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Long-term cultural stability in hunter–gatherers: a case study using traditional and geometric morphometric analysis of lithic stemmed bifacial points from Southern Brazil

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ABSTRACT

Irrespective of the great number of archaeological sites from Southern Brazil presenting bifacial stemmed points, not many detailed studies on their morphological evolution have been carried out so far. We present an extensive study of the morphology of stemmed bifacial projectile points excavated from Garivaldino Rodrigues rockshelter (RS-TQ-58), Rio Grande do Sul, Southern Brazil. Garivaldino presents a range of dates from 11,660 to 7540 cal BP. Multivariate statistics applied to both traditional and geometric morphometric analyses failed to reveal any important changes in shape through time. However, the coefficients of variation presented a significant increase through time in three measurements related to projectile point neck and stem. The absence of change in shape might be related to small group size and low level of cultural innovation. Such cultural stability might be related to novelty-avoiding mechanisms or the operation of a meta-tradition that would be selected in very stable environments. On the other hand, the increase in the variation of linear measurements through time might suggest an increase in population size and copying errors.

1. Introduction

In the mid-1960s, when professional archaeologists started to address the archaeological record of Southern Brazil (Pronapa, 1970), the presence of numerous sites with flaked bifacial stemmed points was acknowledged. These artifacts were initially assigned to the "Umbu Phase" (Miller, 1967, 1974), and later their chronological and geographical extent was considered large enough to define an "Umbu Tradition" (Schmitz, 1978, 1987). As commonly occurs in archaeology, these "traditions" and "phases" were units described by a loose set of characteristics and, therefore, never unambiguously defined (Dunnell, 1971). Even so, for heuristic purposes, the concept of "Umbu Tradition" served to convey the idea of one or more cultural groups that used to make stone points by means of a bifacial flaking technique, aiming for a symmetrical form, by means of both direct percussion and pressure flaking.

Problems started to arise when, after several decades of work, it became clear that this supposed "Umbu Tradition" spans a chronological and geographic interval that seems too large: in geographic terms, it spreads across the southern part of Brazil comprising an area of, at least, 510,000 km^2, but also encompassing portions of Uruguay and Argentina (Caggiano, 1984; Rodríguez, 1992 – Fig. 1).

In chronological terms, the oldest age for Umbu is 13,460 cal BP (11,555 ± 230 ^{14}C years BP; wood charcoal, site RS-I-68, sample SI-3750; Miller, 1987) and the youngest ages reach the 17th century. Some authors proposed distinctions inside this stemmed point universe (Chmyz, 1969, 1981; Chmyz and Chmyz, 1986; Miller, 1967, 1974; Miller, 1972; Piazza, 1974), but these were not widely accepted or applied, and today the term "Umbu Tradition" still subsumes anything related to bifacial points in southern and southeastern Brazil.

In spite of the large number of dated sites containing bifacial points, few of them present good chronological resolution. Our contribution here is related to the analysis of data from Garivaldino Rodrigues, a rockshelter located in Rio Grande do Sul state, Southern Brazil. Garivaldino is important in the present context because its excavation produced a large number of bifacial stemmed points within a dated stratigraphic context (Mentz Ribeiro and Ribeiro, 1999). Using this site as a first approach, we intend to advance some hypotheses regarding the role of population size,

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internal cultural rules, and the environment in the maintenance of cultural traits. We hope that our arguments can be useful as a starting point, inspiring some discussion on this important topic.

2. Area location and site description

Garivaldino Rodrigues (RS-TQ-58) is located in Montenegro county, Rio Grande do Sul state (29°34′05″ S/51°38′45″W), in the Central Peripheric Depression, a geomorphic unit that is placed between the coastal plain and the highlands, which reach 1380 m asl (Fig. 1A). The site is about 150 km inland from the present coast line, at 70 m asl. The main geologic formation in the area is the Botucatu Formation, a Triassic–Cretaceous, fine to medium, well-sorted sandstone of eolian origin (Scherer, 2000). The Garivaldino rockshelter was formed inside a small canyon in the Botucatu Formation, a place where the canyon is 200 m wide and 50 m deep.

The rockshelter faces north, and its dimensions are 21.4 m wide, 8.5 m in maximum depth, and 8.6 m high (Fig. 1B; Mentz Ribeiro and Ribeiro, 1999). The site was identified in 1981. On that occasion, the team of researchers led by archaeologist Pedro Mentz Ribeiro collected some flakes and a bifacial fragment from the surface (Mentz Ribeiro et al., 1989). They returned in 1987 to further investigate the site, excavating a 2 × 2 m test pit, called "Experimental" test pit. Finally, in 1989, the team returned to spend around 50 days excavating the site. Including the test pit, which partially coincided with one of the squares, 12 two-by-two units were excavated (Fig. 1B) using a mixed strategy of natural and artificial 10 cm-levels. All materials retrieved from the excavation are currently housed at CEPA — UNISC, Santa Cruz do Sul, Rio Grande do Sul.

2.1. Stratigraphy and chronology

According to the profile published by Mentz Ribeiro and Ribeiro (1999: 71), the stratigraphy was composed of a basal layer of sand and small pebbles intercalated with hearths, its thickness varying from 30 to 60 cm, directly over the parent rock; over it was a dark-gray layer of unknown texture, approximately 20 cm thick. These two layers were capped by a rockfall, 30–20 cm thick, and over it a sequence of ca. 120 cm of ash and charcoal accumulation.

The stratigraphy (Fig. 2) was divided into three cultural periods, all belonging to the same "Umbu Tradition" based on the shape of the bifacial stemmed points (Mentz Ribeiro et al., 1989; Mentz Ribeiro and Ribeiro, 1999): Period I (from 130 cm below surface to the basal rock) was named "Batinga Phase" and would be comparable to the older materials present in the Uruguay river valley published by Miller (1987); Period II (between 90 and 130 cm below surface) would be akin to the "Umbu Phase" as described by Miller (1969). Period III (from the surface down to 90 cm deep) was named "Itapuí Phase" presenting points that can be found over a broad geographic area, including the neighboring states and the northern portion of Argentina.

Five radiocarbon ages were obtained (Table 1; Mentz Ribeiro and Ribeiro, 1999; Mentz Ribeiro et al., 1989; Rosa, 2009). The dated charcoal was collected on hearths, and the burned Arecaceae (palm tree) seed was dated several years after the excavation and published by Rosa (2009). The exact provenance of the samples was not provided by the authors; therefore, it is impossible to be sure of their stratigraphic position, and their assignment to the cultural layers is tentatively made. The sample taken at Unit B/7 can be reliably placed in the middle of the ash layer, but sample A/5 could represent either the basal age of the ash layer or the rock fall. By the same token, the sample from the "Experimental" test pit could be placed either in the basal sandy layer or inside the dark-gray layer. Sample A/6 can be reliably placed inside the basal sandy layer.

2.2. Lithic and bone technology

Mentz Ribeiro and Ribeiro (1999) described 507 bifacial points (333 complete or nearly complete and 174 fragments). However,

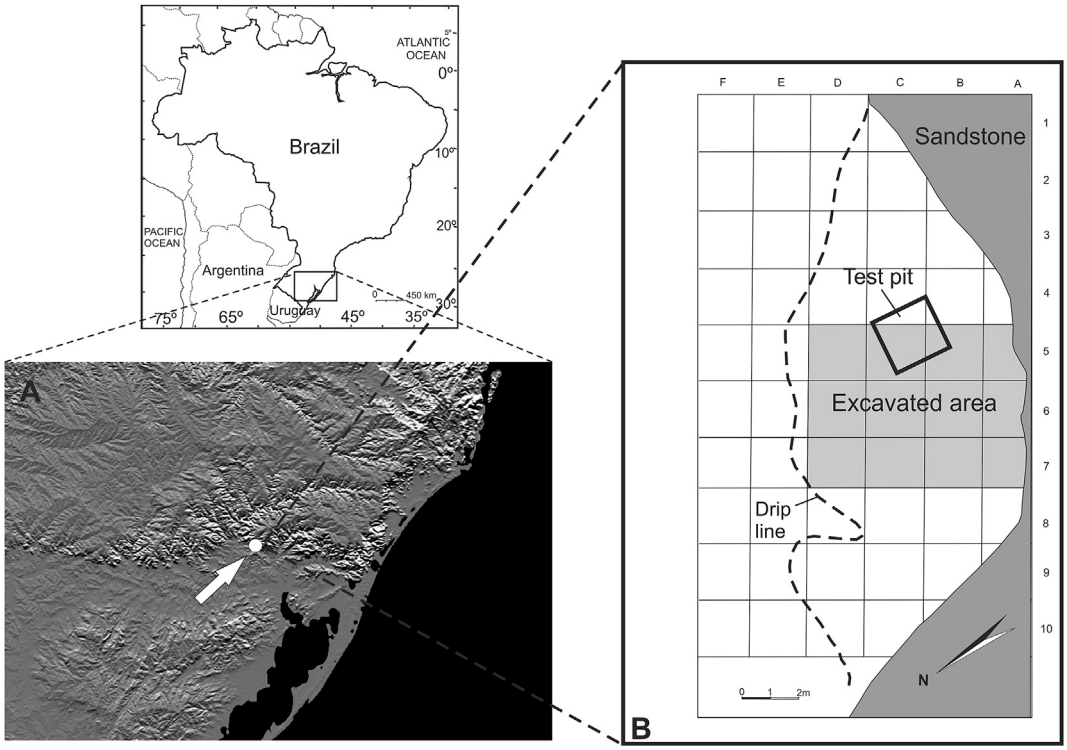

Fig. 1. Detail of South America showing Brazil and neighboring countries. A: Digital elevation model of Southern Brazil, with the location of Garivaldino site. B: Site plan, showing the excavated areas, modified from Mentz Ribeiro and Ribeiro (1999).