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GENDER AND THE EARLY CULTIVATION OF GOURDS IN EASTERN NORTH AMERICA

Gayle J. Fritz

Discovery and AMS dating of mid-Holocene Cucurbita pepo *fragments from central Maine and north-central Pennsylvania necessitate the reevaluation of the status of the earliest gourds in noncoastal areas of the Eastern Woodlands and the role of women in their cultivation. Gourds may have been spread initially in conjunction with improvements in fishing techniques, with small gourds used primarily as net floats. In this scenario, people passed temperate, Eastern* (ovifera-*type) gourds northward from the coastal plains of the Southeast into river valleys of the Midwest and Northeast as fishing became more significant in Archaic subsistence systems. The growing of gourds was fully compatible with a fisher-gatherer-hunter lifeway, and it did not necessarily trigger a transition to farming. Women may have grown gourds, but the possible role of women in fishing activities is more ambiguous than is their role in gathering and eventually domesticating the food plants of the Eastern North American agricultural complex.*

El descubrimiento y el fechado de radiocarbono AMS de los fragmentos del Holoceno medios Cucurbita pepo *del estado de Maine central y del norte central de Pennsylvania, hace necesario reevaluar la condición de las primeras calabazas cultivadas en las areas no litorales de las selvas orientales y del papel que jugó la mujer en su cultivo. El desarrollo inicial de la calabaza pudo haber ocurrido conjuntamente con la mejora de la técnica de la pesca, usando principalmente calabazas pequeñas como flotadores para las redes. Teniendo en mente este escenario, la gente pasó, moderademente, la calabaza oriental (tipo* ovifera*) del litoral del sur-este hacia el norte, a los valles de los ríos del oeste medio y noreste, de la misma forma en que la pesca pasó a ser más significativa en sistemas subsistentes Arcaicos. El cultivo de la calabaza fue totalmente compatible con la vida de pescadores-colectores-cazadores, y no necesariamente provocó la transición a la argricultura. Es posible que las mujeras hayan cultivado la calabaza, pero el posible papel de la mujer en la pesca es más ambiguo que su papel en la recolección y, eventualmente, domesticíon de las plantas comestibles del complejo agrícola de Norte América oriental.*

American Indian women across the Eastern Woodlands and Great Plains did the vast majority of the farmwork when Europeans arrived on the scene. Women also gathered and processed the wild plant foods—nuts, fruits, seeds, greens, and tubers—that continued to play an important role in subsistence systems of indigenous Eastern North American societies long after agriculture developed. It seems reasonable to believe, therefore, that the first farmers in this region were women, and a survey of archaeologists currently studying eastern North America would probably reflect widespread concurrence. We are not the first to think in gendered terms when making inferences about agricultural origins, however. J. R. Caldwell (1962:379) wrote of "generations of women with an empirical interest in wild plants and their properties" in the Mississippi Valley who would have had the "opportunity to innovate along these lines [domestication of native plants] innumerable times."

Caldwell's statement was published when archaeological evidence for domestication of native plants and for introduction of plants domesticated elsewhere was poorly dated and limited to preflotation assemblages. New excavations, new methods of recovery, and new analytical techniques—especially Scanning Election Microscopy, AMS radiocarbon dating, and molecular biology—have revolutionized our ideas about which crops were domesticated in the East, which were introduced, and when. As the cast of characters and sequence of events have shifted, so too have gender-based scenarios concerning the earliest food producers. One type of crop more than others—the eastern group of gourds and squashes belonging to the species *Cucurbita pepo*—is responsible for many of the twists and turns taken during the course of this research. It now appears that native (as opposed to tropical) pepo gourds were the first plants cultivated in the Midwest and in the Northeast, and that cultivation of gourds eventually was

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practiced across eastern North America by groups in various stages of the transition to agriculture, as well as by some who remained otherwise nonagricultural. Recent studies make it necessary to question whether or not women can be viewed as the more likely cultivators of gourds in any or all of these societies. Even if not, however, I argue that cultivation of gourds constitutes a special-case situation that does not reduce the likelihood that women domesticated the indigenous seed plants and that women bred the eastern varieties of corn (*Zea mays* ssp. *mays*) so productive for both Native and non-Native peoples.

Before reconsidering the possible connection between gender and the early cultivation of gourds in light of new evidence from the Northeast, I review major developments that have altered our chronological and phylogenetic scenarios concerning domestication of "container crops" in eastern North America. In addition, I attempt to summarize the views of scholars who have made relevant contributions to the ongoing debate on the role of women in early plant domestication. Aspects of my overviews might seem unnecessary to paleoethnobotanical specialists and might seem excessively detailed to nonbotanically oriented archaeologists. For all readers evaluating the impact of the newest data, it is crucial to understand relevant developments in the history of archaeological research. Interpretations have differed and continue to differ depending upon one's personal view of the early archaeobotanical material. Were pepo gourds native to eastern North America or introduced from the tropics? Could the gourds be gathered from the wild or did the seeds need to be planted to replenish supplies? What other general subsistence practices were in place when people first planted gourds? My basic purpose is to recast gourds as plants native to the Southeast but cultivated outside their natural range so early—and possibly within the particular context of intensified fishing—that we can no longer include them in a larger suite of native food crops domesticated, all at approximately the same time, by women. This has implications not only for gender-related issues, but also for modeling subsistence change in a way that frees cultivation of *Cucurbita pepo* from any "progressive advance" along the pathway to agriculture.

History of Archaeological Research

Suspicions that squash came early in the temporal sequence of domestication go back as far as Volney Jones' (1936) analysis of plant remains from Newt Kash rockshelter in eastern Kentucky, but confirmation depended on radiocarbon dating. The 1970s and 1980s brought a rapid-fire progression of archaeological discoveries:

1. *Cucurbita pepo* seeds and rind fragments were present in Late Archaic (4300 B.P.) deposits at Phillips Spring in western Missouri (refer to Figure 1 for site locations), where they were associated with bottle gourd rind (*Lagenaria siceraria*) but no other domesticates, either temperate or tropical (Chomko and Crawford 1978; Kay et al. 1980; King 1985).

2. *Cucurbita pepo* rind fragments from the Koster and Napoleon Hollow sites in westcentral Illinois were directly (AMS) dated to 7000 B.P. (Conard et al. 1984). The age of 6990 ± 120 B.P. was derived from a *Cucurbita* seed from the Anderson site in central Tennessee (Crites 1991:72). *Cucurbita* rind fragments from Carlston Annis, on the Green River in Kentucky, and from Hayes in Tennessee were directly dated to 5730 ± 640 and 5430 ± 120 B.P., respectively (Crites 1987; Watson 1985).

3. Maize suspected of predating 2000 B.P., when directly dated, turned out to be no older than Middle Woodland (2000 B.P.) in age (Conard et al. 1984; Ford 1987).

4. Cultigen-sized sumpweed (*Iva annua* var. *macrocarpa*) and sunflower (*Helianthus annuus* var. *macrocarpus*) were dated as early as 4300 B.P., thus establishing a Late Archaic time frame for domestication of native North American seed crops (Asch and Asch 1985; Conard et al. 1984; Crites 1993). Chenopod seeds classifiable as cultigen *Chenopodium berlandieri* ssp. *jonesianum* on the basis of reduced seed coat thickness were directly dated to 3500 B.P. in Kentucky (Smith and Cowan 1987) and 3000 B.P. in Arkansas (Fritz 1986; Fritz and Smith 1988).

A *Cucurbita* gourd or squash, then, acquired the status of earliest crop in the East, followed by native seed-bearing plants and, eventually, by maize and other non-native, introduced species.

In the late 1970s and early 1980s, when the 4000–7000 B.P. dates on pepo gourd/squash rind began to hit the presses, conventional wisdom held that indigenous peoples in eastern North America prior to European contact had never grown more than one species of squash, that it was *Cucurbita pepo*, and that it had been domesticated in Mexico (Cutler and Whitaker 1961; Ford 1985; Yarnell 1976). A major challenge to that scenario came in the form of Deena Decker-Walters' isozyme and

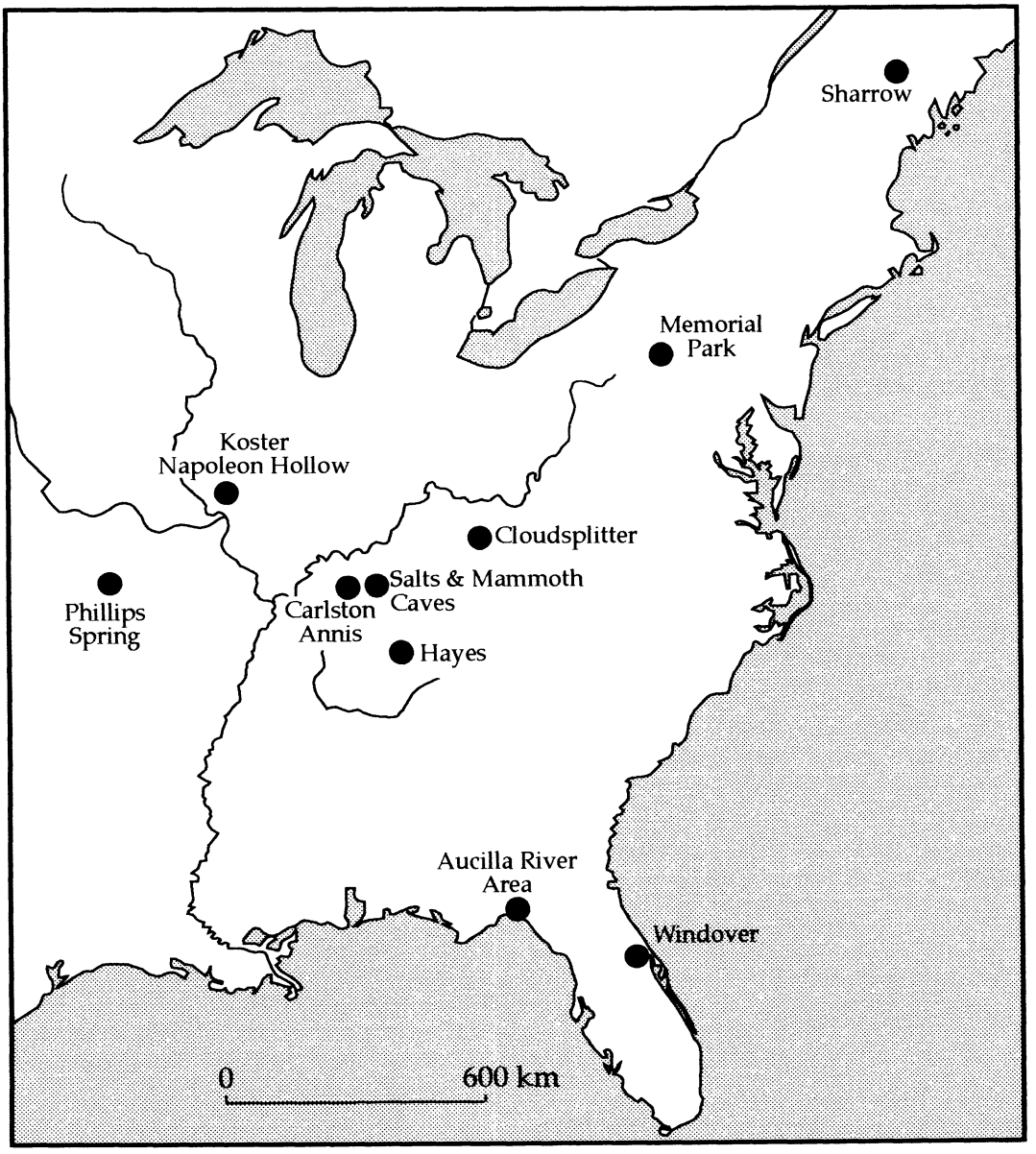

Figure 1. Map of eastern North America showing locations of archaeological sites where early gourd rind or seeds have been recovered.

morphometric analysis of numerous pepo squashes from Mexico and the United States (Decker 1988; Decker-Walters 1993). Decker-Walters demonstrated that there are two lineages within the species *C. pepo*, which she designated subspecies *pepo* and subspecies *ovifera*. The former encompasses landraces and cultivars traditionally grown in Mexico and the U.S. Southwest, but now including varieties such as zucchinis and jack-o-lantern pumpkins grown around the world. No wild ancestor for this subspecies has been genetically fingerprinted.

The second group (ssp. *ovifera*) consists of squashes and gourds that early European explorers observed growing in eastern North American gardens and fields, including varieties similar to modern yellow crooknecks, pattypans or scallops, and the small ornamental gourds popular today at Halloween and Thanksgiving in the United States. This eastern group has a likely progenitor in the wild-growing *C. texana* complex (sensu lato)[1] of eastern Texas and Gulf

Coast states. The existence of these two lineages has recently been supported by the DNA analysis of Wilson et al. (1992). In short, it suddenly became much more likely that pepo squashes and gourds were domesticated in the East as well as in Mexico, removing them—at least locally—from the trinity of "tropical" cultigens.

The discovery of 7,000-year-old bottle gourd rind in a burial at the Windover site in eastern Florida showed *that Lagenaria siceraria* might have been collected by Archaic people as a drift gourd, possibly already in some stage of domestication, having floated across the Atlantic Ocean from its presumed homeland in Africa or up from a secondary home in Central or South America (Doran et al. 1990). As is the case for *Cucurbita pepo*, it is no longer necessary to implicate human agents for transport of bottle gourd from a Mesoamerican center of domestication.

Discussing and Debating the Gender of Early Gardeners

J. R. Caldwell (1962:379) credited women with "a possibly independent development of food production in the Mississippi Valley" at a time when the chronology for agricultural development was poorly documented. After cultigen sumpweed, sunflower, and chenopod were dated to the Late Archaic period (4300–3500 B.P.) and pepo squash/gourd was dated to the Middle Archaic (7000 B.P.), relevant discussions of how, why, and by whom these plants were cultivated or domesticated could begin in earnest.

Shamans as Earliest Growers of Gourds

Guy Prentice (1986) is not explicitly concerned with the gender issue, but his paper, "Origins of Plant Domestication in the Eastern U.S.: Promoting the Individual in Archaeological Theory," is significant because it focuses on gourds, especially their nonfood properties, as I do here, and because it provoked criticism for suggesting that the first individuals to adopt cucurbit gardening were male shamans. Prentice does not exclude women from the shamanistic realm, but he uses only masculine pronouns and uses terms such as "medicine men" in a nongeneric sense. Prentice (1986:112) summarizes as follows:

> Keeping in mind both the profile . . . for the "typical" early adopter and the social organization of Archaic band societies, it seems logical to conclude that the shamans, the headmen, and the individuals involved in the regional exchange networks were the individuals most likely to first adopt cucurbit gardening. These persons possessed the characteristics typical of innovators: higher prestige, greater ambition, greater contact with members of outside groups, and an interest in any innovation that helps them gain or secure their position in society. Of these three . . . the shaman is the one most likely to adopt cucurbit horticulture first.

Prentice's article was written before the completion of Deena Decker-Walters' isozyme work. He therefore assumed—as did virtually all archaeologists of the time— that the mid-Holocene pepo seeds and rind fragments found in the Midwest represented an already domesticated squash brought up from Mexico. He emphasized the associations between gourds and mythological beings across South America and Mexico (one or both of these regions as the presumed source area) and pointed out the central role of gourd rattles, dippers, and even medicinal substances in shamanistic practices across North America in historic times. It made sense then to propose "that cucurbit horticulture was adopted in a shroud of religious thought and symbolism" (Prentice 1986:114).

Environmental Change, Domestilocalities, and Automatic Selection

Bruce Smith's (1987) overview,"The Independent Domestication of Indigenous Seed-Bearing Plants in Eastern North America," has the advantage of incorporating Decker-Walters' evidence for a separate, eastern lineage of pepo squash/gourd, thereby enabling him to sever the tie to Mexico that bound previous researchers in their discussions of early agricultural processes. Unlike Prentice, Smith is not concerned with identifying individuals or subgroups within societies to be credited with earliest gardening activities. Instead, he emphasizes environmental changes—both natural (caused by climate and hydrology) and anthropogenic—that allowed the opening-up and enriching of near-permanent base camps in favorable river valley locations.

Domestication occurred in these spots, which he called "domestilocalities," as a coevolutionary process (following Rindos 1984) that was beneficial to both people and their new cultigens. Much of the change is viewed as a result of altered selection pressures, requiring "only a quite limited degree of conscious and directed innovation on the part of the

prehistoric human populations" (Smith 1987:37). Using the concept of "automatic selection" introduced by Harlan et al. (1973), Smith's model has seeds automatically increasing in size and their seed coats decreasing in thickness when subjected to the heightened competition within the seedbeds of early domestilocalities. But human activities were "unintentionally causal" because the new niches were created and the seeds introduced into them without "any perception or intention of opening up an opportunity for plant evolution in a newly created habitat" (Smith 1987:31). Smith presents alternative possibilities for the status of mid-Holocene pepo gourds, but he argues against interpreting them as already domesticated Mesoamerican crops that heralded the concept of horticulture in eastern North America. Basically, he lumps early cucurbits with native seed-bearing plants into a group of "aggressive and successful colonizers of disturbed soil situations, man-made or otherwise" (Smith 1987:22). In later works (e.g., Smith 1993; Smith et al. 1992), he strongly advocates an "indigenous wild/weedy" status for gourds across the Midwest, but earlier, in 1987, he is open to the possibility that the early gourds spread northward from Texas or even from Mesoamerica as unhusbanded camp followers: "In either case, they would have experienced benign neglect and would have flourished at the periphery of a largely unconscious and undirected coevolutionary process" (Smith 1987:36).

Giving Women Credit for Plant Domestication

In the first publication concerned primarily with gender and plant domestication in eastern North America, Watson and Kennedy (1991) use both Prentice (1986) and Smith (1987) as examples of an androcentric anthropological tradition that fails to give women credit for innovation or invention. They find fault with Prentice's scenario because it removes "women from the one realm that is traditionally granted them"—that is, gardening and cultivating plants—"as soon as innovation or invention enters the picture" (Watson and Kennedy 1991:264). They object to a coevolutionary formulation such as Smith's because it "downplays stress, drive, intention, or innovation of any sort on the part of the people involved, in this case the women" (Watson and Kennedy 1991:262), and they argue instead for an explanation in which the women who domesticated plants "acted consciously with the full powers of human intellect and that their actions were a significant contribution to culture change, to innovation, and to cultural elaboration" (Watson and Kennedy 1991:269).

Alison Wylie (1992:16) includes as an example the paper by Watson and Kennedy (1991) to support her position that "a feminist perspective, which questions entrenched assumptions about women and gender and directs attention to them as subjects of inquiry, promises to substantially enhance the conceptual and empirical integrity—the 'objectivity,' properly construed—of archaeological inquiry." According to Wylie (1992:22):

> Smith (1987) and the proponents of coevolutionary models that postulate a local, independent domestication, and Prentice (1986), among those who support a diffusionist model—all read women out of any active, innovative role in developing cultigens, even though it is commonly assumed that women are primarily responsible for gathering plants (as well as small game) under earlier foraging adaptations and for the cultivation of domesticates once a horticultural way of life was established.

To deny women a role in the transition to farming is "a straightforward contradiction implicit in much current theorizing about the emergence of horticulture in the Eastern Woodlands" (Wylie 1992:24), one that Wylie applauds Watson and Kennedy for highlighting. Smith quickly published a response to what he called the "Gender-Credit Critique" of Watson and Kennedy (1991) and Wylie (1992), disagreeing with a number of points in their discussion of what he calls (Smith 1993:112) his Floodplain Weed Theory. He does acknowledge, however, the likelihood that women played an active role in plant domestication, and points out that post-1987 versions of his model emphasize more than before the importance of "intentional and sustained planting" (Smith 1993:117) in prepared beds of seeds that had been deliberately selected and stored for that purpose. Beyond these accommodations, Smith proposes that classification of the mid-Holocene pepo gourds from eastern sites as indigenous and wild (Smith's position) rather than introduced and domesticated (Smith's account of Watson and Kennedy's position) would help reconcile the two positions.

As Smith (1993:114) points out, archaeologists were beginning to appreciate the implications of Decker-Walters' isozyme research in 1991, but the earlier consensus lingered that domesticated *C. pepo*

was introduced into the East from Mexico. Although Watson and Kennedy cite Decker (1988) and are open to the possibility of independent domestication of an eastern gourd/squash (see also Watson 1989), they do not challenge Prentice's model on the basis of his presumption that a ritual complex including tropical gourds diffused from Mesoamerica. Smith (1993:114) interprets this view (i.e., acceptance of gourds as introduced from south-of-the-border) to be "the Watson and Kennedy position on this issue" as well as Prentice's. By 1993, Cowan and Smith (1993) had collected free-living pepo gourds from the Buffalo River in Arkansas and other river drainages, and Decker-Walters had added their specimens to her isozyme database (Decker-Walters et al. 1993). In addition, pepo gourds associated with the bones of mastodons from the Aucilla River in Florida were directly dated to 12,500 B.P., documenting their presence in eastern North America during the late Pleistocene epoch before the Clovis horizon (Newsom et al. 1993). Smith (1993:114), therefore argues for a "decisive rejection of the early-introduced domesticate consensus of the mid-1980s," replacing it with "adoption of an indigenous wild gourd/local domestication."

An alternative mentioned by Smith (1987:20), but not discussed in the 1993 paper, has become favored by David Asch (1994; Asch and Asch Sidell 1992) and strengthened by recent discoveries of mid-Holocene pepo rind in Maine and Pennsylvania. It now appears that *C. pepo* ssp. *ovifera* did indeed grow wild north of Mesoamerica and was domesticated within the borders of what is now the United States, but that its natural range did not extend as far north as westcentral Illinois. The specimens from Anderson, Carlston Annis, Hayes, Koster, and Napoleon Hollow would, therefore, represent plants that were cultivated (intentionally propagated) but not necessarily domesticated (genetically altered and to some degree dependent on human husbandry for survival in that state). These gourds—planted and tended by Archaic hunter-gatherers rather than established weedy residents of previously existing floodplain communities—would have been passed upstream into the Midcontinent and possibly up the Atlantic seaboard into the Northeast. Smith suggests it would be easy to accommodate local domestication (probably by women) of a native weedy pepo gourd in the Gender-Credit Critique (of Watson and Kennedy). However, a different set of dynamics must be considered if these gourds were introduced as part of a distinct behavioral complex outside the realm of plant food harvesting.

New Evidence from the Northeast

The possibility that pepo gourds deposited in mid-Holocene contexts in Midwestern sites were available as wild plants had been suggested by Heiser (1985:71, 1989) and Smith (1987), and their possible status as "weedy camp followers" that spread into floodplain and river terrace sites along with people but without their active intervention was discussed by Yarnell (1983, 1985: Yarnell and Black 1985:99) and others (including Fritz 1986; Watson 1989). However, the archaeologists and paleoethnobotanists reporting new early *Cucurbita* fragments from sites in central Maine and north-central Pennsylvania (Hart and Asch Sidell 1997; Peterson and Asch Sidell 1996) consider it very unlikely that free-living populations of gourds ever existed that far north and east. This conclusion necessitates a closer look at David Asch's arguments (1994; and more fully developed in Asch 1995) against scenarios in which wild or weedy, camp-following gourds were harvested prehistorically in westcentral Illinois. It does not return us to the point of positing diffusion of *C. pepo* from Mesoamerica, but does necessitate range extension and maintenance of gourds by cultivation in the Midwest and Northeast.

The evidence from Maine consists of a single *Cucurbita pepo* rind fragment from the Sharrow site, directly dated at 5695 ± 100 B.P. (uncalibrated; see Table 1 for a list of relevant dates from the East). The Sharrow site is 1,800 km northeast of Powell County, Kentucky, the closest known location of modern free-living pepo gourds that might be either feral or wild. Peterson and Asch Sidell (1996:693) conclude that "its occurrence at Sharrow represents an intentional human introduction there during the mid-Holocene epoch," and that "current evidence leads us to favor the hypothesis that *Cucurbita* was cultivated at the Sharrow site" rather than having been merely traded in as an object produced elsewhere (and never grown there) or having arrived as a camp-following weed. Asch Sidell (1999:212) has recently become even more doubtful that *Cucurbita* could have grown wild in Maine or perpetuated itself spontaneously: "The pepo gourd could not have grown wild in Maine, and therefore must have been intentionally introduced."

Peterson and Asch Sidell (1996:689) consider it

Table 1. Radiocarbon Dates on Early *Cucurbita* Fragments from Archaeological Sites in Eastern North America.

State	Site Name	Radiocarbon Years B.P. (Uncalibrated)	Source
Illinois	Koster	7100 ± 300 B.P.	Conard et al. 1984
		6820 ± 240	Asch 1994
	Napoleon Hollow	7000 ± 250	Conard et al. 1984
Tennessee	Anderson	6990 ± 120	Crites 1991
Kentucky	Carlston Annis	5730 ± 640	Watson 1985
Maine	Sharrow	5695 ± 100	Peterson and Asch Sidell 1996
Tennessee	Hayes	5430 ± 120	Crites 1987
Pennsylvania	Memorial Park	5404 ± 552	Hart and Asch Sidell 1997
Kentucky	Cloudsplitter	5130 ± 60	Cowan 1997
Missouri	Phillips Spring	4300[a]	Chomko and Crawford 1978
			Kay et al. 1980

[a] This age is from an undisturbed, secure context and does not include a direct AMS assay on *Cucurbita* remains, but all other dates in this table do so.

unlikely that slightly higher average temperatures in central Maine during the mid-Holocene (approximately 1° C warmer during July than modern conditions) could account for the natural spread of uncultivated pepo gourds to that northern latitude, because the average July temperature would still have been 4–7° C colder than elsewhere in the Eastern Woodlands where mid-Holocene *Cucurbita* had been found: "Not even the northernmost portions of the previously postulated range of native *Cucurbita* (i.e., central Illinois) begin to approach the climatic limitations that would have pertained to Maine in the mid-Holocene." The modern average frost-free season of 115–120 days is, however, long enough for growing domesticated pepo squash. Edible fruits of var. "Mandan," a cultivar acquired by Euro-Americans from the Mandan Indians in North Dakota, were produced in 56 days at Geneva, New York (Tapley et al. 1937:38). White Bush Scallop and Giant Summer Crookneck, two more cultivars of *C. pepo* var. *ovifera*, also produced first edible fruits in 56 days, with Fordhook maturing four days later.

Peterson and Asch Sidell (1996:686) state that little evidence exists for long-distance trade in the far Northeast during the Middle Archaic. Therefore, they suggest that the practice of cultivating gourds might have spread "along with broadscale technological developments." It is significant that the Sharrow site is located "near a constriction in the Piscataquis River, which is well suited for fishing" and that "fish bones are relatively common throughout much of the occupational sequence, along with bones of various mammals and some birds and reptiles" (Peterson and Asch Sidell 1996:686).

The Memorial Park site in north-central Pennsylvania yielded two fragments of *Cucurbita pepo* rind in a mid-Holocene feature and 10 *C. pepo* fragments from a hearth-like pit dated to the early Late Holocene. An Accelerator Mass Spectrometer radiocarbon date on the two fragments from the early context confirmed its antiquity at 5404 ± 552 B.P., and a rind fragment from the later context yielded an appropriate radiocarbon age of 2625 ± 45 B.P. The Memorial Park site sits on a floodplain terrace above the West Branch of the Susquehanna River. No modern populations of escaped *C. pepo* gourds are reported for north-central Pennsylvania or adjacent New York by botanists, and the site is far to the north and east of the range of modern free-living cucurbits proposed by Smith et al. (1992), leading Hart and Asch Sidell (1997:529) to conclude that, as at Sharrow, "the ultimate origin of the mid-Holocene cucurbit at Memorial Park was probably intentional human transport."

Because flotation-recovered archaeobotanical assemblages from the Northeast are rare, Hart and Asch Sidell (1997:530) doubt that the rind fragments from Memorial Park and Sharrow are isolated occurrences, but think it "more likely that cucurbit was used over a broad area of the Northeast" during the mid-Holocene epoch, and that gourds may have been used "primarily for technological purposes, such as fishnet floats, rather than as food."

The Net Float (Among Other Uses) Hypothesis

Earlier discussions of why eastern *Cucurbita pepo* gourds were domesticated also emphasize uses other than food. Prentice (1986) speculates that "during the Archaic period both pepo squash and bottle gourd

were raised primarily for use as containers, floats, rattles, etc., and that they contributed little to the native diet." Citing Yarnell (1969), Prentice points out that *C. pepo* seeds comprise only 3.3 percent of fecal bulk in the paleofecal assemblage from Salts Cave, so that dietary significance had evidently not risen greatly even by the Early Woodland period (ca. 2450 B.P.). Asch (1994:30) observes that "wild/weedy" pepo gourds "have some food potential," but precedes this with the statement that their "fruits would have been obviously useful as small containers, cups, and spoons, and for container-like functions such as rattles and net floats." He cites Munson (1973) for linguistic evidence suggesting that technological uses of edible squashes came first. Newsom et al. (1993:83) mention that *C. pepo* from "some" (the exact number is not specified) of the eight sites in Florida that have yielded remains of prehistoric pepo gourd also yielded closely associated fish nets or cordage, indicating that "the gourds functioned as net floats in a fishing tradition." The famous gourds from Key Marco are among these (Cushing 1897; Cutler 1975), probably the first archaeological cucurbits ever reported from eastern North America.[2]

I urge archaeologists to evaluate a scenario focusing on fishing technology as the best explanation for initial diffusion of cucurbit cultivation across eastern North America. All of the sites yielding mid-Holocene pepo fragments (with the possible exception of Cloudsplitter) are in river valley settings where fish could have been procured with nets at certain times of the year. Brown and Vierra (1983) and Styles (1986, 1994) stress the importance of fish in the subsistence systems of Middle Archaic foragers in the lower Illinois River Valley. Stabilization of river systems across eastern North America created opportunities for methods of fishing to become more effective. Innovations in net fishing would have developed and spread at this time. Little gourds as easily growable floats or bobbers could have been passed northward and eastward as part of the larger package.

This hypothesis solves the problem of understanding why, if the fragments from Koster and Napoleon Hollow were cultivated rather than wild, no detectable morphological changes occurred between 7000 B.P. and 4300 B.P.[3] All of the mid-Holocene rind specimens are very thin (less than 2 mm), and all of the seeds are small enough (the average length is less than 11 mm) to keep them from being classified as domesticated. Net floats and line bobbers, however, should not be large. People might even intentionally select for small gourds, presumably with small seeds, even if automatic selection pressures accompanying intentional propagation pushed a bit in the direction of larger seeds. We might expect increases in seed size and rind thickness if early gourds were being cultivated for use as bowl-sized containers or for more productive oil-seed plants, but cultivation for fishing-related tools need not entail morphological change.

The situation in Florida is a case in point. Although *C. pepo* grew there 12,500 years ago, and wild-sized seeds have come from eight archaeological sites dating between 4000 B.P. and historic times, the species is not present today as a spontaneously growing plant (Newsom et al. 1993:89), in spite of expanded ecological opportunities. Asch's (1994:34–35) consideration of this issue ends with the suspicion "that wild *C. pepo* became extinct in Florida long before 200 years ago, perhaps as the result of climate and vegetational changes at the end of the Pleistocene. It seems more likely to me that during most or all of late Holocene time Floridians were growing a small-fruited *C. pepo* rather than collecting them in the wild." Florida's wet sites such as Key Marco give us good reason to infer that at least some of these small gourds were used with fish nets.

People who grew gourds initially or primarily for net floats probably used them for other purposes as well. It is hard to believe that the protein-rich seeds would be neglected as a food source, especially at times when other foods were scarce. The placental tissue surrounding seeds in wild pepo gourds is very bitter, however, and is not easily removed when processing seeds for consumption. Unless there was selection for nonbitter gourds, seeds might not have been eaten on a regular basis. Flowers may have been the most highly desired part of the plant for food. I believe that even the thin-walled gourds would have been handy cups and containers for short-term purposes, although most of the wild-growing ones I have handled are too brittle for long-term use. Some of the thicker ones (approaching 2 mm) would probably make good rattles. It is possible that gourd cultivation spread across the East in conjunction with fishing-related activities, but that mid-Holocene specimens deposited in the archaeological record at any given site served some other purpose.

First Farmers?

Pepo gourds were probably very easy to grow. There is no reason to suspect that early cultivation of gourds

in Illinois, Maine, or anywhere else in eastern North America caused scheduling conflicts or necessitated significant alteration of subsistence or settlement patterns beyond what was already occurring. Vines grown in floodplain settings adjacent to fishing areas could be expected to reseed themselves when not washed away by floods, especially with monitoring and minimal tending. Plants grown in or near settlements on higher terraces or natural levees probably volunteered occasionally—maybe even more often than not—if their spaces were weeded and maintained as openings. Replanting, however, would have been necessary when base camps or fishing territories moved, or when existing populations of gourds failed to regenerate for whatever reason. In this scenario, foraging people during the Middle Archaic adopted, planted, and tended pepo gourds primarily to procure more fish. Cultivation may well have been practiced in Illinois as early as 7000 B.P., but because Smith et al. (1992) contend that westcentral Illinois was within the range of wild pepo gourds, I focus temporarily on Pennsylvania and Maine, where evidence of earliest cultivation dates to 5404 ± 552 B.P. and 5695 ± 100 B.P., respectively. I do not believe that cultivation of gourds in central Maine transforms occupants of the Sharrow site into incipient agriculturalists or places them on a trajectory to farming. The site is, in fact, slightly beyond the northernmost limit of prehistoric maize agriculture, and the people living there at European contact were hunter-gatherers (Asch Sidell 1999). As far as we know, no native seed crops or tropical cultigens were grown in southern Maine before 900 B.P. Therefore, cultivation of gourds in Maine was not the first step along a path to serious agriculture in that region.

A pair of unjustifiable assumptions or biases risks erring either in the direction of (a) failing to appreciate the importance of early gourd cultivation and its possible impact on later agricultural developments; or (b) assigning too much value-laden significance to early gourd cultivation by seeing it as inexorably linked to all subsequent steps ("advances") toward farming. European and American researchers tend to perceive a false dichotomy between foragers and farmers, whereas many subsistence systems, especially during the Archaic and Woodland periods in North America, fall somewhere in between or incorporate aspects of both. Even for late prehistoric societies in the upper Midwest (e.g., Oneota), Southeast (Mississippian), and Northeast (Owasco and Proto-Iroquois), we can infer analogically using ethnographic data at Contact that 50 percent of the adult population (men) considered themselves to be hunters, and they were married to the other 50 percent, who considered themselves to be farmers and gatherers. Among the women, the proportions of one's time spent farming rather than gathering plant foods varied according to geographic region, and the time devoted to food production diminished as we travel back through time, but not at the same rate from region to region. The challenge of understanding the dynamics of time allocation during the earliest stages is daunting.

Alternatively, we risk viewing transitions to agriculture as making progress toward a more advanced evolutionary stage that brings "achievements" such as more settled lifeways and sociopolitical complexity. We might be searching out and awarding special recognition to groups that cultivated any plant at all because we see them as moving in the direction of what we think of as a higher plane, whether or not cultivation of the plant actually took them in that direction. These same Archaic peoples lived with a domesticated animal—the dog—but nobody to my knowledge has suggested that they were in early stages of a transition to animal husbandry, nor is that claim made for early dog-possessing people in the Greater Southwest, Mesoamerica, or South America, whose descendants subsequently domesticated other animals. Caring for gourds may have been no more difficult than raising dogs, and both were probably far less sophisticated than finding (or encouraging/managing/possibly even cultivating) and processing the fiber plants used to manufacture fish nets and other textiles.

The primary significance of finding mid-Holocene gourds in Maine and Pennsylvania does not lie in extending our evidence for agricultural origins thousands of years into the past in the Northeast. Rather, it forces us to think more seriously about how cultivation of gourds fits into the overall scheme of technological, economic, and social change among groups that, as far as we know now, did not cultivate or domesticate any other plants or adopt crops from elsewhere for at least 3,000 years (Memorial Park) if ever (Sharrow). I advocate recasting the significance of the 7,000-year-old pepo gourd in west-central Illinois along the same lines, given the increasing likelihood that gourds also were being cultivated there rather than collected from the wild.

Reconsidering Gender and Plant Domestication in the Eastern Woodlands

The proposed scenario in which improvements in fishing techniques led to the cultivation and spread of pepo gourds in eastern North America during the Middle Archaic period begs a reassessment of the role of women in earliest stages of plant domestication. Women would have been quite capable of fishing with nets in shallow slackwater and shoal areas of eastern rivers. However, I know of no ethnographically-informed discussion that assigns any more responsibility for prehistoric fish procurement to women than to men. This is very different from the domains of plant food gathering and growing, which were dominated by Native women across the East according to ethnohistoric accounts, validating use by archaeologists of ethnographic analogy (see discussion in Watson and Kennedy 1991:258). It seems premature to argue that women were more likely than men to have acquired and cultivated gourds for fishing-related purposes. It seems equally imprudent to suggest that men deserve more credit than women for these innovations. Smith (1993:115) claims that his Floodplain Weed Theory is a gender-neutral approach in that it "focuses on family groups forming closely cooperating social and economic units." Watson and Kennedy, however, had previously (1991:261) pointed out, "Although the entire human group contributes to sunlight and soil fertility factors, it is the women who are primarily responsible for soil disturbance and continual introduction of seeds."

The status of mid-Holocene gourds in Smith's model as wild and uncultivated until nearly 4000 B.P. (or even later in his earlier papers) lumps them with sunflowers, sumpweed, and chenopod in a suite of edible floodplain ruderals domesticated at approximately the same time. Women can be "definitively identified" (Watson and Kennedy 1991:262) as the primary handlers of early food crops. Recasting the mid-Holocene gourds as cultivated far outside their natural range, primarily not for food, makes it likely that men, women, and children all participated directly in their propagation and spread. The role of children as hurlers of small gourds during games and fights should not be ignored. Nabhan (1985:174) describes wild-sized gourds as "preadapted to the adolescent human hand" and tells about piling up gourds for research purposes beside irrigated field plots in northwestern Mexico, leaving them over the weekend, and returning on Monday to find them strewn everywhere, having served as ammunition in "some boys' battlefield": "The kids had made great seed dispersal agents, whether that was their aim or not."

No matter who had primary responsibility for gourd husbandry, the women in fisher-gatherer-hunter societies in the Midwest were almost certainly the harvesters of wild seeds, some of which became domesticated between 5000 and 4000 B.P. Selection for gourds with thicker walls and larger seeds also occurred at this time: Clearly recognizable gardening had begun. These developments were followed by a rapid increase in size of sunflower and sumpweed seeds and by storage of seed stock in rockshelters in Arkansas and Kentucky by 3000 B.P. (Fritz 1997; Gremillion 1994). Corn entered eastern North America by 2000 B.P. (Riley et al. 1994), and it became a widely-used crop in many parts of the East after 1200 B.P. The fact that women may not have been more involved than men in the initial cultivation of gourds (primarily for nonfood purposes) does not make it any less likely that women were the domesticators and breeders of all later crops, with the exception of tobacco (*Nicotiana* sp.), another special-use plant with a history setting it apart from the realm of food plants.

Conclusion

The recent discovery and documentation by AMS dating of mid-Holocene *Cucurbita* fragments in central Maine and north-central Pennsylvania requires a reevaluation of the status of the earliest gourds and the role played by women in their cultivation and range extension. I agree with the investigators of the Sharrow and Memorial Park sites that gourds were introduced and probably grown there and at many other Archaic sites in the Northeast, well outside their natural range. This also was probably the case at Carlston Annis, and may have been the case at Koster and Napoleon Hollow, although the fact that free-living (but maybe feral) pepo gourds infest present-day soybean fields in Illinois makes a plausible argument for gourds growing wild there 7,000 years ago. I propose a scenario in which people passed gourds northward from their native habitat on the Gulf Coastal Plain as part of a fishing technology that spread as riverine systems stabilized. Although gourds were easy to grow, they required tending and periodic replanting. These activities were fully com-

patible with a hunter-gatherer lifeway and did not trigger an agricultural revolution. Selection pressures did not result in visible enlargement of seeds or thickening of rind for nearly 3,000 years, because small gourds were most desirable for use as floats and bobbers. Women may have grown gourds, but their possible role in fishing activities is much more ambiguous than their role as gatherers and eventual domesticators of food plants.

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Notes

1. In the broad sense, "the *Cucurbita texana* complex" includes free-growing (uncultivated) pepo gourds across the Southeast and possibly into the midcontinent. Decker-Walters et al. (1993) have recently subdivided this complex into *C. pepo* ssp. *ovifera* var. *texana* and *C. pepo* ssp. *ovifera* var. *ozarkana*, with var. *texana* largely restricted to Texas and var. *ozarkana* found to the east and north. The key distinguishing traits of var. *ozarkana* are possession of the isozyme allele Idh-2m, occasional possession of the isozyme allele Idh-3o, and ivory-colored or green-and-white-striped rind. The *texana* variety may possess Idh-3o but lacks Idh-2m and typically has green-and-white-striped rind. Examination of Table 3 in Decker-Walters et al. (1993:62-63) reveals that individual wild-growing specimens from Arkansas, Illinois, Kentucky, and Oklahoma lack Idh-2m, although most from Arkansas, Missouri, and Oklahoma possess it. Specimens from Illinois and Louisiana that I personally collected and contributed to the analysis of Decker-Walters et al. (1993) were neither ivory-colored nor positive for Idh-2m, therefore do not key out to var. *ozarkana*. The specimen from Kentucky is singled out as a fruit that "may have come from a feral domesticated plant" (Decker-Walters et al. 1993:65), and certain populations from Arkansas, Louisiana, and Missouri "showed morphological signs (e.g. nonbitterness, large seeds, thick peduncles) of hybridization with cultivars" (Decker-Walters et al. 1993:59). Asch (1995:43–46) discusses at length his reservations with the proposal that *C. pepo* ssp. *ovifera* var. *ozarkana* is the wild progenitor of eastern cultivars, including the possibilities that Idh-2m entered the Ozark populations through past introgression with *C. argyrosperma* and that the ivory color of many Ozark gourds may result from cultivation of "egg gourds" by Euro-American inhabitants of the Ozarks to encourage chickens to nest. Due to the current lack of consensus, I prefer to write about a "*C. texana* complex sensu lato," although I accept Decker-Walters' (1988) earlier circumscription of *C. pepo* ssp. *ovifera* var. *texana* that does not separate var. *ozarkana* from other spontaneous populations in the Eastern Woodlands.

2. Not all researchers see the food value of pepo gourds as secondary. Cowan (1997:70–71) finds it unlikely that Archaic foragers would have found them to have much utility as vessels, rattles, or floats, and points instead to the oily, protein-rich seeds as what probably initially attracted Archaic foragers and served as the impetus to cultivate wild gourds.

3. 4300 B.P. is the date at which seeds from the Phillips Spring site in Missouri surpass in size those from any known wild population.

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