1989, 116; Heller and Heyn 1989, 43). The plant grows as a cultivated, escaped or adventive species in other areas, including the Azores, Madeira and the Canary Islands, as well as in western Europe, but it is not recorded as a cultivated species in Turkey. It is a scrambling annual without hairs, climbing by means of tendrils, 30–100 cm. high with winged stem. The flower is crimson with violet or lilac wings. Flowering time in Turkey is April-May. The legume is channeled on the dorsal suture, with five to six seeds (Fig. 8) (Davis 1970, 365; Desfontaines 1799, 159; Ooststroom 1970, 387; Tutin *et al.* 1968, 142).

Seed variability, even in the same pod, is greater than that of most other pulses, because, like *L. sativus* L. (grass or Indian pea, or chickling vetch), the terminal seeds differ in shape from the intermediate one. The intermediate seeds are oval-oblong (rectangle with rounded vertices), more or less laterally compressed, both ends are truncate (in a strain from Morocco), or somewhat rounded in other strains. The terminal seeds narrow in their breadth and thickness towards the end of the pod. The dorsal side is rounded, attenuated or carinated. The seed coat is generally smooth, but that of the strain from Morocco is tuberculate. The seeds may resemble some strains of *Vicia sativa* L. (common vetch), but they are distinguished by their greater variability, compressed shape, truncate ends, straight sides (in the intermediate seeds), and the carinated dorsal side. Also, they differ from *L. sativus* and *L. cicera*. While seeds of *L. clymenum* have biconvex faces, like a lentil, those of *L. sativus* and *L. cicera* are triangle-like in cross section.

L. clymenum belongs to a distinct group of the genus, section *Clymenum*. Sometimes an allied species, *L. articulatus* L., is recorded in the literature. This plant has a legume that is somewhat constricted between the seeds and not channeled on the dorsal suture, and a flower with white or pink wings, (e.g. Desfontaines 1799, 159;

Figure 5. *Representative MB IIA pottery found on the floor of room* C_1.

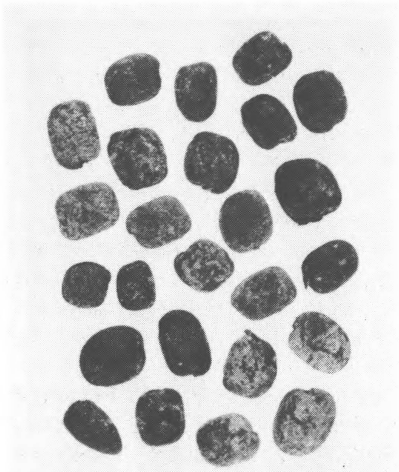

Figure 6. *Charred seeds of L. clymenum from Tel Nami.* × 2·0.

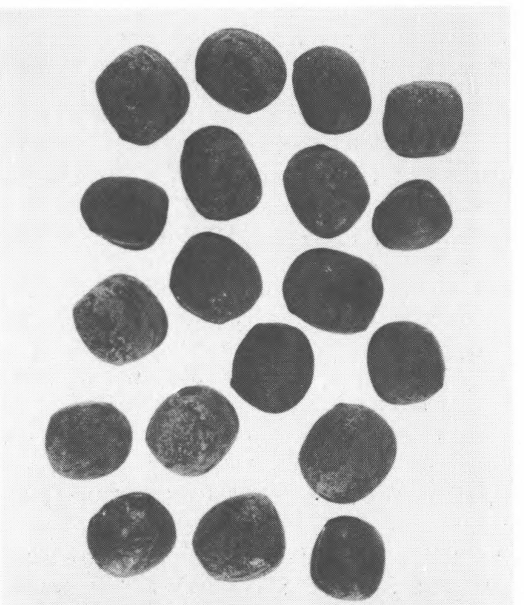

Figure 7. *Modern seeds of L. clymenum originated in Lakki, Crete.* × 2·0.

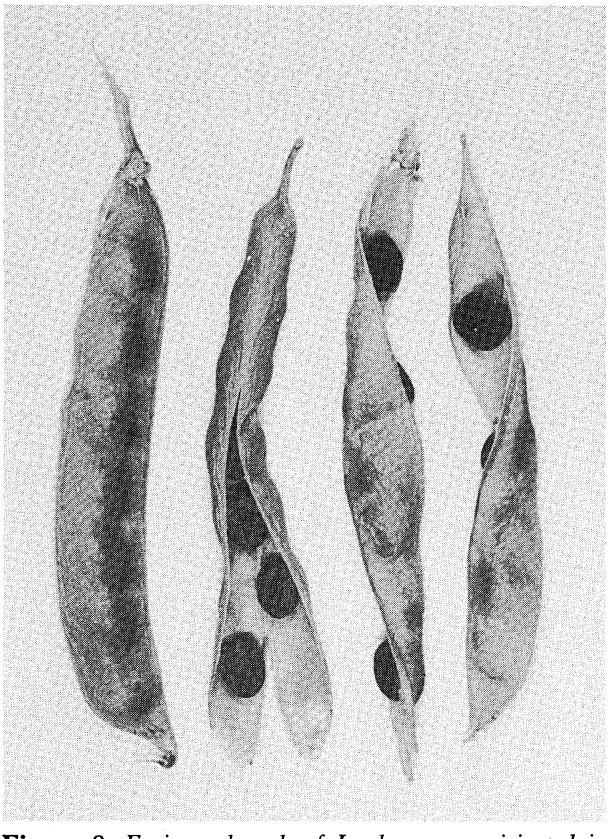

Figure 8. *Fruits and seeds of L. clymenum originated in Lakki, Crete.* × *1·4.*

Tutin *et al.* 1968, 142). However, Davis (1970, 365) finds it impossible to treat *L. articulatus* from *L. clymenum* as a separate species, and even difficult to assign them to separate varieties. Section *Clymenum* includes also *L. ochrus* (L.) DC. (Cyprus vetch) which is rarely cultivated. *L. ochrus* seeds are readily distinguished from those of *L. clymenum* by their spherical or almost spherical shape.

L. clymenum today is a rare and local food plant in the western Mediterranean countries where its seeds are consumed as a pulse, but it is not mentioned as such in agricultural textbooks or dictionaries of economic plants (e.g. Aykroyd and Doughty 1982; Uphof 1968). Apparently, the seeds have a significant nutritional value, like *L. sativus* and other legumes, but it is an uncommon pulse crop due to toxic substances in the seeds that cause a serious disease when eaten by man or domestic animals in large quantities. A few case studies will illustrate the peculiar position of this pulse as a food and as a feed.

During the nineteenth and twentieth centuries, *L. clymenum* was grown to a limited extent in the region of Salerno, southern Italy. The seed flour was utilized in special dishes, or was mixed with wheat flour in various ratios for baking bread. In the 1870s, after a severe shortage of food in that region, the population was compelled to expand the human consumption of *Lathyrus*. In the same year many peasants exhibited clear, irreversible difficulties in walking. In the local dialect, *L. clymenum* is called 'dolaca'; and there is a local folk saying that one who eats 'dolaca' becomes lame. Cantani (1873), who coined the term lathyrism for this disease, described two incidences in Italy of spastic paralysis of the lower limbs which he related to continuous consumption of *L. clymenum* (Visco 1924, 1f.).

Today, the species is still grown as a human dietary component on the southern Cycladic islands of Thera (Santorini), and Anafi, as well as the southern Aegean island of Karpathos. The islanders call this pulse 'arakas', which is the usual mainland name for fresh, green peas. *L. clymenum* seeds are usually eaten in the dried form, split in a hand-mill with the testa or 'skins' removed, and are made into a kind of soup or gruel. The seeds are also eaten green (Halstead and Jones 1989; Sarpaki 1987; Sarpaki and Jones 1990, 363).

In addition, it is cultivated in southern Europe as a fodder plant (Uphof 1968, 302). The drought in the years 1921–22 in north-eastern France resulted in a scarcity which forced the farmers of Montfort-sur-Meu to cultivate common vetch to replace clover. Unfortunately, the seeds purchased from two merchants were mixed with great quantities of *L. clymenum*. At the time of pod formation, the end of June and the beginning of July, many cases of lathyrism were reported in cows, which were paralyzed and died (Vazeux 1923, 481).

Lathyrism and its related toxicants

Lathyrism, or more precisely neurolathyrism, is known to have plagued human populations in many parts of the world since the beginning of recorded medical history. Lathyrism, a disease of the nervous system, is caused mainly by eating the seeds of *L. sativus* (because of its wide distribution), but *L. cicera* L. (flat-pod pea), *L. clymenum*, *L. ochrus* and other species of *Lathyrus* can cause the illness. Probably, *Vicia sativa*, and *V. ervilia* (L.) Willd. (bitter vetch) have the same effect. However, from many of the earlier publications it is difficult to discern the particular species responsible for the reported lathyrism because the diet consumed was varied or the plant seeds were not precisely identified. Often, the same vernacular name was used for different related species, even in neighbouring communities of the same country.

The principal clinical sign of the disease is a spastic paralysis of the lower limbs that usually lasts for life. The

symptoms are muscular rigidity, weakness, paralysis of the leg muscles—and in extreme cases, death. In milder cases there is bending of the knees and difficulty in running, and in more advanced cases people walk on their toes and require a cane for support. The disease tends to assume epidemic proportions, especially at times of semi-famine conditions, when the population is unable to obtain other foodstuffs in adequate amounts. This appears to have been the case historically in Italy, France, Spain, Algeria, and other countries, and even today in India and Ethiopia. Mainly males are affected, with the highest incidence occurring in boys and young men. Usually, when the disease appears in a human population, it also affects domestic animals. There does not seem to be any risk of lathyrism when *Lathyrus* seeds are eaten in relatively small quantities, namely when its amounts do not exceed the usual dietary consumption of legumes. The disease usually appears when a diet containing one-third to one-half of *Lathyrus* seeds is consumed for three to six months (Aykroyd and Doughty 1982, 38f; Selye 1957, 11).

The cause of neurolathyrism has been traced to some unusual amino acids. The main neurotoxin of *Lathyrus* seeds is usually called β-N-oxalyl-amino-L-alanine (BOAA), or β-N-oxalyl-amino-L-α,β-diaminopropionic acid (ODAP), and it is found in *L. sativus*, *L. cicera*, *L. clymenum* and 18 other species of *Lathyrus* (Bell and O'Donovan 1966, 1215; Murti *et al.* 1964, 76; Rao *et al.* 1964, 432f.). While the average amount of the toxin in the seeds is about 0·9%, it differs considerably from strain to strain. Folk traditions are practiced to remove the toxin from the seeds before consumption. These involve one of the following procedures: 1. cooking the pulse in excess water and draining off the liquid; 2. soaking the pulse overnight in cold water; and 3. steeping the dehusked seeds in hot water (Padmanaban 1980, 259). However, a complete removal of the lathyrogen (the toxin that causes lathyrism) is unwanted, because the substance appears to contribute to.the unusual tasty properties of the cooked legume (Spencer *et al.* 1986, 303). In addition, there is another neurotoxin, probably with a similar effect, β-cyano-L-alanine, that is found in seeds of *V. sativa* and 15 other species of *Vicia* (Bell and Tirimanna 1965; Ressler 1962).

Archaeobotany

Crop remnants of *L. clymenum* were unknown to archaeobotanists until June 1983, when Anaya Sarpaki exhibited her charred material from Thera in the 4th Symposium of the International Work Group for Palaeoethnobotany at Groningen, Holland. Before the finds at Tel Nami, this pulse was identified at only two or three other sites, all confined to Aegean Island Late Bronze sites. 1. Large quantities of seeds, still in storage jars in the West House at Akrotiri, which was destroyed in the volcanic eruption of Thera (Sarpaki and Jones 1990, 364), now dated to 1628 B.C. (cf. Manning 1988). The average dimensions of the larger seeds (sample 40) are 4·8 × 3·9 × 3·4 mm., and of the smaller seeds (sample 65), 3·1 × 2·3 × 2·2 mm. (Sarpaki and Jones, *loc. cit.*). 2. As a consequence of the first identification, *Vicia/Lathyrus* seeds from a Late Minoan II house at Knossos, Crete were re-identified as *L. clymenum*. Their average dimensions are 4·7 × 3·6 × 3·0 mm. (Jones 1984, 304f.; Sarpaki and Jones *op. cit.*, 364f.). 3. A large seeded vetch, 'possibly *Vicia sativa*', reported from Late Minoan Phylakopi, Melos (1600–1100 B.C.), may also represent the same species (Renfrew 1982, 156; Sarpaki and Jones 1990, 365). The find at Tel Nami, the first outside the Aegean Sea area, is also the earliest (no later than 1750 B.C.).

Discussion

Contemporary as well as archaeobotanical data indicate that *L. clymenum* has served as a local staple food. However, the reasons for its being a rare crop plant in ancient and modern times are not clear. It is likely that the toxicant included in the seeds has prevented its cultivation on a large scale throughout the Mediterranean region. However, *L. sativus* and *L. cicera* were rather important pulse crops, in the Balkan peninsula for example, from the Neolithic period to the Iron Age (Kislev 1989, 266). Although the seeds of *L. clymenum* include larger amounts of the toxin than *L. sativus* and *L. cicera* (Bell and O'Donovan 1966, 1215), it is assumed that in normal times the inhabitants knew how to process the seeds into a tasty food without exposing themselves to dangerous quantities of the lathyrogen.

The absence of the wild plants from the eastern Mediterranean countries suggests that the climate of the region is not entirely suitable for its cultivation. Evidently, following domestication, the plant increased its distribution area especially towards the Atlantic islands and western Europe, but not to the Near East. Perhaps *L. clymenum* suffers from the dry, hot east wind of that area, which prevails during the May ripening season. Apparently for this reason, seeds originating in several countries died in the experimental plot at Bar-Ilan University before producing their full yield. Therefore, it is suggested that *L. clymenum* has not been cultivated in the Levant and that the finds at Tel Nami represent seeds grown elsewhere. In addition to the botanical argument that the wild plant does not grow today in the Levant, it is not likely—based on these findings—that it grew in the vicinity of Tel Nami. The 259 charred seeds in a single structure cannot be

reasonably interpreted as the result of the gathering of wild plants, because it would be expected that they would be accompanied by other wild legume seeds, or wild plants of other families.

The find of an exotic crop in a coastal site, ostensibly with an anchorage, is evidently a result of sea trade. Trade along the coasts from adjacent regions is excluded, as there is no evidence of present or past cultivation of *L. clymenum* in the Near East, including Anatolia, Cyprus and Libya. Therefore, the nearest region from which the plant may have originated is the Aegean sea, 800–1100 km. from the Israeli coast. The alternative regions, in Italy or Tunisia, are much further away. On the other hand, it is not possible to locate more precisely, by the archaeobotanical data, the island or the region on the Greek mainland from which the seeds were imported.

In this particular case, the plant remains could be evidence of contact between the Minoan culture and the southern Levant. Certainly these pulse seeds were not a usual agricultural import, as it is difficult to understand the reason for their demand by the local population. More than likely the demand for *L. clymenum* came from a person or persons who were either native to, or familiar with the Aegean region and were acquainted with the plant's consumption and its palatable taste. The discovery of *L. clymenum* at Tel Nami could be evidence for the presence of Aegean people on the Israeli coast during the Middle Bronze IIA period. Note that the seeds found at Akrotiri come from the West House, often called the 'Admiral's House', which is the source of the famous 'marine fresco' with scenes depicting later Theran maritime activity (cf. Morgan 1988 and accompanying bibliography).

Material evidence of direct contact between the Minoan world and the Levant during this period is scant, permitting a brief summary to be presented here. Byblian daggers discovered on Crete, and Minoan pottery found at Byblos and Ugarit indicate that commercial connections may have been established sometime between the Early Minoan III and Middle Minoan IA periods (Brannigan 1966 and 1967; Ward 1971, 77–83). The synchronism of Middle Minoan IB–IIA = MB IIA is founded on Cretan finds from Ras Shamra and Cyprus (Cadogan 1983, 514); the documentation in the southern Levant has been less than copious. Sherds of Middle Minoan Kamares ware reported at Hazor (Yadin *et al.* 1960, 91, pl. CXV, nos.12–13), if they are Kamares ware (cf. Ward 1960, 78, n. 319; N.B. Cadogan 1983, *loc. cit.*), were found in stratum III which is ascribed to the MB IIB period (*c.* 1750–1550 B.C.). A text from the archives of Mari, *c.* eighteenth century B.C., mentions a Cretan merchant (accompanied by an interpreter) who delivered a tin consignment from Ugarit to Mari (Malamat 1971; Astour 1973). Recently, the excavation of a Middle Bronze palace in area D at Tel Kabri has revealed a rare painted floor which, in its design and execution, exhibits strong Cretan affinity (cf. Niemeier *et al.* 1990; Kempinski 1988; Kempinski and Giveon 1989). The principal occupation phases of this structure, and specifically the 'Cretan' floor, have been assigned to the MB IIB period. Furthermore, it is the opinion of the excavators that this floor is the work of an itinerant Minoan artisan who may have been commissioned by the local ruler to adorn his palace (Niemeier *et al.*, *op. cit.*).

The absence of material evidence for Minoan—South Levantine trade during the Middle Bronze IIA period has naturally resulted in its negation, despite contemporaneous evidence for, albeit ambiguous, Minoan–Egyptian contact (see Kemp and Merrillees 1980, 268ff.) and evidence for contacts with North Syria. In general it is the durable find—the ubiquitous potsherd—which claims preeminence as an indicator of the existence or absence of inter-cultural contact and, to some extent, the degree of intensity of such contacts. The perishable find, by its very definition, is often lost to the archaeological record, but where it is present its significance should not be minimized. In the light of the nature of the archaeobotanical find at Tel Nami, we must consider that Minoan–Levantine contacts were not of an ephemeral disposition, but were of a sufficient scale to create the conditions whereby either local inhabitants (merchants, sailors?) acquired a presumably expensive taste for an Aegean food plant, or Aegeans abroad imported the ingredients for their own *haute cuisine*!

Addendum

Since the submission of this article, W.-D. Niemeier has brought to our attention a reference to a "keftiu" (Cretan) bean in Papyrus Ebers, *c.* 1550 B.C. Although the purported medicinal properties of this bean (as a laxative) do not permit an identification with *Lathyrus Clymenum*, this text does demonstrate further foreign acquaintance with Aegean botany. Note that, based on paleographical evidence, this portion of the text may date to the Middle Kingdom, see Strange, J. (1980) *Caphtor/Keftiu: a new investigation*, Leiden, E. J. Brill, p. 93.

Acknowledgements

The authors wish to express their sincere thanks to Dr G. Jones for confirming the identification of the charred seeds of *L. clymenum* from Tel Nami, and together with Dr P. Halstead, both from the Department of Archaeology and Prehistory, Sheffield University, and Dr A. Sarpaki, Tsikalaria, Crete, for their comments and for sending us

their articles. Thanks are due to Dr C. Lehman, Zentralinstitut für Genetik und Kulturpflanzenforschung, Gatersleben, Germany; Dr D. J. Goyder, Department of Biology, Southampton University and Mr M. Nesbit, British Institute of Archaeology, Ankara, for providing the *L. clymenum* seeds for the reference collection. Mrs M. Marmorshtein and Miss E. Silber did the technical work, and T. Anker prepared the photographs of *L. clymenum*, Figs. 6–8.

The Tel Nami Land and Sea Regional Project is sponsored by the Center for Maritime Studies and the Institute of Archaeology of the University of Haifa, initially assisted by the Carsten Neibhur Institute of the University of Copenhagen, Denmark and now serves as field school for the University of Massachusetts at Amherst. Funding for the project and costs incurred in this and related studies have been provided by the Robert Shay Foundation, D. Hillel, the Harold Grinspoon Foundation, the Dorot Foundation, and others. Figs. 1–3 were prepared by Natalie Messika. Fig. 4 was photographed by M. Artzy. Fig. 5 was photographed by David Evan.

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