

Spindle Whorls and Fiber Production: Evidence from Two Late Ceramic Age Sites in Eastern Puerto Rico

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This paper presents evidence for the production of cotton and *henequen* fibers based on archaeological evidence from CE-11 and CE-33--two Late Ceramic Age habitation sites at the former U.S. Naval Station Roosevelt Roads in Ceiba, Puerto Rico (Figure 1). Radiocarbon dates from both sites indicate occupation between ca. AD 1050 and AD 1450. CE-11 and CE-33 yielded a relatively high quantity of spindle whorls, indicating that the procurement and spinning of plant fibers was an important aspect of daily life for the inhabitants of these two sites.

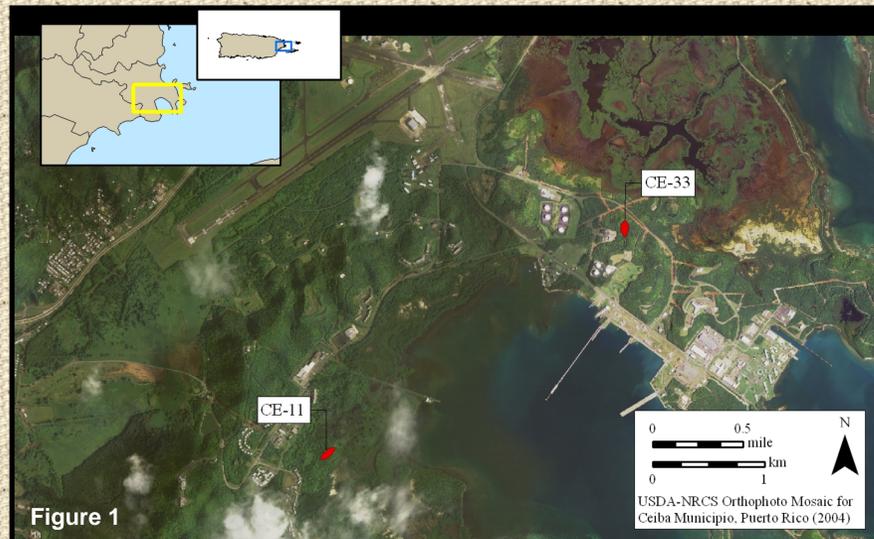


Figure 1

Gossypium hirsutum is the indigenous cotton species of the Americas (Figure 2). The fluffy "boll" of the plant is spun to create yarn or thread that is woven into textiles. The earliest evidence of cotton in the Americas dates to about 5,000 years ago from central Mexico and slightly earlier from pre-ceramic sites on the Peruvian coast. Ethnohistoric documents from the Greater Antilles provide many examples of the importance of cotton for the late prehistoric Taíno (e.g. Dunn and Kelley 1989; Las Casas 1951[1527-1561]).



Figure 2

Henequen, or *Agave fourcroydes*, also was documented as an important fiber for the Taíno (Figure 3). Spanish chronicles provide an account of how *henequen* was processed into rope and twine, noting that the leaves were soaked for several days then dried in the sun, after which the hairs or strings of the plant were subsequently removed and spun. Oviedo (1959:42-43 [1535]) states that henequen fibers were so strong they could "cut a piece of iron, however thick it may be". Due to its strength and coarser fiber structure, *Henequen* was likely used to make durable products such as rope, hammocks, nets, and cordage for binding.



Figure 3

One of the first in-depth studies of spindle whorls was carried out by Mary H. Parsons (1972) on a surface-collected sample from the Teotihuacan and Texcoco valleys in the Basin of Mexico. Parsons applied attributes of diameter, weight, and spindle hole size to classify whorls into size grades. Parsons found a major distinction in whorls based on variability of sizes. She interpreted this variation as an indication of processing different fibers with small whorls used for cotton and large whorls used for *henequen* (Parsons 1972). Parson's cotton spindles are quite small, measuring between 2 and 3 cm in diameter, while her *henequen* spindles average 5 cm in diameter (Parson 1975:210).

The whorls used in spinning are perforated disks usually made of baked clay but also made of stone, bone, or shell. Although spindle whorls are present in archaeological assemblages in Puerto Rico, they are usually found in limited quantities and have not been studied in any detail until now.



Figure 4. Examples of whorls from CE-33

The CE-11 and CE-33 spindle whorls are undecorated, rounded, and drilled potsherds, made from both vessel body and base fragments (Figure 4). Such expediently made ceramic whorls are typical across the Greater Antilles and Northern Lesser Antilles. Other forms such as conical, acorn-shaped, and bobbin-shaped whorls tend to be restricted to the islands of the Lesser Antilles.

CE-11. Thirty whorls were recovered at CE-11 (Figure 5). The highest quantity of spindle whorls was recovered from excavation units (EU)12 (n=5) and EU 7 (n=4). Figure 5 shows whorl distribution separated by size classes. Of the 28 whorls intact enough to produce size measurements, three were small (~<4.5 cm diameter), 17 were medium (5-6 cm), and eight were large (6-7cm). The medium whorls cluster in this distribution, with all the whorls in both EU 12 and EU 7 belonging only to this size grade. One-third of the sample from CE-11 consists of such large whorls.

Assuming the size difference in whorls observed by Parsons is true, then the smaller whorls would have been used for spinning cotton. Congruently, the larger whorls would likely have been useful for spinning thicker fibers such as henequen.

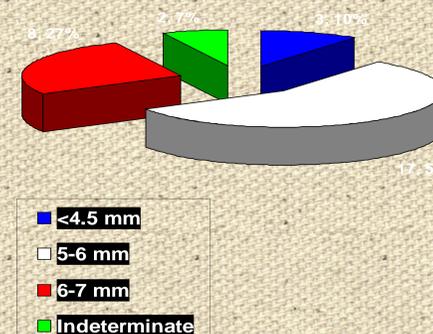
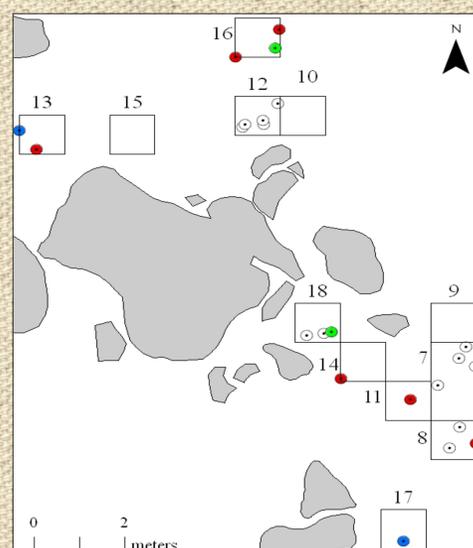


Figure 5. CE-11 distribution of whorls by size grade (left). Whorl frequency (above). (Note: Colored dots correspond to size grades).

CE-33. One complete spindle whorl preform (Figure 6) and 13 whorl fragments were recovered. Based on the size categories utilized for CE-11, three of the whorls are small, two are medium, and six are large (with three of indeterminate size) (Figure 7). Whorls were recovered from three excavation areas: four from a shell midden, four from a tool use area, and six from a living surface/activity area. The eastern units of the tool use area and living surface area are interpreted as activity areas rather than discard areas, suggesting that spinning may have been taking place in these locations.

Two whorls from the living surface area were more than half complete. The two examples show the variability in size (and possible functional differences) in the assemblage. The small whorl (Figure 4; left) measures 3.8 cm in diameter, is 8.2 mm thick, and has a 5.0-mm diameter perforation. The large whorl (Figure 4; right) is 55% complete and measures 6.5 cm in diameter, 5.6 cm thick with a 9.2-mm diameter perforation.



Figure 6. Spindle whorl preform from CE-33

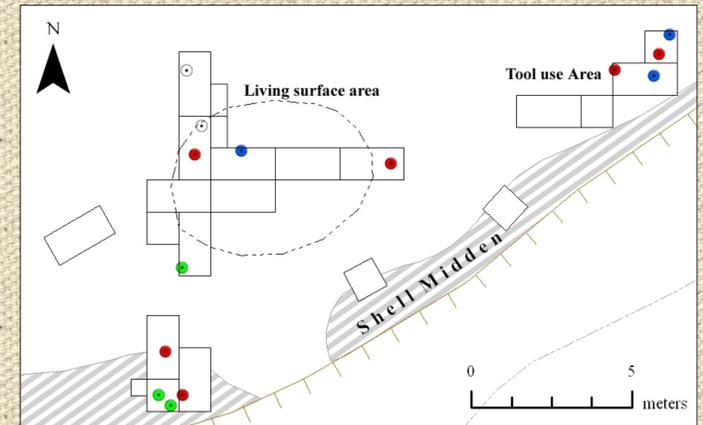
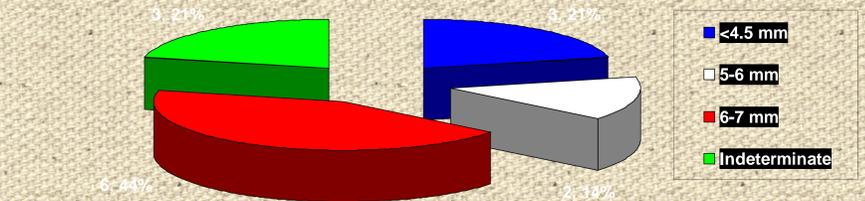


Figure 7. CE-33 distribution of whorls by size grade (left). Whorl frequency (below left). (Note: Colored dots correspond to size grades).



To conclude, the recovery of spindle whorls from CE-11 and CE-33 indicates that the occupants of these sites were engaged in the local acquisition of plant fibers for the creation of well-documented items such as clothing and hammocks. Due to the relatively large size (≥ 5 cm diameter) of the majority of the spindle whorls from CE-11 and CE-33, it is proposed that henequen was the primary fiber spun in these sites to produce rope for a variety of purposes, in particular nets for fishing in the local waters immediately adjacent to the sites.

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