Preliminary Data on Nonwood Plant Remains at Sambaquis from the Southern and Southeastern Brazilian Coast: Considerations on Diet, Ritual, and Site Particularities

Rita Scheel-Ybert

INTRODUCTION

Archaeobotany is still a young field of research in Brazil. The lack of specialists is certainly related to the poor preservation of plant macro-remains in most tropical archaeological sites, but also to the lack of field research aimed at maximizing their recovery. Except for some exceptionally well preserved desiccated botanical remains, especially in Central Brazil and Amazonian caves and rock shelters (e.g. Magalhães 1998; Roosevelt et al. 1996; Kipnis 2005; Scheel-Ybert and Solari 2005; Shock 2010), and for rare waterlogged remains in shellmounds (Heredia and Beltrão 1980; Peixe et al. 2007; Santos 2010), carbonization is the major preservation way for plant remains in Brazilian sites.

Most charred remains in archaeological sediments correspond to wood charcoal. They are studied by Anthracology, defined as the “charcoal analysis and interpretation based on wood anatomy criteria” (Vernet 1992; Scheel-Ybert 2000), and historically devoted especially...
to palaeoenvironmental reconstruction. Along with this material, however, one can frequently find seeds, fruits and tuber remains. In tropical regions, studying these charred remains is frequently the only way to access data on diet and cultivation based on macro-remains (Scheel-Ybert 2001a; see also Di Piazza 1998; Tengberg 2002). Therefore, associated anthropological and archaeobotanical studies provide information on palaeoenvironment, landscape evolution, site catchment area, and firewood economy, but also on several palaeoethnobotanical aspects of upmost importance to the archaeological science, such as diet, food production, plants use in quotidian and ritual contexts etc.

Sambaquis, the Brazilian shellmounds, occur along almost the entire Brazilian coast and testify of an occupation dated from at least 8000 until ca. 1000 years BP (Gaspar 1996; Lima et al. 2002). These sites, usually established on the margins of large water bodies, especially the coastal lagoons, are constituted mainly of mollusk shells and fish bones, frequently alternating with sandy layers rich in organic matter (Gaspar 1998). Artifacts, burials, and hearths are frequently associated in specific areas of the sites, corroborating the interpretation that at least a great part of them are in fact burial monuments, intentionally constructed as landscape markers (DeBlasis et al. 1998).

At present, following the theoretical trend towards what has been called “complex hunter-gatherers” (Price and Brown 1985; Chapman 2003), particularly regarding coastal adaptations (Yesner 1983; Lightfoot 1993; Gamble et al. 2002), sambaqui builders are largely recognized to have been sedentary fishers with rather large demographic parameters (DeBlasis et al. 1998; Gaspar 1998) and a relatively complex sociocultural organization pattern (Lima and Mazz 1999/2000).

Although the typological homogeneity from the lithic and bone industries, as well as the structural characteristics of the sites themselves, argue for the existence of a single sociocultural system all along the Brazilian coast (DeBlasis et al. 1998), there are some noticeable regional particularities among sites. In Southern Brazil, especially in the Santa Catarina State, these sites may attain very large dimensions, present elaborated lithic sculptures (zoolithes), and are considered as exclusively funerary in purpose (Fish et al. 2000; DeBlasis et al. 1998). In Southeastern Brazil, sambaquis are much smaller. Previous studies considered that all Southeastern sites reunited funerary and domestic activities (Gaspar 1998; Barbosa 2001), but recent field research is demonstrating that at least some of them are also exclusively funerary (Gaspar et al. in press).

Anthracological studies in Brazilian sambaquis date from the end of the nineties (Scheel-Ybert 2000, 2001a, 2001b; Scheel-Ybert et al. 2009, 2010; Bianchini et al. 2011). They have demonstrated that sambaquis, either in Southern as in Southeastern Brazil, were always established in the restinga environment2, exploiting either the open restinga as the restinga forest. Other vegetation types, such as mangrove and coastal forests, were generally inside their site catchment area. The charcoal assemblage at each site did not change significantly over the several centuries of occupation, in spite of the record of climatic oscillations, at least in the Southeastern coast (see Scheel-Ybert 2000).

A great floristic diversity characterizes all of the charcoal diagrams; the prevalence of wood with traces of decay points to regular dead wood collection (Scheel-Ybert 2000). This is taken as an indication of generally unselective gathering of firewood, although there is evidence of the recurrent choice of at least one species, as related

2 The restinga ecosystem, characteristic of the Brazilian coast, is associated to sandy beach ridges. This complex ecosystem includes different vegetation types, from sparse open plant communities, herbaceous and scrub formations (“open restinga”) to dense evergreen forest (“restinga forest”). Each of these vegetation types occupies a well-defined relief configuration, producing zonation of the ecosystem. Low areas between the beach ridges and dune slacks support marshy vegetation. Scrub communities usually grow inland on the external sand barrier, on dunes or in low areas. The remnant restinga forests, growing on the innermost sand barrier, are ca. 8 m high with emergent trees that reach 15-25 m, a dense understory and many epiphytes (Araújo & Henriques 1984).
It is conceivable that the choice of firewood was based on varied criteria, including physical properties (such as dead wood), specific criteria for special uses (Scheel-Ybert 2000), as well as wood availability and cultural beliefs (as proposed by Picornell et al. 2011)

Plant gathering by these populations has always been implicitly recognized, but this activity tended to be seen as negligible or secondary. Despite the frequency, in these sites, of lithic instruments attributed to plant processing (Kneip 1980, 1994; Tenório 1991; DeBlasis et al. 1998), few authors have suggested that plant gathering, management, and domestication (Tenório 1991) could have been practiced by sambaqui people. However, more recent studies of several expertises indicate that, in addition to an economy essentially based on fishing and on the exploitation of aquatic resources, plant food were of much greater importance than earlier assumed (Scheel-Ybert 2001a; Scheel-Ybert et al. 2009).

The present paper aims to compare previously published data (Scheel-Ybert 2001a) to an as yet unpublished work (Bianchini 2008) to demonstrate that plant macroremains other than wood charcoal do exist in these sites, and that they can be an important source of information about sambaqui moundbuilders.

**REGIONAL SETTING**

Anthracological/archaeobotanical studies were developed on several sambaquis from Southern and Southeastern Brazilian coast. Detailed data on the present environment and archaeological context of each area were previously published (DeBlasis et al. 1998; Fish et al. 2000; Scheel-Ybert 1998, 2000, 2001b).

In this paper we present only the sites where nonwood macro-remains were studied based on flotation samples, that is to say, five sambaquis from Rio de Janeiro State (22°53′- 42°03′/22°57′S - 42°33′W) and one from Santa Catarina State (28°36′- 48°57′W) (Figure 1). The chronology of these sites was established by radiocarbon dating. In Southeastern Brazil, sambaqui do Forte is dated from 6180-5630 to 1990-1670 cal BP, Boca da Barra from 4540-3580 to 1380-1180 cal BP, Salinas Peroano from 5280-4870 to 1820-1570 cal BP, Pontinha from 2750-1750 to 1730-1540 cal BP, and Beirada from 5240-4190 to 4250-3290 cal BP. In Southern Brazil, sambaqui Jabutiçabeira-II is dated from 3206-2849 to 1859-1526 cal BP.

**MATERIALS AND METHODS**

Charred nonwood plant remains (fruits, seeds, and tubers) were sampled and analyzed concomitantly to wood charcoal. The remains were collected from vertical profiles in

---

Figure 1. Geographical location of the studied sites in Southeastern (Rio de Janeiro State) and Southern Brazil (Santa Catarina State).
Excavations of 1 m², through a combination of natural archaeological layers and 10 cm artificial levels (Scheel-Ybert et al. 2005/2006). All the sediment from each unit was floated, attaining 100-200 liters of sediments for each artificial level. Both the light and the heavy fractions were then sorted for charcoal recovering. A minimum of 100 to 200 charcoal pieces per sample were analyzed; whenever this minimum number was not available, the totality of charcoal pieces from a sample were analyzed.

Seeds and fruits were analyzed under estereomicroscopes for external morphology, and under reflected light microscopes for internal structure. Wood charcoal and tuber pieces were analyzed under reflected light microscopes. Charred pieces were hand-splitted to expose the three fundamental sections for wood anatomy, or different sections for tuber anatomy. Systematic determination was based on morphometric data and external morphology characters for fruits and seeds, and on the internal anatomical structure for tubers and wood. For that, ecofacts were compared with descriptions and photographs from the literature and with extant charred samples of reference collections.

Frequency of food remains in each sample (fruits, seeds, tuber fragments, and non-identified parenchyma, which can belong either to seeds or to tubers) was estimated on the basis of food remains:wood charcoal ratios. Charcoal was used in the denominator rather than sediment volume, to control for differential preservation (Miller 1988).

RESULTS

In addition to the presence of charred palm endocarps, an already well-known ecofact in sambaquis, anthracological/archaeobotanical analysis demonstrated that charred seeds and tuber fragments also occur in these sites (Scheel-Ybert 2001a; Bianchini 2008).

The retrieving of these vestiges was made possible by a great investment in charcoal identification. Seeds and tubers are extremely under-represented in sambaquis archaeological record, therefore, only the analysis of a high number of charred pieces allowed their finding. In sambaqui do Forte, for example, from 8887 charred pieces analyzed, 250 could be attributed to dietary remains. Most of those were palm endocarps, while only 27 were seeds, 15 tuber remains, and 7 fragments of unidentified parenchyma, (Scheel-Ybert 2001a). As it will be discussed latter, this is not a measure of food consumption, but, rather, a direct consequence of differential preservation.

In Southeastern sites, palm endocarps of Syagrus sp were the most frequent food plant vestiges. Besides those, Poaceae or Cyperaceae and

---

**Figure 2.1** Sambaqui do Forte (50-60 cm, ca. 2360-2140 cal BP). 2. Sambaqui Salinas Peroano (20-30 cm, ca. 1820-1570 cal BP). cf. Gramineae/Cyperaceae. 3. Sambaqui do Forte (140-150 cm, ca. 4340-3980 cal BP). Dioscorea sp. 4. Sambaqui do Forte (200-210 cm, ca. 5720-5480 cal BP). scales = 100 µm (adapted from Scheel-Ybert 2001a).

**Figure 3.** Bar graphs showing food remains:wood charcoal ratios and the absolute number of charred nonwood remains for sambaqui do Forte (Rio de Janeiro State, Southeastern Brazil): schematic stratigraphic columns of the site below (adapted from Scheel-Ybert 2001a). Nf = total number of food remains; Nt = total number of charcoal pieces. Legend for stratigraphy, see figure 4.
yam (Dioscorea spp) tubers were identified, along with other monocotyledonous tubers and several seeds that remain still unidentified (Figures 2-4). The high proportion of indetermination in these analyses may be explained by the difficulties of the determination process, due to high fragmentation and to the scarcity of comparative material. Although comparative collections for seeds, fruits, and tubers are being constructed, they are as yet incomplete.

DISCUSSION

The retrieval of plant food macro-remains in sambaquis is overall very important, even if most of these vestiges remain as yet unidentified. It comes to strengthen the hypothesis that plant foods were making a much more important part in these population diet and lifestyle than formerly admitted (Scheel-Ybert 2001a; Scheel-Ybert et al. 2009).

The rarity of these remains must not be
taken as an indication of plants being secondary in their diet, but, well on the contrary, the preservation of these few vestiges emphasizes the importance of their utilization.

Different classes of botanical archaeological vestiges (wood, fruits, seeds, roots, tubers, leaves etc.) are differentially preserved in the sediments, due to their intrinsic characteristics and particularities. Wood charcoal remains, which are the main fuel of combustion features, are easily preserved, consisting on the biological elements most resistant to degradation that exist. Preservation of food remains, however, is aleatory and depends on several factors. First of all, on the characteristics of the plant tissues involved – hard parts tend to preserve much easier than fleshy parts. Besides, under tropical climate, where preservation is achieved almost exclusively by carbonization, it depends on whether or not the plant material is directly exposed to fire, intentionally or accidentally, aiming its preservation or consumption. Hard palm fruit shells, besides being much more resistant to degradation, are likely to be thrown on the fire after the edible parts of fruits are removed, and even recycled as a supplementary fuel, increasing the probability of preservation in archaeological sediments (Scheel-Ybert 2001a). In domestic context, seeds, which are commonly parched before consumption or storage, can be accidentally preserved if some of them spill into the hearth (Munson et al. 1971, apud Miksicek 1987), while seeds of fleshy fruits may be thrown to the fire as disposal. Tubers, on the other hand, like leafy greens and fleshy fruits, which are usually consumed fresh or boiled, are seldom directly exposed to fire and consequently very unlikely to be preserved by carbonization.

In ritual context, preservation of each one of these elements will depend either on the characteristics of plant tissues as on the manner as they are offered or used in the ceremony, and therefore can vary compared to domestic contexts. In sambaquis, particularly, the importance of hearths associated to the funerary ritual and the possibility of occurrence of funerary food offerings and/or feasting allow expecting that most ceremonial food remains would be charred, including those of fleshy fruits that are usually eaten raw in domestic context (as it is the case of Annonaceae and Myrtaceae fruits, retrieved in Jabuticabeira-II site). For all these reasons, the estimation of ratios using the number of wood charcoal pieces in the denominator is important to compare data coming from different samples.

Due to differential preservation, animal remains tend to be overestimated in archaeological studies regarding to plant remains, exactly in the same way that mollusk shells have long been considered as the major staple food in sambaquis, in detriment of fish, which has finally been proven to be the most important protein source for these people (Figuti 1993; De Masi 2001). Recent investments in the study of macro- and micro-plant remains in sambaquis are progressively putting in evidence that plant foods made a substantial contribution to their diet (Scheel-Ybert 2001a; Boyadjian 2007, 2012; Wesolowski 2007; Scheel-Ybert et al. 2009). Paleopathological analyses of caries rates and tooth wear sustain this hypothesis in some sites (Wesolowski 2007; Scheel-Ybert et al. 2009).

The list of known plant items contributing to sambaqui builders diet is still limited. Palms, which remains are frequently found in these sites (e.g. Kneip 1980, 1994; Heredia and Beltrão 1980; Carvalho 1984; Kneip and Pallestrini 1987; Gaspar 1991; Tenório 1991; Tenório et al. 1992), generally produce edible fruits and are considered high value plants to indigenous groups and traditional populations (Balée 2000; Miranda and Hanazaki 2008). Remains of Syagrus sp were found in all sites analyzed here (along with Butia sp. in Jabuticabeira-II), dating since ca. 6000 cal yrs BP in Forte. Tubers, on the other hand, are rarely identified in archaeological sites, due to their aleatory preservation. The presence of yams (Dioscorea sp), attested at least since ca. 4000 cal yrs BP, along with other as yet unidentified tubers, point to the importance of the use of starchy plants. Dioscorea starch grains found in dental calculus from a southern Brazilian sambaqui corroborate this importance (Wesolowski 2007; Boyadjian 2012). Yams were independently domesticated both in the old world as in the neotropics (Piperno and Pearsall 1998);
several yam species are important food items cultivated in Central and South America, Africa, Asia, and in the Pacific Islands. Archaeological findings in several parts of the world attest of the ancientness and widespread use of this plants (e.g. Fullagar et al. 2006; Barton and Paz 2007).

The other species already identified in these sites correspond to seeds, all of which produce fruits that are still used as food in Brazil and other countries. Among those, Cucurbitaceae is certainly the more studied, either because of the current economic interest in these plants, as because of the ancient domestication of different species (Smith 1997, 2005; Piperno et al. 2000; Iriarte et al. 2004). Cucurbita pepo is recognized to have been domesticated in the Americas as early as 10000 yrs BP (Smith 1997). Domesticated Cucurbita phytoliths were identified in cerritos from Southeastern Urugai since ca. 4190 yrs BP, along with palm phytoliths and Phaseolus and Canna starch grains (Iriarte et al. 2004). In North America, C. pepo seeds were found in waterlogged sediments of a shellmound dated from 2450 to 200 yrs BP (Decker and Newsom 1988).

As for the Myrtaceae and Annonaceae families, both of them produce a great variety of savorous fleshy fruits; a number of them, domesticated or semi-domesticated, are important food items in tropical regions.

It is not possible, at this stage, to recognize if these tubers and seeds were the product of gathering, or if they could be related to plant management or food production activities. A much greater investment in archaeobotanical studies is still needed to provide more data on this subject. However, these ecofacts certainly are a significant part of the archaeological record, their preservation attests that they were widely used by these populations, and their study potentially can bring important information on the way of life of sambaqui builders.

It is remarkable that in Southeastern sambaquis (Forte, Salinas Peroano, Boca da Barra, Pontinha) plant food remains, including tubers, are present within most of their archaeological levels, starting at the beginning of the occupation. The higher food remains:wood charcoal ratios are associated either to shell-rich archaeological layers as to sandy layers. There is a tendency to increased ratios in more recent periods at Salinas Peroano and Pontinha, but no clear trend has been detected in the ensemble of sites.

Not one of the analyzed Southeastern sites samples is associated with funerary areas, even if burials are recorded for all of the sites. These sites used to be considered as dwelling and dumping spaces, in addition to funerary, however, all of them were excavated during the 1980s (cf. Kneip 1980, 1994; Gaspar 1991), and therefore the archaeological context of the analyzed samples is not so well known. A new look on these sites archaeology would be most important to understand the significance of these food remains.

On the contrary, sambaqui Jabuticabeira-II is presently one of the best excavated and understood sites in Brazil (cf. Fish et al. 2000; DeBlasis et al. 2007; Bianchini 2008; Klokler 2008; Villagran et al. 2010). The magnitude of the site itself, with its complex constructive process and rich funerary offerings and features that reflect an elaborated mortuary ritual and ceremonial feastings, point to a special “concern with the body” in this society (Gaspar 2004; Klokler 2008). In these circumstances, we may expect that most of the material integrating the funerary ritual might have been carefully selected, in agreement with the ideological and/or symbolical universe of the group (Bianchini 2008).

At this site, the anthracological sample was taken from a profile in locus 1. The upper part of this profile consists in a shell layer from which 3 m³ of sediments were sampled, producing 1788 wood charcoal fragments (596 remains/m³) and no food remains (Scheel-Ybert 2001b). This is interpreted as corresponding to a “covering layer”, i.e., a sequence of thinner or larger shell layers in a mound-like disposition, intended to close a funerary area. Shells in this archaeological level are interpreted as construction material (DeBlasis et al. 1998). The funerary layer, although presenting shell remains as well, is much richer in fish remains, artifacts, and hearths. The lower part of this profile presents the funerary area itself, from which 0.7 m³ of sediments were sampled,
providing 2193 wood charcoal fragments, 149 seeds, 115 palm nuts, and one tuber fragment (Bianchini 2008), that is to say, 4097 remains/m³.

Food remains: wood charcoal ratios are overall much higher in Jabuticabeira-II funerary area than in any of the Southeastern sites studied. Inside the funerary area, higher food remains ratios are associated to hearths, which also presented the higher concentration of vestiges associated to the funerary ritual (special shells, fish bones, thermal flakes).

The abundance of seeds and palm nuts associated with specific features of the mortuary layers, especially hearths, contrasts with their absence in the covering layers, suggesting that food plants were an important component of the funerary ritual practiced in Jabuticabeira-II (Bianchini 2008). It is likely that fruits were used as offerings or consumed during the funerary rituals or feasting ceremonies. Indeed, the presence of food plants in funerary contexts is frequently associated with the practice of feasting (Pauketat et al. 2002; Rosenswig 2007). This evidence strengthens the hypothesis of funerary feasting, suggested by zooarchaeological studies (Klokler 2008), while demonstrating that not only animal food was used in these ceremonies, but plant food as well.

Although we have no evidence of these fruits being consumed in domestic contexts (as we are not absolutely sure that Southeastern sites correspond indeed to domestic unities), it is quite probable that they were. Ritual practices and quotidian activities may be intimately related in several aspects (Hodder 2005). Moreover, mortuary rituals are amongst the routine, strategic engagements through which people reproduce the conditions of their own lives (Barrett 1990).

CONCLUSIONS

It was observed that many Southeastern sites present plant food remains in all their archaeological layers, independently of the presence of burials, while in the site studied in the Southern region plant remains are strictly limited to funerary areas.

The presence of food remains in all sediments of Southeastern sambaquis might be associated to domestic activities being carried out in these sites, or else with different activities recorded in the dump sediments possibly used to construct these sites (see Scheel-Ybert, in press). However, as new field research in this region is revealing that several other Southeastern sites are also exclusively funerary, their dwelling function remains yet to be confirmed.

Should these fruits, seeds, and tubers represent funerary offerings, regularly charred during funerary rituals, or else everyday food items consumed in domestic spaces which remains were accidentally or intentionally thrown to the fire, or even both, their differentiated occurrence point to regional or local specificities distinguishing the sites at some level.

It is important to give continuity to archaeobotanical investigations to have a clearer comprehension of the processes involved in plant food use and consumption, as well as to determine whether food production activities were in practice at any level. More archaeological research is also needed, in order to understand the context of deposition in each site. However, the association of anthracological and archaeobotanical research has already proven to be a valuable tool for the identification of plant macro-remains.

Even if still incipient, archaeobotanical research in Brazil is contributing to demonstrate the importance of plants to sambaqui people’s subsistence. Yams and other tubers, palm fruits, Myrtaceae, Annonaceae, Cucurbitaceae and surely many other plant species were probably consumed. At the same time, these plants played a role in ritualistic activities, being offered in funerary rituals and/or consumed during mortuary feastings. The present data point to the importance of plant resources in the diet, as well as in the belief system of sambaquis moundbuilders.

ACKNOWLEDGEMENTS

Thanks are due to Gina Bianchini, for allowing the use of data from her unpublished MSc dissertation, and to Drs Debora Kligmann and Bernarda Marconetto, for valuable comments that
very much improved this manuscript. Thanks are
due also to the National Council of Technological
and Scientific Development (CNPq) and to the
Carlos Chagas Filho Foundation for Research
Support of the State of Rio de Janeiro (FAPERJ)
for financial support.

REFERENCES

ARAUJO, D.S.D. and R.P.B. HENRIQUES
1984. Análise Florística das Restingas do Estado
do Rio de Janeiro. In Restingas: Origem, Estrutura,
Processos, edited by L.D. Lacerda, D.S.D. Araujo,
R. Cerqueira and B. Turcq, pp. 159-194. CEUFF,
Niterói.

BALÉE, W.
2000. Antiquity of traditional ethnobiological
knowledge in Amazonia: The Tupi-Guarani

BARBOSA, M.
2001. Espaço e organização social do grupo
construtor do sambaqui IBV-4, RJ. MSc
dissertation. Universidade de São Paulo, São
Paulo.

BARRETT, J.C.
1990. The Monumentality of Death: The Character
of Early Bronze Age Mortuary Mounds in Southern

BARTON, H. and V. PAZ.
2007. Subterranean diets in the tropical rainforest
of Sarawak, Malaysia. In Rethinking Agriculture:
Archaeological and ethnoarchaeological
perspectives, edited by T.P. Denham, J. Iriarte and L.
Vrydaghs. One World Archaeology. Left Coast Press
Inc., California.

BIANCHINI, G.F.
2008. Fogo e Paisagem: Evidências de Práticas
Rituais e Construção do Ambiente a Partir
da Análise Antracológica de um Sambaqui no
Litoral Sul de Santa Catarina. MSc dissertation.
Universidade Federal do Rio de Janeiro, Rio de
Janeiro.

BIANCHINI, G.F.; M.D. GASPAR; P. DEBLASIS
and R. SCHEEL-YBERT
2011. Processos de formação do sambaqui
Jabuticabeira-II: interpretações através da análise
estratigráfica de vestígios vegetais carbonizados.
Revista do Museu de Arqueologia e Etnologia 21:
51-69.

BOYADJIAN, C.H.C.
2007. Microfósseis contidos no cálculo dentário
como evidência do uso de recursos vegetais nos
sambaquis de Jabuticabeira II (SC) e Moraes
(SP). M.Sc. dissertation. Universidade de São
Paulo, São Paulo.

BOYADJIAN, C.H.C.
2012. Identificação de microfósseis vegetais para
a reconstrução de dieta sambaquieira. Ph.D.
dissertation. Universidade de São Paulo, São
Paulo.

CARVALHO, E.T.
Missão de 1978. Boletim do Instituto de

CHAPMAN, R.W.
2003. Archaeologies of Complexity. Routledge,
London.

DE BLASIS, P.A.D.; S.K. FISH; M.D. GASPAR
and P.R. FISH
1998. Some references for discussion of
complexity among the Sambaqui moundbuilders
from the southern shores of Brazil. Revista de
Arqueologia Americana 15: 75-105.

DE BLASIS, P.; A. KNEIP; R. SCHEEL-YBERT;
P.C. GIANNINI and M.D. GASPAR
2007. Sambaquis e Paisagem: Dinâmica Natural e
Arqueologia Regional no Litoral do Sul do Brasil.
Arqueologia Suramericana 3: 29-61.

DECKER, D.S. and L.A. NEWSOM
1988. Numerical analysis of archaeological
Cucurbita pepo seeds from Hontoon Island,

DE MASI, M.A.N.

DI PIAZZA, A.
1998. Archaeobotanical Investigations of an Earth
Oven in Kiribati, Gilbert Islands. *Vegetation History and Archaeobotany* 7: 49-154.

FIGUTI, L.


FISH, S.; P. DE BLASIS; M.D. GASPAR and P. FISH


FULLAGAR, R.; J. FIELD; T. DENHAM and C. LENTFER


GAMBLE, L.H.; P.L. WALKER and G.S. RUSSELL


GASPAR, M.D.


GASPAR, M.D.


GASPAR, M.D.


GASPAR, M.D.


GASPAR, M.D.; D. KLOKLER; R. SCHEELYBERT & G.F. BIANCHINI

In press. Sambaqui de Amourins: mesmo sítio, perspectivas diferentes. Arqueologia de um sambaqui 30 anos depois

HEREDIA, O.R. and M.C. BELTRÃO


HODDER, I.


IRIARTE, J.; I. HOLST; O. MAROZZI; C. LISTOPAD; E. ALONSO; A. RINDERKNECHT and J. MONTAÑA


KIPNIS, R.


KLOKLER, D.M.


KNEIP, L.M.


KNEIP, L.M.


KNEIP, L.M. and L. PALLESTRINI


LIGHTFOOT, K.G.

1993. Long-term developments in complex

LIMA, T.A. and J.M.L. MAZZ

LIMA, T.A.; K.D. MACARIO; R.M. ANJOS; P.R.S. GOMES; M.M. COIMBRA and D. ELMORE

MAGALHÃES, M.P.

MICKSICEK, C.H.

MILLER, N.F.

MIRANDA, T.M. and N. HANAZAKI

PAUKETAT, T.R.; L. KELLY; G. FRITZ; N. LOPINOT; S. ELIAS and E. HARGRAVE

PEIXE, S.P.; J.C.F. MELO and D.R. BANDEIRA

PICORNELL, L.G.; E. ASOUTI and E. ALLUE-MARTI

PIPERNO, D.R. and D.M. PEARSELL

PIPERNO, D.R.; T.C. ANDRES and K.E. STOTHERT

PRICE, T.D. and J.A. BROWN (eds.)

ROOSEVELT, A.C.; M.L. COSTA; C.L. MACHADO; M. MICHAB; N. MERCIER; H. VALLADAS; J. FEATHERS; W. BARNETT; M.I. SILVEIRA; A. HENDERSON; J. SILVA; B. CHERNOFF; D.S. REESE; J.A. HOLMAN; N. TOTH and K. SCHICK

ROSENSWIG, R.M.

SANTOS, A.M.P.

SCHEEL-YBERT, R.
PhD dissertation, Université Montpellier II, Montpellier.


SCHEEL-YBERT, R. and M.E. SOLARI


SCHEEL-YBERT, R.; D. KLOKLER; M.D. GASPAR and L. FIGUTI


SCHEEL-YBERT, R.; S. EGGERS; V. WESOLOWSKI; C.C. PETRONILHO; C.H.C. BOYADJIAN; M.D. GASPAR; M. BARBOSA-GUIMARÃES; M.C. TENÓRIO and P. DE BLASIS


SCHEEL-YBERT, R.; G.F. BIANCHINI and P. DE BLASIS


SHOCK, M.P.


SMITH, B.D.


SMITH, B.D.


TENBERG, M.


TENÓRIO, M.C.


TENÓRIO, M.C.; M. BARBOSA and T. PORTELA


VERNET, J.-L.


VILLAGRAN, X.S.; D.M. KLOKLER; P. NISHIDA; M.D. GASPAR and P. DE BLASIS

WESOLOWSKI, V.

YESNER, D.R.