

# LEGUMES IN ANCIENT GREECE AND ROME

## Food, Medicine, or Poison?

Choosing, preparing, and eating food are more than just survival habits. These actions also function as complex social rituals. Discovering what foods are eaten and under what circumstances, how food is normally procured and prepared, and how it is eaten and with whom can provide valuable information about a culture. We can learn where and how an individual fits into a given society by determining how closely societal standards of diet and dining are observed. Eating also has moral and ethical connotations. Proper eating habits convey to others that one knows how to conform to accepted standards of behavior.<sup>1</sup>

The ancient Mediterranean everyday diet has received very little attention. Even less is known about the cultural significance of various foods in the Greek and Roman worlds. We know from Pliny (*HN* 18.85–92), for example, that bread was prepared and consumed by all socioeconomic groups, but white bread made from wheat flour was generally preferred over darker breads or those made from barley flour.<sup>2</sup> Fine, high-rising, white bread made from the flour of bread wheat, a free-threshing hexaploid wheat that is more sensitive to drought than other wheats and is therefore more difficult to grow in Mediterranean climates, was associated with the upper classes. On the other hand, coarse, brown breads made from emmer wheat or barley, both of which are easier to grow and more common than bread wheat, were associated with the lower classes. But the cultural significance of legumes has been virtually ignored. In this article, I examine the ways in which legumes were used in the ancient Mediterranean, as documented in the archaeological record and by literary sources. I focus in particular on lentil, chickpea, bitter vetch, broad bean, garden pea, and grass pea.

The ancient diet has previously been studied in connection with the Greek symposium, as described by Plato and Xenophon and depicted in vase painting, and as part of ritual animal sacrifice.<sup>3</sup> Recently, the social significance of various foods and diet in antiquity has been addressed. Wilkins, for example, points out that “classical texts in which food plays an important part were numerous in antiquity. . . . In the *Odyssey*, for example, good men are distinguished from bad and Greeks from foreigners partly in terms of how and what they ate. Herodotus identified people

1. See, e.g., Murcott 1983; and Wilkins, Harvey, and Dobson 1995.

2. See Flint-Hamilton 1994, pp. 97–101.

3. Wilkins, Harvey, and Dobson 1995, pp. 380–385; and Slater 1991. The *Deipnosophistae* of Athenaeus provides descriptions of food in the context of the symposium and banquet. For animal sacrifices, see, e.g., Detienne and Vernant 1989, especially chap. 10, “A Bibliography of Greek Sacrifice.”

partly in terms of their eating habits. And the Athenian comedies abounded with images and discussions of food and eating."<sup>4</sup> Garnsey's study of famine and food shortage in the Graeco-Roman world has helped us understand how frequently ancient farmers could expect to be confronted with food shortage and how they dealt with the resulting difficulties.<sup>5</sup>

Despite this beginning, the foods and customs associated with the diet of the Graeco-Roman world are poorly understood. Even when we have literary references, our sources often do not answer basic questions about cultivation, processing, and diet. In fact, literary sources can be misleading. Wilkins has pointed out that in the Homeric epics, for example, the heroes dine almost entirely on roast meat.<sup>6</sup> Whatever the reasons may be, the Homeric corpus, in which scenes of feasting are very common, constructs a special diet that differs from the evidence in the archaeological record of what people actually ate in the prehistoric Aegean.

To understand diet and dining, literary references to food need to be studied with reference to physical finds of food in the archaeological record. But remains of food are nearly impossible to detect in archaeological contexts without a systematic method of retrieval, for example, water-sieving of soil samples from floors, hearths, and storage areas. Palaeoethnobotanical analysis of processed soil samples can reveal the presence of seeds and seed fragments that are impossible to detect *in situ* with the naked eye. Many excavators, however, do not collect soil samples for palaeoethnobotanical study, assuming, wrongly, that we can find all the information we need about diet and agriculture in historical periods from literature. For this reason, practically all the palaeoethnobotanical studies conducted so far in the Mediterranean are from archaeological sites that predate the historical period by at least several hundred years.

Even when we have archaeological material, proper identification of species can be difficult. In the Mediterranean, most botanical material is preserved by the carbonization process, which can distort or even destroy many diagnostic features.<sup>7</sup> Studies are currently being conducted to determine whether variations in the seed coat are diagnostic for genus- and species-level identification of legumes.<sup>8</sup> But even though species-level identification can sometimes be tenuous, it is only by study of the physical finds of plant remains in the archaeological record that we can determine with any certainty what foods and plant products were used in antiquity.

What evidence we have, both literary and archaeological, indicates that legumes were used regularly throughout antiquity. It has long been known that they constitute an essential dietary supplement. Not only are they an important source of protein, but they also improve the quality of the soil, are relatively easy to store, and serve as nutritious food for livestock as well as for people. Beans and peas were not only eaten boiled or in soups, but were used in other ways as well. In the Roman period, for example, meal made from beans, *lomentum*, was used to make heavier loaves of bread (Plin. *HN* 18.117). Some varieties of legume may have been used medicinally, as reported by Theophrastus, Pliny, and Hippocrates (see below). In spite of their usefulness and versatility, however, legumes in the Graeco-Roman world have received less attention than grains, particu-

4. Wilkins 1995a, p. 3.

5. Garnsey 1988.

6. Wilkins 1995b, p. 105.

7. Identification of legumes is based not only on the size and shape of the seed, but on the size, shape, and relative positions of anatomical features such as the hilum, chalaza, and hypocotyl, which are often damaged when the seeds burn. Helbaek (1970, p. 227) points out that when large peas and beans carbonize, the seed coat dries and shrinks as the moisture in the cotyledons expands, eventually causing the seed coat to fall from the seed. As a result, although the position of the hilum, for example, can sometimes be determined, what often remains is merely a vague indentation that cannot be accurately measured or described.

8. Studies of the seed coat, or testa, using scanning electronic microscopy have been fairly successful in determining distinguishing characteristics among the taxa. Chernoff, Plitmann, and Kislev (1992) have identified distinctive testa patterns among the *Viciae*. Similarly, Butler (1986) has studied the variation in seed coat patterns among *Lathyrus*.

larly wheat and barley. This is understandable to some extent, since grains are mentioned in the classical literature much more frequently than legumes. But this results in a very lopsided understanding of the role that legumes played in the culture and economy of Greece and Rome.

As early as the Greek Bronze Age, legumes seem to have been regarded differently from grains and other foods. Legumes are entirely absent from the Linear B records. Although the economic importance of cereals, olives, spices, and wine in the palace records has been and continues to be studied,<sup>9</sup> no Linear B ideogram has been identified that corresponds to any of the legumes, nor does there occur any word that corresponds to bean or pea.<sup>10</sup> Renfrew has suggested that the most important crops in Bronze Age Greece were cereals, olives, and grapes, the so-called "Mediterranean triad."<sup>11</sup> The production of a large surplus of these foods for purposes of trade and taxation by dominant states, a practice continuing into the Classical period, was a major factor leading to the establishment of the palatial economy of the Late Bronze Age. Legumes, however, were not cultivated as cash crops, which may explain their absence from the palace records.

The value of legumes for the Greek and Roman farmer did not go unnoticed. The agriculturalist Marcus Porcius Cato recommends that wine, oil, and grain be produced in surplus quantities, with a mind to selling the surplus (*Agr.* 2.7). He does not mention selling any of the legumes, but does acknowledge that legumes are a necessary component of a well-functioning farm. He recommends at least one lupine vat (*labrum lupinarium*) as part of the requisite equipment for olive groves and vineyards (*Agr.* 10.4–5, 11.3). Broad beans and vetches, along with clover, are to be planted as fodder (*Agr.* 27), and the straw and pods of beans, vetch, and lupines are to be stored as feed (*Agr.* 54). That a successful legume harvest was considered important can be demonstrated by Cato's recommendation that farmers offer incense and wine to Ceres, Janus, and Jupiter before harvesting beans (*Agr.* 134).<sup>12</sup>

It is well known that legumes improve the fertility of soil.<sup>13</sup> If cereals and legumes are rotated or if they are grown together in the same field, especially if the legume plants and seeds are plowed back into the field as compost or green manure, the soil will not be depleted of nitrogen as quickly as when cereals alone are grown season after season in the same field. The soil, then, is regenerated, and the crops of the following season are healthier and more prolific. Although the ability of legumes to fix nitrogen into usable form was not discovered until the 19th century, the benefits of legume cultivation for soil fertility were appreciated in antiquity. As early as the 4th century B.C., Xenophon notes in the *Geoponica*<sup>14</sup> that legume cultivation replenishes exhausted soils. Cato acknowledges that certain legumes act as fertilizer (*Agr.* 37) and Pliny (*HN* 18.134, 137) mentions that certain species of legume enrich the soil so that fertilizer is not necessary.

The same features that make legumes so useful for fields and so beneficial to our health, however, may well have resulted in the evolution of toxin production. Plant biologists speculate that the toxins produced by legumes evolved as a defense mechanism, to protect the plants' valuable

9. See, e.g., Chadwick 1976; Boardman 1976; Melena 1983; and Palmer 1989 and 1992.

10. Ruth Palmer (personal communication, 1995) confirms that no evidence has yet been found for the occurrence of legumes in Linear B texts.

11. Renfrew 1972, p. 280.

12. Prayers and offerings are also made before harvesting spelt, wheat, and barley.

13. A symbiotic relationship is established with the bacterium *Rhizobium radicola*, which stimulates the growth of nitrogen-capturing root nodules. The nitrogen is then converted into a form that the plant can use. When the plant dies and decays, the usable nitrogen in the root nodules is released into the soil.

14. *Geoponica* β.12: δυνατόν δὲ καὶ ἐν τῇ πεδιάδι σπείρειν τὰ ὀσπρία μετὰ τὴν τοῦ σίτου συλλογὴν τῷ ἐπιόντι καιρῷ.

nitrogen and to discourage destruction of leaves and pods by foraging animals.<sup>15</sup> Beans and peas are known to concentrate toxic substances in their seeds. In rare cases, ingestion of these toxins can result in vomiting, fainting, and even death. In most cases, however, the effects are much more subtle and result from long-term ingestion of a single species of legume. The most common long-term effects of toxin ingestion include inhibition of growth, pancreatic hypertrophy, hypoglycemia, and liver damage, and are more likely to affect livestock than humans, since under normal circumstances the human diet is far more varied.<sup>16</sup> Among the toxins most commonly found in legumes are protease inhibitors, which interfere with the activity of digestive enzymes and therefore the ability of our intestinal tract to absorb nutrients; lectins, which cause red blood cells to agglutinate; cyanogenic glycosides, which when metabolized can form cyanide;<sup>17</sup> and alkaloids, which act as neurotoxins and can cause numbness, convulsions, weakening of the limbs, and even death. Some alkaloids are psychoactive, i.e., they can be hallucinogenic.<sup>18</sup> Many of the edible varieties of legumes become innocuous only as a result of thorough cooking, since high temperatures can neutralize certain of the toxins.

The cultivation of legumes, in spite of their potentially poisonous properties, has been and continues to be important for our survival. Because of their high albumen content, legumes are a critical dietary supplement in warmer countries where meat is in short supply and difficult to store.<sup>19</sup> Because people in the Graeco-Roman world probably consumed far less meat than we do today, in some cases adhering to a largely vegetarian diet except at festival times,<sup>20</sup> legumes were a necessary source of protein. At the very least, legumes were an important protein supplement.

Sarpaki concludes in her study of the role of legumes in Greek history that an agricultural system could not have succeeded without legume cultivation.<sup>21</sup> Good agricultural land is scarce in Greece, and crop rotation practiced with legumes is highly beneficial to Greek soils, more so than a simple fallow. The effects of wind, sun, and rain accelerate the erosion process, and are intensified when fields remain fallow. Furthermore, since the success of cereals is directly related to the frequency of spring rains, a successful crop is severely jeopardized in times of drought. Some sort of buffer crop, such as legumes, would certainly have been needed, many species of which are drought-resistant.<sup>22</sup> Sallares, however, reports that the cereal component of the cereal-legume crop rotation produces a lower yield than that of a cereal-bare fallow rotation.<sup>23</sup> Like Sarpaki, he emphasizes the importance of legume cultivation, but rather than a cereal-legume rotation he suggests that cereals and legumes were probably grown together in the same field. Whether rotated or produced as a maslin with other crops, legumes were clearly important both for soil and for survival. Garnsey lists legumes as one of the crops that are produced and stockpiled in the event of famine.<sup>24</sup>

When we encounter legumes in literature, they nearly always seem to have been considered the food of the lower classes. In Petronius's *Satyricon*, a reference to legumes in several places illustrates how desperate and impoverished the main characters have become. Encolpius and Ascultus be-

15. Levy and Primack 1984, p. 56.

16. Liener 1983, pp. 217–218.

17. In the early 20th century lima beans were imported into Europe from various tropical countries. Following ingestion, serious outbreaks of cyanide poisoning were reported. Liener 1983, p. 237.

18. Blackwell 1990, p. 146. The active toxin in the legume locoweed is an alkaloid.

19. Hopf 1978, p. 70.

20. Wilkins 1995a, p. 2. It is by no means certain that the majority of people in the Graeco-Roman world were largely vegetarian. Sheep and goat bones are frequently found during archaeological excavation. When the bones exhibit cut marks, it is clear that the animal was slaughtered and butchered. Depending on the age of the animal at the time it was butchered, one can determine whether herds were used primarily for meat, or for their secondary products such as wool or milk. At the Iron Age settlement at Kavousi, Crete, for example, it has been suggested that sheep and goats were raised primarily for their meat: Klippel and Snyder 1991.

21. Sarpaki 1992, pp. 63–69.

22. Aykroyd and Doughty (1964, table 1, pp. 9–14) note that chickpea, grass pea, and lentil are resistant or moderately resistant to drought and high temperatures.

23. Sallares 1991, p. 301.

24. Garnsey 1988, pp. 53–54.

moan the fact that they need to spend their last coin on beans (*Sat.* 14), while the old woman Oenoe, whose house is so modest that her furniture is falling apart, asks Encolpius to clean some beans (*Sat.* 135) while she prepares for a sacrifice. Aristophanes (e.g., *Plut.* 1004, *Ach.* 801) uses lentils and chickpeas to highlight the lack of sophistication of his characters. On the other hand, broad bean, grass pea, and lentil are numbered among the fine foods served to the guests in Athenaeus's *Deipnosophistae* (4.131). Otherwise, however, these species as well as garden pea and bitter vetch are rarely mentioned. What little attention they receive is generally in the form of advice on their proper care from the agriculturalists and, occasionally, on uses other than food for the seeds and their products. This suggests that, although they were available and perhaps easily procured, they were not normally considered favorite foods.

The only way to understand how and in what contexts legumes were used in the ancient Mediterranean world is to review literary references and archaeological remains from excavation. With this goal in mind, I examine several species in detail in the following pages.

25. *Lens culinaris*: φακός, φακῆ (lentil soup, dish of lentils), φακίνος (made of lentils), φακίον (decoction of lentils, used as an emetic), *lens*, *lenticula*.

26. Zohary 1976, p. 163.

27. The following is a sample of sites at which lentils have been recovered in the Near East: 8th millennium: Tell Aswad (van Zeist and Bakker-Heeres 1979, p. 162); 7th millennium: Jericho (Hopf 1983, pp. 584–585); Jarmo (Helbaek 1959, pp. 367–369); Hacilar (Helbaek 1970, pp. 224–226); Can Hasan (Renfrew 1968, pp. 55–57; Zohary and Hopf 1988, p. 205); Yiftah'el (Garfinkel, Kislev, and Zohary 1988); 6th millennium: Ali Kosh (Helbaek 1969, p. 391).

From Greece, see, e.g., Upper Palaeolithic–Neolithic Franchthi Cave (*Franchthi* 7, *passim*); Aceramic Neolithic Knossos (Evans 1968, p. 269) and Ghediki (Renfrew 1966, p. 26); EN Argissa and Souphli (Renfrew 1966, p. 26); EN Nea Nikomedeia (van Zeist and Bottema 1971, pp. 534–535); LN Rachmani (Renfrew 1966, p. 31); LN Dimini (Kroll 1979b); Early Chalcolithic–Early Cycladic Naxos (Flint-Hamilton 1994, pp. 120–124); EH Kastanas (Kroll 1983, pp. 52–53); EH Lerna (Hopf 1962a, p. 4); MH Argissa (Hopf 1962b, pp. 101 and 109); MM Mallia (*Mallia* I, p. 38); the LM Unexplored Mansion at Knossos (Jones 1984, p. 303); and LC Akrotiri (Sarpaki 1987, p. 146).

## LENTIL

Lentils<sup>25</sup> are among the earliest domesticated crops to appear in Greece. Together with wheat and barley, they are associated with the spread of Neolithic agriculture throughout the eastern Mediterranean. Today lentils are grown in India, Pakistan, Ethiopia, the Near East, and the Mediterranean. They are considered one of the most palatable and nutritious of the legumes, and constitute an important substitute for meat in those countries where they are grown.<sup>26</sup>

In archaeological contexts, lentils are commonly found at prehistoric Mediterranean sites where archaeologists have systematically retrieved plant remains. They have been identified at many sites in the Near East, and among settlements on the Greek mainland as well, dating from as early as the Upper Palaeolithic period in the Franchthi Cave.<sup>27</sup> Since so few palaeoethnobotanical studies have been conducted on classical sites, we must rely on literary references to lentils to determine how frequently and in what ways lentils were used during later periods.

Of all the legumes, lentil is most frequently mentioned in Greek and Roman literature. In Aristophanes' *Plutus*, Chremulos comments that the gigolo has no further need for lentil soup since he has found wealth (*Ar. Plut.* 1004). The sausage-seller in *Knights* sees lentils in his oracle (*Ar. Eq.* 997). Bdelycleon in *Wasps* places a snack of lentils in a pan next to Philocleon, who eats too much, develops a stomachache, and begins to shed tears, which is mistaken for sympathy (*Ar. Vesp.* 811, 984). According to Aristophanes then, lentils are the food of the lower classes, a food that can be used to punctuate a point about poverty or lack of sophistication. Lentils make several appearances in Athenaeus's *Deipnosophistae*. One particular dinner is described in which the only food served consisted of lentils in various forms and a foul-smelling sea perch (4.156). In another

instance, a dinner guest extols the virtues of lentils, which the other guests find highly amusing (4.157–158).

Columella and Cato, the herbalist Theophrastus, and Pliny all refer to the cultivation and care of lentil. According to Columella, lentils are labor-intensive crops. One and a half modii<sup>28</sup> of lentils take a total of about eight days to plant, weed, and harvest. Four modii of chickling vetch and five modii of bitter vetch, each more than twice the volume as lentil, take only six days each (Columella *Rust.* 2.12). In spite of that, however, Columella (*Rust.* 2.7.1) still considers it among the most useful of the legumes, and recommends that it be sown twice per year, once in mid-winter and again in February (*Rust.* 2.10.15–16). Cato (*Agr.* 35 and 116) gives detailed instructions on the manner in which lentils should be sown, suggesting that they be planted in rough soil cleared of weeds. Pliny advises that lentils grow best in thin soil and a dry climate, and considers it a spring-sown crop (*HN* 18.50, 123). Pliny, Theophrastus, and Columella all agree that lentils should be planted in dry dung.<sup>29</sup>

Following the harvest, Pliny (*HN* 18.98) recommends that the lentil pods first be roasted, then mixed with bran and pounded, if necessary, with a fragment of unbaked brick and some sand. Columella (*Rust.* 2.10.15–16) suggests that as soon as the lentils are threshed, they must be soaked in water, sun-dried, sprinkled and rubbed with silphium<sup>30</sup> mixed with vinegar, dried again in the sun, and stored in a bin or oil jars sealed with gypsum. He also indicates that lentils can be stored mixed with ashes.

Among the most intriguing accounts of lentil are Pliny's reports of the ways it was used medicinally. According to Pliny, lentils dull the sight (*HN* 22.142), an indication that there may be a mild neurotoxic effect. He reports that lentils, when only lightly boiled, can be a remedy for constipation.<sup>31</sup> In fact, lentils have been found to inhibit the action of digestive enzymes,<sup>32</sup> which explains how, when not thoroughly cooked, they could provide relief. Pliny also recommends that lentils be used in combination with other ingredients such as beets, vinegar, and barley to treat abscesses, ulcers, gangrene, gout, and sore throat, but he warns that they should not be used for ailments of the lungs, or for headaches, joints, or insomnia (*HN* 12.145–146). Hippocrates recommends lentils as a remedy for ulcers and hemorrhoids.<sup>33</sup>

According to Theophrastus (*Hist. pl.* 8.8.6), lentils, as well as several other legumes, become “cookable” and “uncookable” depending upon the conditions under which they are harvested, and the same patch of land in a field can result in producing both types of seeds. If two rows of lentils are planted side by side, the plants in one row might produce cookable seeds while the adjacent row might produce uncookable ones. He suggests that the weather is responsible for rendering cookable seeds uncookable, and attributes the cause to the direction of the prevailing wind during winnowing.

What Theophrastus was observing might have been the action of mycotoxins.<sup>34</sup> Warm, damp conditions are highly favorable for the growth of fungi, some varieties of which produce toxins. If the lentils are harvested or winnowed on damp days, or if they are stored in damp contain-

28. 1 modius is approximately 2 gallons.

29. Theophr. *Hist. pl.* 2.4.2; Plin. *HN* 18.198; Columella *Rust.* 2.10.15–16.

30. Silphium was a strong spice highly valued in Roman and Greek cuisine for flavoring as well as for medicinal purposes. It became extinct in the first century A.C. Roman cooks replaced it with asafoetida; see Dalby and Grainger 1996, p. 21.

31. Pliny also reports that, when thoroughly boiled in rainwater and eaten together with other foods, lentils can be a remedy for diarrhea (*HN* 22.142).

32. Tampion 1977, p. 148.

33. Hippoc. *On Hemorrhoids*, Part 2; *Acut.* 9.

34. See, e.g., Moreau 1979.

ers, ingestion of these mycotoxins can result in serious illness, even if the lentil is cooked before being eaten. Pliny's recommendation for roasting as a necessary step in processing and storing lentil may well have been a preventive measure to kill potentially toxic fungi.

## CHICKPEA

Chickpea<sup>35</sup> is a nutritious legume, highly palatable and often prepared dried and roasted. In India, flour from ground chickpeas is a common dietary supplement. Today, about 85% of chickpea production takes place in northern India. It does not fare well in cool temperate regions, and outside India chickpea is grown in the Mediterranean, Ethiopia, and Mexico. There is very little international trade of chickpea. Since its seeds are 20–22% protein, a diet of chickpea and cereals can supply all the essential amino acids, while the carbohydrate and oil contained in chickpea supply considerable energy. It is considered a food of the lower classes, grown where and in conditions under which preferred crops would normally fail.<sup>36</sup>

Although we find chickpea in the literature nearly as often as we do lentil, unlike lentil it is relatively rare among Greek archaeological finds. It appears early in the Near East, but in Greece is found only infrequently, suggesting that it was not regularly used as a staple food, at least not at prehistoric sites.<sup>37</sup> Perhaps its popularity grew over the generations, and it was more frequently used in the Graeco-Roman period. More palaeo-ethnobotanical studies conducted on later sites would clarify the usage patterns of chickpea as well as other plant species.

In Aristophanes' *Acharnians* the pig-seller feeds chickpeas and figs to his pigs (*Ach.* 801).<sup>38</sup> The chorus in *Clouds* proclaims that a winning verdict will earn a chickpea for the skins of old men (*Nub.* 1396). In *Ecclesiazusae*, when Praxagora lays out her plan for equality, she says that people will have in abundance all they could want, including chickpeas (*Ecc.* 606). In Petronius's *Satyricon*, Trimalchio asks the drunken tombstone mason Habinnas what had been served at the funeral feast he had just attended. Habinnas responds that, in addition to chickpeas, the menu included sausages, beets, whole wheat bread, cheese tart, honey, lupines, nuts, and an apple for each guest. The feast, he says, was not at all as nice as Trimalchio's party (*Petron.* *Sat.* 66).

Even though it is relatively rare among archaeological remains, chickpea still warrants instruction on proper cultivation by Pliny. Chickpea should be sown in spring. It takes only forty days to ripen, making it the fastest-ripening crop (Pliny *HN* 18.60). When harvested, however, *cicer* is pulled up by its deep roots; the roots carry along with them a portion of topsoil, which he cautions is bad for the soil (*HN* 17.56). Pliny also comments on the fact that the seeds are unusually salty, and suggests that they be soaked in water for a day before they are sown (*HN* 18.124).

Meal from chickpea was used to leaven barley bread (*HN* 18.103). Theophrastus comments that although it was not unusual to sow two crops of chickpea every year, it tends to exhaust the soil more than any other

35. *Cicer arietinum*; ἐρέβινθος, ἐρεβινθοφόρος, *cicer*, *cicerula*.

36. Ramanujam 1976; Zohary and Hopf 1988, pp. 98–102.

37. E.g., from the Near East at 8th-millennium Çayönü (van Zeist 1972, pp. 12–13); and 7th-millennium Jericho (Hopf 1983, pp. 585–586) and Tell Ramad (van Zeist 1976, p. 29). From Greece, e.g., EN Sesklo (Kroll 1981, pp. 100–102), LN Dimini (Kroll 1979b, pp. 181–183) and Chalcolithic Naxos (Flint-Hamilton 1994, pp. 145–147).

38. Aristotle (*Hist. an.* 8.21) also recommends these foods as most effective for rearing and fattening pigs.

legume (*Hist. pl.* 8.1.4, 8.9.1). He characterizes chickpea as being quick to flower and mature, and destructive of certain weeds (*Hist. pl.* 8.7.2). Pliny suggests that it be planted alongside cabbages to ward off caterpillars (*HN* 19.178).

## BITTER VETCH

As its name implies, the seeds of bitter vetch<sup>39</sup> are bitter-tasting. Although grown as a minor crop in the Mediterranean, it is used mainly as animal fodder or fertilizer, and is considered a very inferior food, used only in times of famine. Today, the primary producer of bitter vetch is Turkey.<sup>40</sup> Bitter vetch is thought to have been more of a straggler than a crop in its own right; it grows primarily in fields of lentil and horsebean and survives best in moist soil.<sup>41</sup>

Bitter vetch seeds are difficult to identify in archaeological contexts on the basis of their shape alone. The seeds are small, globular, and roughly triangular in cross section. With natural variation in shape, however, bitter vetch can resemble garden pea or grass pea, and it is often difficult to distinguish the species.<sup>42</sup>

Bitter vetch appears in the Mediterranean as early as the 8th millennium, although the morphological similarity between wild and domesticated varieties of the plant makes it difficult to determine which form the earliest appearance of bitter vetch represents.<sup>43</sup> In Greece, bitter vetch is fairly common at prehistoric settlements, generally in relatively small quantities.<sup>44</sup>

Bitter vetch seems to have been used in antiquity for food only infrequently. Like chickpea, meal from bitter vetch was used to leaven bread (Plin. *HN* 18.103). That it was considered famine food is demonstrated by Demosthenes' comments in *Against Androtion*, in which he reminds his audience that, during the Decelean War, the Athenians became so desperate that vetches were sold for food.<sup>45</sup>

Cato recommends that bitter vetch be planted for fodder (*Agr.* 27), and suggests that it be planted in fields cleared of weeds (*Agr.* 35). He warns that *ervum* damages the soil because it, like chickpea, is pulled up by the roots (*Agr.* 37). Theophrastus cautions his readers against the poisonous properties of bitter vetch. Sown in autumn, it is indigestible, but when sown early in the spring, it is harmless (*Hist. pl.* 2.4.2). Pliny repeats Theophrastus's comments and elaborates on the problems caused by eating *ervum*: "It is said to be injurious to oxen if sown in March [i.e., late spring] and to cause cold in the head if sown in autumn, but sowing it early in the spring makes it harmless" (*HN* 18.139).<sup>46</sup> Furthermore, he cautions that it causes vomiting, digestive difficulties, headaches and stomachaches, and weakening of the knees. If soaked in water for several days, however, it becomes palatable (*HN* 22.153).

How can the toxicity of a plant be determined by the time of year it is sown? Perhaps, like lentils, this phenomenon results from toxic fungi that grow in late spring and early autumn but do not flourish in colder weather.

39. *Vicia ervilia*: ὄροβος, ὄροβίνος (made from ὄροβος, e.g., ἄλευρον); ὄροβίζω (to feed livestock on ὄροβος); *ervum*.

40. Brumfield 1981, p. 20; Zohary and Hopf 1988, p. 107.

41. Helbaek 1970, p. 228.

42. Hansen (*Franchthi* 7, pp. 45, 59) distinguishes bitter vetch from grass pea (*Lathyrus*) by the dorsal face, which in bitter vetch tends to be sloped, but in grass pea is horizontal. The bitter vetch seed tends to be teardrop-shaped. The work of Butler (1986, 1991) and Chernoff, Plitmann, and Kislev (1992) has already begun to elucidate the distinctions between these species. Continued research, however, is much needed.

43. Zohary and Hopf 1988, p. 107. Near Eastern sites with bitter vetch include 8th-millennium Tell Mureybit (van Zeist 1970, p. 168, table 1, and p. 175); 7th-millennium Can Hasan III (Renfrew 1968, pp. 55–57); 6th-millennium Hacilar (Helbaek 1970, pp. 227–228) and Erbaba (van Zeist and Buitenhuis 1983); and 5th-millennium Girikihacıyan (van Zeist 1979–1980).

44. See, e.g., Upper Palaeolithic and Lower Mesolithic Franchthi (*Franchthi* 7, pp. 45–47), EN Nea Nikomedeia (van Zeist and Bottema 1971, pp. 536–537), EN Sesklo (Hopf 1962a, p. 4), LN Dimini (Kroll 1979b, p. 173), and LN Athens (Hopf 1971, p. 267); FN-EH Lerna (Hopf 1961, pp. 240–241) and EH Kastanas (Kroll 1979a, pp. 232–233); LN and Early Chalcolithic Naxos (Flint-Hamilton 1994, pp. 130–134); LH Mycenae (Wace 1921–1923, pp. 148–149), and the LM Unexplored Mansion at Knossos (Jones 1984, pp. 303 and 305).

45. Dem. *Against Androtion* 15 [Dem. 22.15].

46. Pliny: *Naturalis Historiae* V, H. Rackham, trans., Loeb Classical Library, p. 279.

A study of bitter vetch and the fungi associated with it throughout the spring and in autumn is needed before we can understand the mechanism of its toxicity.

Medicinally, bitter vetch seems to have been something of a panacea according to Pliny. Its extensive healing properties were thought reliable enough to administer to the emperor Augustus.<sup>47</sup> Pliny relates the recipe for an antidote to a poisonous venom that he saw engraved on the Temple of Asclepius of Cos, which included vetch meal (*HN* 20.264). Meal made from *ervum* was thought to heal pimples and spots, and to prevent sores from spreading, especially when they appear on the breasts (*HN* 22.151). Painful urination, flatulence, liver problems, indigestion, and other digestive difficulties are purportedly relieved by eating *ervum* that has been roasted and mixed with honey. The chaff from the *ervum* plant was even used as a dye for hair (*HN* 22.153). According to Hippocrates (*Acut.* 18), vetch causes flatulence and pain when eaten boiled as well as raw. Aristotle too recognized this property of vetches, advising that because it causes flatulence, cattle should be fed vetch when they are being fattened (*Hist. an.* 8.7.10). Theophrastus remarks that, if bitter vetch is sown among radishes, spiders stay away (*Hist. pl.* 7.5). Finally, according to Cato, flour from vetch could even be used to sweeten wine (*Agr.* 109).

## BROAD BEAN

Broad bean<sup>48</sup> grows well in dry, Mediterranean climates as well as more temperate environments. Its seeds are 20–25% protein, an important source of protein for Asian as well as Mediterranean countries, particularly Egypt, especially among the poor. Its pods are used for animal fodder.<sup>49</sup> Called broad bean, horsebean, or fava, *faba* is a common food in Greece today. It is also used for green manure or in maslin with other crops. Broad bean is relatively rare among archaeological finds. Although it has been reported at settlements in the Near East as well as in Greece,<sup>50</sup> it generally appears in small quantities.

Ancient reaction to broad beans was mixed.<sup>51</sup> Broad beans were regularly grown and consumed throughout antiquity. They make several appearances in Athenaeus's *Deipnosophistae*, where they are included in the menu of a fine meal (4.131) and are served as a dessert mixed with figs (4.139). In spite of this, however, there existed rather strong proscriptions against them. In his description of the sanctuary of Demeter at Pheneus, Pausanias (8.15.3) explains that the goddess Demeter so loved the Pheneatians that she presented them with a gift of a variety of legumes, but specifically excluded the broad bean. According to Herodotus (2.37) the Egyptians refused to eat broad beans, which were considered so unclean that their priests could not even look upon them. Like the Egyptians, the Pythagoreans practiced a particularly aggressive avoidance of broad bean. Even touching the bean vines was considered taboo, to the extent that, according to one account, Pythagoras himself, as he was trying to escape Syracusan soldiers, came upon a field of broad bean vines that he

47. Plin. *HN* 18.139: *Ipsum medicaminis vim optinens, quippe quo divom Augustum curatum epistulis ipsius memoria exstet*. "It too has medicinal properties; indeed the fact that his Late Majesty Augustus was cured by it stands on record in his own records." Pliny: *Naturalis Historiae* V, H. Rackham, trans., Loeb Classical Library, p. 277.

48. *Vicia faba*: *κῶμμος*, *faba*.

49. Zohary and Hopf 1988, p. 102; Bond 1976, p. 179.

50. From, e.g., PPNB Yiftah'el (Garfinkel, Kislev, and Zohary 1988, p. 49) and Jericho (Hopf 1983, p. 609); FN and EH Lerna (Hopf 1961, pp. 239–245); and EH Kastanas (Kroll 1979a, pp. 231–234, 1983, pp. 53–55). *Vicia faba*-type seeds were also identified in LN Thessaly (Renfrew 1966, p. 30). Sarpaki (1992, p. 75) has suggested that the rarity of *Vicia faba* among archaeological finds may be a reflection of poor preservation rather than its unpopularity as a food. Because the seeds are large, they may crumble or explode during the carbonization process. Perhaps they also do not withstand water-sieving, and the carbonized seeds might be destroyed before the sample can be examined.

51. See, e.g., Andrews 1949 where the ancient taboo on consuming beans is discussed.

could not force himself to cross. He waited instead to be captured (Diog. Laert. *Pythagorae*). Plato (*Resp.* 372c), however, considered them appropriate to be included as a relish in his model city.

According to Pliny, broad beans had several valuable uses. Ground up, their meal was used for making bread. Bean porridge was used in religious ritual, and it was considered auspicious to bring home a fava bean from the harvest. As a food, broad beans were considered a delicacy, but also were thought to cause insomnia. Pliny reports that the Pythagoreans taught that the souls of the dead were housed in the beans, and it is for this reason that they avoided eating them (*HN* 18.118–120). Theophrastus includes them with lentils as legumes that become cookable or uncookable depending on the conditions under which they are sown (*Hist. pl.* 8.8.6).

In his study of the “bean veto” of the Pythagoreans, Arie suggests that a medical syndrome known as “favism” was responsible for their aversion.<sup>52</sup> The main feature of this syndrome is hemolytic anemia, which results from ingestion of the beans, or, in more sensitive individuals, can even result from inhaling the pollen. Symptoms of this condition include discolored urine, jaundice, nausea, vertigo, and vomiting. In more severe cases it can also cause fainting, severe lumbar pain, and high fever. The anemia usually occurs within several hours of consumption, but the reaction can be delayed for up to nine days. This reaction has been observed in nursing infants whose mothers had consumed fava beans, even when the mother herself was free of symptoms.<sup>53</sup> Mortality is currently estimated to occur in one out of twelve cases, but may have been higher before the advent of modern clinical methods of treatment. Although favism has been observed worldwide, it occurs most commonly in the Mediterranean.<sup>54</sup> Indeed, it is so widespread in Rhodes that local ordinances forbid cultivation of *Vicia faba*.<sup>55</sup>

Susceptibility to favism is associated with deficiency of a red blood cell enzyme, glucose-6-phosphate-dehydrogenase (G6PD). The gene responsible for manufacturing this enzyme is sex-linked, and men are more commonly affected than women by a factor of about 6:1.<sup>56</sup> Katz suggests that the frequency of G6PD deficiency in the Mediterranean, coupled with the cultural affinity for growing and ingesting broad beans, may be associated with the incidence of malaria. He observes that broad beans produce the same effects on the hemoglobin of enzyme-deficient individuals that the antimalarial drug primaquine produces. Broad beans, therefore, might have antimalarial properties.<sup>57</sup>

Pliny provides instructions on the proper cultivation of the broad bean, commenting that it requires little labor and is easy to grow. It can be sown three times per year, January, March, and October. The March sowing can be used for green fodder. He cautions that beans should not be sown among grapes as they drain the moisture from the grapes and cause the vines to droop (*HN* 18.137). Theophrastus notes that broad bean takes longer than any other crop to sprout, as long as fifteen or twenty days, and it takes even longer if it rains immediately after sowing (*Hist. pl.* 8.1.5), but they serve to fertilize the soil and thus are valuable. He reports that the Macedonians and Thessalians plow the ground when broad bean is in flower (*Hist. pl.* 9.1).

52. Arie 1959, pp. 77–78.

53. Kattamis, Kyriazakou, and Chaidas 1969, p. 36.

54. Katz 1987, p. 138.

55. Kattamis, Chaidas, and Chaidas 1969, p. 290. In spite of the local ordinances, cultivation of broad bean remains widespread and the ordinance is not enforced.

56. Kattamis, Kyriazakou, and Chaidas 1969, p. 36.

57. Katz 1987, pp. 139–140.

58. *Pisum sativum*: πῖσος, *pisum*.

59. Davies 1976, p. 172.

60. E.g., 8th millennium: Tell

Aswad (van Zeist and Bakker-Heeres 1979, p. 162, table 1), Jericho (Hopf 1983, pp. 584–586), and Çayönü (van Zeist 1972, pp. 3–19); 7th millennium: Jarmo (Helbaek 1959) and Neolithic Can Hasan (Renfrew 1968, pp. 55–56). In Greece, garden pea has been identified at a number of prehistoric sites, including, for example, Lower Mesolithic and Neolithic Franchthi (*Franchthi* 7, pp. 63–65), LN Sesklo (Renfrew 1966, p. 31), LN-EC Naxos (Flint-Hamilton 1994, pp. 125–129), EH Lerna (Hopf 1961, p. 240, and 1962a, pp. 3–4), MH Asea (Holmberg 1944, p. 10), and MH Argissa-Magoula (Hopf 1962b, p. 101). It has also been reported from MH Eutresis (Goldman 1931, p. 42) although I cannot confirm that a specialist made this identification. Garden pea has also been found at the LM Unexplored Mansion at Knossos (Jones 1984, p. 303) and in the LC West House at Akrotiri (Sarpaki 1987, p. 146).

61. Three species: *Lathyrus sativus*, *Lathyrus cicera*, *Lathyrus clymenum*: λάθυρος, *lathyris*.

62. Sarpaki 1992, p. 75; Aykroyd and Doughty 1964, pp. 9–14.

63. Zohary and Hopf 1988, p. 109.

64. From the Near East at, e.g., Neolithic Tepe Sabz (Helbaek 1969, p. 409), Hacilar (Helbaek 1970, p. 236), and Jarmo (Helbaek 1960). In Greece, grass pea has been identified at, e.g., Upper Palaeolithic, Lower Mesolithic, and Neolithic Franchthi (*Franchthi* 7, pp. 59–63), LN Dimini (Kroll 1979b, pp. 174, 183), EH Lerna (Hopf 1962a, p. 4), LN-EC Naxos (Flint-Hamilton 1994, pp. 137–144), FN Kephala (Renfrew 1977), the LM Unexplored Mansion at Knossos (Jones 1984, pp. 303–304), and the LC West House at Akrotiri (Sarpaki 1987, pp. 146, 148).

Medicinally, broad bean was used in a variety of ways. *Faba*, according to Pliny, strengthens the voice and is helpful against colic, boils, burns, and swellings of testicles; its ashes are good for sciatica and can be mixed with pigs' lard for chronic pains of the joints, and the boiled husks provide relief from constipation (*HN* 22.140).

## GARDEN PEA

Like broad bean, garden pea<sup>58</sup> is well adapted both to the warm, dry Mediterranean climate and cooler temperate climates. It is currently cultivated in Ethiopia, temperate Europe, parts of Russia and China, and the north-western United States. It can be grown in light soils with sufficient rainfall, but yields under these conditions are generally poor. Heavy soils can support peas if they are very well drained. The crop has traditionally been used either fresh or dried for human consumption and for green manure. In the past generation, however, especially in North America and northern Europe, harvesting the crop while still immature for frozen storage has become a standard practice.<sup>59</sup>

Peas are associated with the spread of agriculture in the Old World, as they frequently appear alongside wheat and barley in some of the earliest settlements in the Near East and Greece.<sup>60</sup> In spite of the fact that it is fairly common in archaeological contexts, garden pea is mentioned only rarely in classical literature.

Pliny advises that pea can be sown in autumn or spring as long as the plants have plenty of sun, and that they are especially sensitive to cold (*HN* 18.123). Theophrastus names it as one of several crops that must be sown late (*Hist. pl.* 8.1.4). Little is known about how pea might have been used medicinally. It seems not to have attracted the attention of the ancient writers.

## GRASS PEA

Commonly called grass pea or chickling vetch,<sup>61</sup> *Lathyrus sativus* is currently produced primarily in India. It grows well in dry climates and poor soils, as it is drought-resistant and produces more in volume per hectare of cultivation than does barley.<sup>62</sup> It is used mainly for fodder, although in India it is commonly eaten by the poor, especially in times of famine. Grass pea is also cultivated in the Mediterranean, Ethiopia, and northwestern India.<sup>63</sup> It has been reported among archaeological finds in the Mediterranean and the Near East.<sup>64</sup>

Not much is known about how the Greeks and Romans used and prepared the grass pea. Pliny (*HN* 27.95) suggests that grass pea seeds soaked in water will cure dropsy (*hydropicos*) and draw away bile, but if they are eaten without soaking they will upset the stomach. For this reason the seeds are usually eaten with fish or chicken broth.

Under certain conditions, eating large amounts of *Lathyrus* with little

or no variety in the diet can result in nervous paralysis of the lower limbs in humans and some animals. This condition, known as lathyrism, has been known to affect large populations in Western Europe as recently as World War II, and there are still occasional outbreaks in regions of Bangladesh, China, Ethiopia, and India. The condition, which seems to affect only men, particularly young adults, is reversible to some extent if treated early in its outbreak. In India, individuals at the bottom of the socioeconomic ladder often receive *Lathyrus sativus* in lieu of wages, and grass pea is used as a staple food in times of drought.<sup>65</sup> Another species of grass pea, *L. odoratus*, produces a different form of lathyrism, called osteolathyrism,<sup>66</sup> which deforms the skeleton by producing skeletal lesions and overgrowth of cartilage. The symptoms resemble those of premature aging.<sup>67</sup>

## CONCLUSION

Several varieties of legume arrived in Greece with the earliest settlers. Others may have been native to Greece and were domesticated by early farmers. There can be no doubt that legumes have been used as a valuable nutritional supplement since prehistory. That Cato, Columella, Theophrastus, and Pliny thought them important enough to give instructions on their successful harvest and processing is an indication of their continuing value.

Apicius relates several recipes that include lentils, chickpeas, and garden peas, indicating that these were readily available to Roman cooks.<sup>68</sup> Beans and peas may have been generally considered poor fare, but they are found by nearly every archaeological excavation that practices systematic retrieval methods for botanical material. Beans and rice or macaroni and cheese may have the same status in the United States. Traditionally, these are the foods one eats during times when money is short, but beans, rice, and pasta are likely to be found in the cupboards of most American households.

Because they are easily dried and stored, legumes were an important source of food during famine. Garnsey's study of famine and food shortage in antiquity reveals that legumes numbered among the foods that were regularly grown and stockpiled to last through the unproductive months.<sup>69</sup> Subsistence farmers normally placed enough land under cultivation that the produce could last past the next growing season in the event of famine.

It is clear that the Greeks and Romans of classical antiquity knew of the toxicity of certain legumes. But were legumes used medicinally as suggested by Pliny? Some of the conditions that he thought legumes could alleviate, e.g., constipation and diarrhea, sore throat, and minor wounds, are commonplace in modern society and were probably common in the Graeco-Roman world as well. Perhaps legumes constituted at least one method of providing relief. Further study of the chemical properties and potential medicinal uses of legumes is needed to gain a clearer idea of how they might have been used, and how useful or realistic the preparations that Pliny relates to us might have been.

65. Spencer et al. 1986, p. 298. In 1671 Duke George of Württemberg banned the sale of flour made from grass pea for this reason.

66. Liener 1983, p. 243.

67. Blackwell 1990, p. 190.

68. Apicius 4.174; 5.2, and 5.202: *tisane barricam* and *alitar tisanam*.

69. Garnsey 1988, pp. 53–54.

Virtually all the sites in Greece at which palaeoethnobotanical studies have been conducted predate the Classical period, and we thus have no way to determine how often legumes were used throughout the historical period. Just as the preference for one cereal over another seems to have fluctuated during the Bronze Age,<sup>70</sup> legume usage may also have changed over time throughout the historic period. This seems to have been the case at two Late Neolithic/Early Cycladic sites, Zas Cave on Naxos and Skoteini Cave on Euboia. Among the Late Neolithic samples from Zas Cave, cereals outnumber legumes by a factor of almost three to one. In the Early Cycladic samples, however, the situation is reversed, and legumes outnumber cereals three to one.<sup>71</sup> The same pattern can be seen for samples recovered from Skoteini Cave.<sup>72</sup> In the Late Neolithic sample, cereals outnumber legumes by a factor of about nine, but by the Early Bronze Age legumes outnumber cereals five to one. In an isolated deposit of a hearth at Kephala, 300 grass pea seeds and 22 caryopses of barley were recovered.<sup>73</sup> At Kephala, then, legumes outnumber grain by a factor of nearly fourteen. Furthermore, the West House of Akrotiri presents an example of the use of legumes by a Late Cycladic, wealthy urban population.<sup>74</sup> Although grains are present in several samples, legumes make up the bulk of the preserved food remains. The elite, as represented by the West House inhabitants, were storing, and presumably consuming, a large amount of legumes. Whether the shift in relative proportions of legumes and cereals means that farmers placed more of their agricultural land under legume cultivation, or that cereals for some reason were less favored cannot be determined with the data we have now. But, for some reason, we begin to see more legumes than cereals by the beginning of the Bronze Age, indicating a possible change in legume usage.

The contexts of legumes at prehistoric sites such as Knossos, Thera, and Lerna suggest that they were used by the wealthy, and the manner in which they are described in the classical literature indicates that they were used by the poor. The near-ubiquity of lentils among excavated botanical finds suggests that they were a common complement of most households. Bitter vetch, grass pea, and broad bean are not as common at archaeological sites, nor are they mentioned very often in ancient literature. These legumes were apparently less desirable, and may have been stockpiled or simply left in fields for livestock to graze when there was plenty, but eaten by the population in times of drought. The only way we can gain a clear understanding of the uses of legumes in antiquity is to continue to sample for them on excavations. Only when we have determined the contexts in which they do and do not occur can we know with any measure of certainty who did and did not use them.<sup>75</sup>

70. Jane Renfrew (1966) has shown that, in prehistoric Thessaly, emmer wheat was the most frequently used cereal throughout the Neolithic. Over the centuries, however, barley began to increase in importance. By the Late Bronze Age, six-row hulled barley had become the most common cereal in Greece.

71. Flint-Hamilton 1994, pp. 206–207.

72. Mangafa 1993, p. 361.

73. Renfrew 1977, p. 127.

74. Sarpaki 1987, p. 110.

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