

# THE USE OF *SABAL URESANA* (ARECACEAE) AND OTHER PALMS IN SONORA, MEXICO<sup>1</sup>

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**Joyal, Elaine** (Department of Botany, Arizona State University, Tempe, AZ 85287-1601 USA). THE USE OF *SABAL URESANA* (Arecaceae) and Other Palms in Sonora, Mexico. *Economic Botany* 50(4):429–445. 1996. *Sabal uresana* was the palm most often discussed in published historic accounts from Sonora, Mexico, and the only palm mentioned from the earliest written documents to the present. An inventory of topographic maps identified 337 palm place names, thus reinforcing the cultural significance of palms in this region. Participant observation and formal interviews were used to learn how wild-harvested palms are utilized in present-day Sonora. *Sabal uresana* is the most economically important palm. Its leaves are employed for weaving, the major use of palms in this region, and for thatching and broom-making. Palm logs are used for construction and the fruits are eaten in certain parts of the state. The use of palms in Sonora is changing. Weaving and thatching could probably be maintained as viable crafts and sources of income with appropriate resource management and marketing.

El Uso de *Sabal uresana* (Arecaceae) y Otras Palmas en Sonora, México. *Sabal uresana* fue la palma más frecuentemente discutida en los registros históricos publicados para Sonora, México, y la única mencionada desde los documentos escritos más antiguos al presente. En un inventario de mapas topográficos fueron identificados 337 nombres para los palmares, reforzando así el significado cultural de las palmas en esta región. Observación participante y entrevistas formales fueron los métodos utilizados para aprender el uso actual de las palmas silvestres en Sonora. *Sabal uresana* es la palma económicamente más importante. Las hojas son empleadas para tejer, lo cual es el mayor uso de las palmas en la región, y para techar y hacer escobas. Los troncos son usados en la construcción y los frutos son comestibles en algunas partes del estado. La utilización de la palma en Sonora está cambiando, pero el tejido y techado podrían mantenerse como actividades artesanales y fuentes de ingreso si se acompañan del debido manejo de los recursos naturales y la adecuada comercialización de los productos.

**Key Words:** *Sabal uresana*; *Brahea*; Arecaceae; Sonora; Mexico; weaving; thatching; ethnobotany.

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Six regional endemic palm species in three Coryphoid genera grow in the Mexican state of Sonora (Felger and Joyal n.d.). The four *Braheas* (a primarily Mexican genus), *B. aculeata* (Brandege) H. E. Moore, *B. dulcis* (H. B. K.) Martius, *B. elegans* (Franceschi ex Beccari) H. E. Moore, and *B. nitida* André, are poorly known due to the paucity of collections from the region (Quero 1989). Both species of the regional endemic genus *Washingtonia* are commonly planted ornamentals. Only *W. robusta* H. A. Wendland is native in Sonora. *Sabal*, comprising 16 species native to Mexico and the Caribbean Basin (Zona 1990), is represented only by *S. uresana* Trelease in extreme northwestern

Mexico. Mexico's most recent list of endangered, threatened, and rare species (SEDESOL 1994) includes three Sonoran palms: *B. aculeata* is listed as "threatened, endemic"; *B. nitida* as "endangered"; and *S. uresana* as "rare, endemic."

This paper documents the historic and present use of these palms and certain palm-like plants. Because *S. uresana* is the most valuable and the most widespread of the native palms, much of what follows is devoted to it. Although known from relatively few collections, it is distinctive within the genus (Zona 1990). *Sabal uresana* occupies the most xeric habitat of any *Sabal*, growing at the limit of the tropical dry forest as it follows the river drainages north into the Sonoran Desert from the coast near Guaymas and

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east into the western foothills of the Sierra Madre Occidental to southwestern Chihuahua (Joyal 1995). While thought to be over-exploited (SEDESOL 1994), very little was known about *S. uresana* scientifically until the present study.

### HISTORIC USE

Palms and palm-like plants have been used by most indigenous and many mestizo peoples in Sonora, primarily for weaving and thatching (Brugge 1956, 1961; Di Peso and Matson 1965; Felger and Moser 1985; Fontana, Faubert, and Burns 1977; Gentry 1942, 1963; Hinton 1959, 1969; Molina 1972; Nentvig 1977; Pennington 1979, 1980, 1981; Pfefferkorn 1949; Sobarzo 1966; Standley 1920:72). Combining geographic locations, plant descriptions, uses, and common names from these references with field research, I have now determined species identities for many of the plants reported (Table 1). In the text, these determinations are bracketed.

Adamo Gilg, writing from the mission at Pópulo (on the Río San Miguel, near Ures, an area where *S. uresana* is now common) in 1692, wrote that the Seris "...weave baskets and blankets or mats of palm and reed" (cited by Di Peso and Matson 1965:55). Pennington (1979, 1981) translated two historical vocabularies from central Sonora. The first (1979), in Névome [Pima Bajo], was compiled "at or near Batuco [north of Onavas] or by a Jesuit who worked in Eudeve [a tribe thought to be related to Ópata (Hinton 1959)] country," probably during the seventeenth century. The only palm words listed were "tacut" and "palma." The second vocabulary (1981) is Eudeve and was taken from documents dating from the seventeenth or eighteenth century. Pennington believed that the author may have been a missionary stationed at Onavas. The list included "tacút" as "palma" [*S. uresana*] and "hoveúh" as "otra clase de palma" [*B. elegans*] (Pennington 1981:142).

In 1764, Juan Nentvig (1977:37-8) described two kinds of palms growing in northeastern Sonora. He gave common names for each and discussed differences in size and flavor of the fruits. The smaller one [*Brahea* sp.] was of better quality. Nentvig specified that the seed of the other [*S. uresana*], the size of a dove's egg, was used to make buttons. He was the first to record the use of the common name *taco*, indicating that it was an Ópata word. In his next entry, Nentvig discussed the harvest and preparation of

palm heart. Each was the size of a sugar loaf ("un pilón de azúcar") and could feed four to six people, either raw or slightly cooked. It is not clear which species he was referring to here. Finally, Nentvig described mats ("*petates y en ópata hipet*") made by the Indians from the "many and good palms" which abound in their [Ópata] land, and which they brought to nearby towns to sell ("... Bacadeguatzi ... Satechi ... del río de los Mulatos y del de Aros").

Ignaz Pfefferkorn (1949:74), writing in the late eighteenth century, described, "...many palm trees in the region near the sea, especially in the vicinity of Guaymas" [*B. elegans, S. uresana, W. robusta*]. He dismissed them from further discussion because they "neither yield fruit nor attain the heights reached by genuine palms." He later wrote that the Ópatas and Eudebes plaited mats and hats from palm leaves [*S. uresana*] (Pfefferkorn 1949:245).

Gentry (1942:68-69, 86) wrote of "palma" or "tahcu" as being "one of the most useful plants of the Río Mayo", used by Mexicans and Guarihio for thatch and by the latter for weaving petates and for edible palm heart from young palms. Later he added that the Guarihio used palm leaves for weaving baskets and mats, used the trunks for construction, and that they ate the terminal bud [heart] of both *S. uresana* and *B. aculeata* (Gentry 1963:98). He reported that *B. aculeata* leaves were "considered superior to those of *S. uresana* for roofing" (in 1993 Guarihios at Los Bajíos told me that it was not a question of quality but simply that *B. aculeata* was abundant nearby). Gentry (1963:116) noted that a palm [*S. uresana*] hat was the "one article on a dressed Indian which most quickly identified the wearer as [W]ahirio." He tentatively identified much of this material as *S. uresana* while stating that some might be *Brahea aculeata*. All except one of Gentry's palm collections are now referable to *B. aculeata*, *B. dulcis* or *B. nitida* (Felger and Joyal n. d.). Gentry's "palma" or "palmilla" appear to apply most often to *B. aculeata*. One "palma" ["ta'cu"] collection made in Guarihio country is a mixed sheet of *S. uresana* leaf and *B. aculeata* fruit (Gentry 1210). In his Guarihio publication, Gentry (1963:115-116) identified two palm-like plants used for weaving baskets, *Dasyllirion wheeleri* Watson and *Nolina matapensis* Wiggins. He omitted species identification for plants used for weaving mats ("only leaves of palms")

and hats ("made from the leaf of a plant known as yerey palma (*wechesas*) which grows only in certain localities, one near Conejos"). His 1963 description of *S. uresana* matches the species, however, and it is now commonly called "palma del taco."

Hinton (1959:14–16) wrote extensively of palm use [*S. uresana*] for basketry and hats in eastern Sonora. He considered it to be characteristic of the Ópatas, and that it had been passed down "through the generations to the progressively more mestizo population." Hinton stressed that Indian settlements were the centers of palm work; that Indian women were the best, and in some areas the only, palm workers; that "the palm weaving complex is of considerable antiquity in eastern Sonora," and concluded that "there is also archaeological evidence, since I have found twilled palm material in cave sites." Areas which Hinton considered centers of palm-weaving included the lower San Miguel, Sonora, Batuc [now flooded] and Sahuaripa valleys, Guisamopa, Buena Vista, Onabas, and Maicoba.

Interestingly, the name "babiso", which is applied to two *Brahea* species from Ures to Nácori Chico, does not appear in references until Molina's recent *Nombres indigenas de Sonora* (1972). It is commonly recognized as the other "palma" by residents in these areas and is also a common place name (see below).

Pennington (1980:288–299, 346) stated that four species were important to the Pima Bajo at Onavas for weaving. The favored material for baskets was *S. uresana*. Its larger, tougher leaves were used for thatching. *Dasyilirion wheeleri*, *Nolina matapensis*, and *Agave yaquiana* Trelease, all members of the Agavaceae, were the other species used. He added that "data in the Névome vocabulary [Pennington 1979] suggest that the Onavas Pima were familiar with at least five species of plants probably used for basket-making." Pennington (1980:234) also recorded that the "young and tender leaves of a 'palma del suelo' [*S. uresana*] are pit baked. . . ." Amadeo Rea (pers. comm. 1996) recorded Pima Bajo names, uses, and management for *S. uresana* (= "mahagam" Rea s.n., SD) and *B. elegans* (= "mahagam stutum," Rea 871, ARIZ) at El Palmar de Onavas (El Palmar) in the 1970s.

Felger and Moser (1985:351) noted that the Seris' generic term, *zami*, for any palm is incorporated into several modern expressions, e.g. *hehe zami*, a wooden box. This hints at earlier

palm use, i.e., that these items were originally made from palms. The leaves of *B. elegans* were said to be woven into a kind of hat in the Tastiota region on the central coast. They reported that the Seris ate the fruit of "zami *ctam*" (*S. uresana* and/or *Washingtonia robusta*) which grew wild "south of Tastiota" but that they considered those of *B. elegans* inedible [the opposite is true in the Río Sonora area, i.e. *B. elegans* fruits were said to be good and those of *S. uresana* bitter, see Joyal 1996]. Felger (pers. comm. 1994) knew no Seri who had first hand knowledge of palm use.

In summary, palms and palm-like plants have been important fiber sources in Sonora since the earliest written records, and certainly before these references. *Sabal uresana* was clearly the most commonly-cited species, the only species consistently mentioned in the literature through more than three centuries, and thus assuredly an important, if not the most important, hard fiber resource in Sonora.

## PALM PLACE NAMES

Identifying the use of a resource in the language can be used to document its cultural importance. Initial field research revealed that several palm locations were identified by palm place names (PPNs) on topographic maps. I inventoried these maps for the eastern half of Sonora to determine if there was a pattern to the naming of palm places and, if so, whether this information could be used to locate additional populations. All place names derived from the spanish, palma, and *babiso*, a reference to palms used only in former Ópata territory, were included in the records.

The inventory of 101 topographic maps identified 337 PPNs (Tables 2, 3). "Palma" and "palmar," a palm stand, were the major palm-derived names. Diminutive forms most often ended in "-ita," a little palm, or "-ito," the term used for palm heart. "Palmilla" and "palmillo" referred to both palms (*Brahea* spp.) and monocots with a palm-like growth form (*Nolina* spp.). The suffixes "-al" or "-illoso" were added to denote quantity, e.g. "palmillal," a place with abundant *Nolina*. No PPNs were found for native palm names other than "babiso," the Ópata word for certain *Brahea* species. The large number of PPNs may reflect their abundance, wide geographical distribution, or dis-

TABLE 1. HISTORICAL REFERENCES TO PALMS AND PALM-LIKE PLANTS IN SONORA.

Observer-author/period:	Gilg 1692 <sup>a</sup>	unknown 17th century missionary <sup>b</sup>	unknown 17-18th century missionary <sup>c</sup>	Nentvig 1764 <sup>d</sup>	Pfeffercorn 1756-1767 <sup>e</sup>
Ethnic group:	Seri	Névome = Pima Bajo	Eudeve = Ópata (?)	Ópata	Ópata ?
<b>Arecaceae</b>					
Brahea aculeata					
Brahea elegans		humugui—palm with spines on leaves	hoveúh—otra clase de palma	jove gue (?)	
Brahea nitida				jove gue (?)	
Sabal uresana	palma	tacut = palma; maagama	tacut—palma	taco (Span.) = tacut (Ópata)	palma
Washingtonia robusta					
<b>Agavaceae</b>					
Agave yaquiiana					
<b>Nolinaceae</b>					
Dasyilirion wheeleri		arhita maagama—palmito (dwarf palm)			
Nolina spp.		sutu maagama; moha ?			
Yucca spp.				dátil	
<b>Zamiaceae</b>					
Dioon purpusii					
<b>Unknown</b>					
?		palma		palmito—heart eaten	

<sup>a</sup> Di Peso and Matson 1965; <sup>b</sup> Pennington 1979, 1980; <sup>c</sup> Pennington 1981; <sup>d</sup> Nentvig 1977; <sup>e</sup> Treutlein 1949; <sup>f</sup> Gentry 1942; <sup>g</sup> Gentry 1963; <sup>h</sup> Pennington 1980; <sup>i</sup> Felger and Moser 1985; <sup>j</sup> Sobarzo 1966; <sup>k</sup> Molina 1972.

tinctiveness. Most probably, it also signifies their cultural importance in Sonora.

Ground-truthing, "palmar" always referred to *S. uresana* and "palmarito" sometimes did (Ta-

ble 2). The use of palmar for *S. uresana* may reflect its primary importance as the overall best fiber source. The village of El Palmarito east of Alamos is the center of the local *Brahea acu-*

TABLE 2. PALM PLACE NAMES IN EASTERN SONORA BY COMMON NAME.

Palm place name	Botanical identity	Number of times used	Number verified in the field
Palmar, -era, -ira	<i>Sabal uresana</i>	38	5+ <i>S. uresana</i>
Palmarito, -cito, -ejo, -illo	<i>S. uresana</i> ?	58	2 <i>S. uresana</i> 1 <i>Brahea</i> sp.
Palma	any palm?	114	
Palmita, -cito, oso, -oza, -sito	any palm?	83	1 <i>S. uresana</i>
Palmilla, -al, -o, -oso, -osa	<i>Nolina</i> sp., <i>Brahea</i> sp.	26	
Babiso, -al, -alito, -berach	<i>Brahea</i> sp.	18	2+ <i>Brahea</i> sp.
Total		337	11+

TABLE 1. EXTENDED.

Gentry 1930s <sup>f</sup>	Gentry 1930s <sup>e</sup>	Pennington 1960s <sup>b</sup>	Felger & Moser 1966-80 <sup>a</sup>	general Sonoran vocabulary <sup>f</sup>	general Sonoran vocabulary <sup>e</sup>
Guarihio	Guarihio	Pima Bajo	Seri	Ópata/Cahitan	Ópata
tahcu = palma	coguegue; pascu		zamij cmaam ?		babizo ?
tahcu = palma ?	ta'cut = palma; wechesas = yerey palma	ma'agam = palma del suelo	zamij ctam ?  zamij ctam ?	taco = palma	babizo ? taco, tacu = palma; ilitaco = palmita
		šú'ut = maguey			
	sotol	sotol			
	palmita	maàm suttum = palmilla no c.v. (p. 296)			
	palma de la virgen; palmita				

*leata* thatch industry. *Sabal uresana* also grows in the area and it is not clear to which species palmarito originally referred. Palma and palmita, the most common PPNs (58.5%), appeared to be general terms for palms, including *S. uresana* and ornamentals such as *Washingtonia robusta*.

TABLE 3. PALM PLACE NAMES IN EASTERN SONORA BY PHYSICAL ATTRIBUTE.

Physical attribute	Number of palm place names
Settlement (town, ranch, mine)	96
Water (arroyo, bajío, barranca, bordo, cajon, cañada, corral, presa)	169
Peak (cerro, cordon, loma, picacho, rincon) & passes (puerto)	59
Unknown/uncertain	13
Total	337

In southern Sonora, "palmita" sometimes refers to *B. aculeata*. "Palmilla" was applied to *B. aculeata* and *B. elegans* in southern and east central Sonora (Mpio. Yécora), respectively. It was used also for *Nolina matapensis* in the mountains of NE Sonora and to the east in Chihuahua. Babiso was encountered only in areas that were Ópata territory. It was applied to *B. elegans* in north central (Mpio. Ures) and in the Sierra Libre (central coast) and to *B. nitida* in northeastern Sonora (Mpio. Nácori Chico).

Sonoran PPNs were applied to drainages, settlements, and peaks and passes (Table 3). Because PPNs were sometimes associated with two or more adjacent physical attributes, e.g. Rancho El Palmar is located on Arroyo El Palmar, the number of palm places is less than the number of PPNs. That the majority (50.3%) of PPNs were attributed to drainages was not surprising: palms generally grow in low, moist areas. Sim-



Fig. 1. Study areas in Sonora, Mexico. Principal towns referred to in text are shown. Distribution of *Sabal uresana* is concentrated in and around these areas.

ilarly, settlements are located near water sources and thus are associated frequently (28.4%) with palms and PPNs. Indeed, “ba-” is Ópata for water and “babiso” is a palm that grows near water (meaning of “-biso” or “-viso” unknown) (Molina 1972). Only 17.5% of PPNs referred to peaks and passes. With the exception of some *Brahea* populations and *Nolina* spp., most palms are not found on dry, open sites.

#### STUDY AREAS

Initial identification of study areas was made in consultation with ethnobiologists working in Sonora (Richard Felger, Gary Nabhan). Palm populations were also located from herbarium records, historical references, and palm place

names. Finally, Sonoran harvesters provided locations for previously undocumented populations (Joyal 1996). Study sites were located in four areas within eastern Sonora, referred to as Ures (north central), Buena Vista (northeastern), Onavas-Yécora (east central), and Alamos (southern) (Fig. 1). The populations north of Ures, in the Ríos Sonora and San Miguel drainages, form some of the most extensive stands for the species. Well-developed stands are also common in the upper Río Yaqui, principally in the Río Aros tributary.

#### ETHNOBOTANICAL METHODS

The ethnobotanical component of this study was primarily qualitative research, consisting of

participant observation and formal taped interviews, to learn who worked with palms and how palms were used. One or more key informants regarded as major harvesters and/or the better palm workers were used in each area. Herbarium vouchers were prepared from one or more palm populations for each area, and for associated woody species, including alternative fiber sources and plants used to dye palms. The methodology was that recommended by Dransfield (1986) for palms and by Bye (1986) for ethnobiological specimens. Specimens were identified at ASU and duplicates distributed to MEXU, BH, US, and CICTUS (see Joyal 1995 for list of collections). Palm products also were collected to document this research.

Formal taped interviews were conducted from August through November 1993. Every person who worked with palms and who was available during my stay in each area was interviewed, except in Buena Vista where all 43 households were involved in palm weaving. There I divided the town into quarters and randomly sampled four households per quarter. I also interviewed the four men whom key informants had identified as the principal palm harvesters and two weavers who lived in the nearby town of Bacadéhuachi. Each person was questioned on his or her use and knowledge of palm products and personal demographic data. For example, I asked which palm products they made or used and then which products they recognized but did not make or use. These were posed as free-list questions (Bernard 1988) and followed with specific prompts, if necessary. For example, "What do you make with palms?" might be followed by, "Do you make only hats?" or "Do you also eat the fruit?" Typical responses were "Yes, I only make hats," or "I also make baskets and mats but mostly I make hats," or "Other people eat the fruit but I don't like them," or "No, they're bitter." Specific responses from the transcribed interviews were copy-pasted into a relational database and coded for analysis.

In coding, I looked first at the range of responses given by all informants to any one question. For example, each informant had been asked which palm products they made or used. In analysis, I identified nine general categories of palm products: hats, baskets, mats, other woven products, thatch, brooms, logs, petioles, and fruit eaten. That is, while I could have identified several types of baskets, I lumped all baskets

into one category at this stage of analysis. Likewise, I looked only at the number of different products that each informant made or used and not at their level of expertise nor time spent at the craft.

The Sonoran offices of Mexican federal agencies, including Secretaría de Agricultura y Recursos Hidráulicos (SARH), Instituto Nacional de Indigenista (INI) and Dirección General de Culturas Populares/Dirección de Integración Familiares (DIF), were visited to obtain estimates of yearly sales, including historical data, where available. These data were scant.

## ETHNOBOTANICAL RESULTS AND DISCUSSION

Each of the following seven subsections is presented here to show the importance of the palm resource and how each sheds light on some aspect of the people's link to it.

### THE PEOPLE

Like much of Latin America, eastern Sonora is inhabited by a mixture of indigenous and mestizo peoples. Indigenous groups historically present in Sonora included the Guarihio, Jova, Mayo, Opodepe, Ópata, Pima Bajo, and Seri (Crumrine 1983; Gentry 1963; Hinton 1959, 1969). The Jovas, Ópatas, and Opodepes were mostly assimilated into the dominant mestizo society by the mid-1950s (Hinton 1959). The remaining groups are in various phases of assimilation or fusion with the semi-nomadic Seri being the least so (Felger and Moser 1985; Hinton 1969).

While many traditional Sonorans are direct descendants of the original inhabitants, most no longer consider themselves indigenous. In some areas the residents are only one or two generations removed from parents and grandparents who spoke "la lengua" (Ópata). The more elderly residents of these towns still spoke native languages in the mid-1950s (Hinton 1959). I interviewed older residents in Buena Vista who remembered parents and grandparents who spoke la lengua. Pedro Estrella, the last native speaker of Pima Bajo in Onavas, died in the late 1980s. His children do not consider themselves "indios." Yécora and Maycoba still have Mountain Pima communities where both Pima and Spanish are spoken. Guarihio settlements are centered around San Bernardo, north of Alamos. Older residents usually understand Spanish but

TABLE 4. DEMOGRAPHIC PROFILES FROM FORMAL TAPED INTERVIEWS: PEOPLE USING PALMS IN SONORA (N = 47).

Residence	Harvester status		
Ures	4	Harvester	11
Buena Vista	20	Harvester/weaver	9
East central	13	Weaver	27
Alamos	10		
Ethnicity	Gender		
Mestizo	36	Male	11
Guarihio	6	Female	36
Mtn. Pima	5		
Age	Formal education		
<60 years	23	0 years	27
≥60 years	24	1–5 years	20

(mean = 56.3; range 25–ca. 90)

prefer to speak their own language. Their children are bilingual. Mayo, who are scattered through much of the southern half of the Mpio. de Alamos, now speak both Mayo and Spanish.

Most of the towns which Hinton (1959) considered indigenous in the mid-1950s are no longer considered as such by the residents. However, they are still the places where one goes to find palm workers. In the Río Sonora drainage, most mestizos interviewed recalled mothers or grandmothers who wove. They knew that the palm had come from the Rayón-Ures area. Only a few made a connection to indigenous weavers (Ópata and Opodepe). Hat weavers and broom-makers in this area now live mostly in El Sauz,

a small town a few km west of Ures. Most were relocated from the sierra near Batuc [identified by Hinton (1959) as indigenous and possibly the town referred to by Pennington (1979)] because of dam construction at Novillo in the 1960s. Rogelio Apodero, the oldest broom-maker in El Sauz (71 yrs in 1993), recounted how for many years he led pack-trains from Batuc to harvest palms near Ures because the desert palms produced better quality “cojyos” (newly-emerging leaves) for weaving than those that grew in the sierra.

The term “Sonoran mestizo” has been used to differentiate these people from urbanized mestizos who lack their connection to the local landscape (Humberto Suzan, pers. comm. 1992). Sonoran mestizos use native words to describe objects, e.g. “guari,” and organisms, e.g. “babiso.”

Forty-seven formal, taped interviews were conducted in 15 towns and villages (Table 4). They were mostly mestizo communities and to a more limited extent Guarihio and Mountain Pima. More than a third of the interviews were conducted in Buena Vista because it was the only town where most residents still worked with palms. More women were interviewed because palms were most often used for weaving and most weavers were female. The mean age was 56 yrs. More than half of the people interviewed had no formal education and none had attended more than primary school. About half said that they worked primarily with palms, e.g. “tejer la palmita.”

#### FOLK NOMENCLATURE

One to four types of palms were recognized by a given informant in any given area and the correspondence between these names and binomials used in the scientific literature is presented in Tables 5, 6, and discussed further in Felger and Joyal (n.d.). Where only one type of palm was present, it was usually called palma. If two or more species occurred together, “palma” typically referred to the more useful species, most often *S. uresana*. Variants of “palma” were then commonly used for additional species present in the area, e.g. “palma para la casa” (*Brahea aculeata*, where used for thatch). The predominance of the lexeme “palma” for both *Sabal* and for palms in general may represent an undifferentiated folk genus or it may point to the salience of *Sabal* (Berlin, Breedlove and Raven 1974).

TABLE 5. COMMON NAMES FOR *SABAL URESANA* REPORTED IN SONORA, 1990–1995.

Area	Common name
Ures	palma [del suelo] palma [del taco]
Buena Vista	palma [del suelo] palma [del taco] palma real
east central	palma [del suelo] palma [del taco] sa'avil (Mtn. Pima)
Alamos	palma [del suelo] palma palma real palma grande saú or sabo (Guarihio)



TABLE 6. COMMON NAMES FOR PALMS AND PALM-LIKE PLANTS USED FOR WEAVING IN SONORA (EXCLUDING *SABAL URESANA*), 1990–1995.

Area	Latin name	Common name
Ures	<i>Brahea elegans</i>	babiso
Buena Vista	<i>B. nitida</i>	babiso
	<i>Dasyllirion wheeleri</i>	sotol
	<i>Nolina matapensis</i>	palmilla
east central	<i>B. elegans</i>	palmilla, verde, palmillo, cohuehui
	<i>D. wheeleri</i>	sotol
	<i>N. matapensis</i>	palmilla, mo'o (Mtn. Pima)
Alamos	<i>B. aculeata</i>	palmilla, pascu
	<i>B. nitida?</i>	palma liza
	<i>B. dulcis?</i>	palma ceniza
	<i>D. wheeleri</i>	sotol
	<i>Dioon tomaselli</i> De Luca, Sabato & Vázquez-Torres var. <i>sonorense</i>	palma de la virgen
	<i>N. microphylla</i>	palmilla

*Sabal uresana*, the most widespread Sonoran palm, is most commonly called "palma" (Table 1, 5). Different size-class palms within the same population may have distinct names, however. For example, at El Palmar "palma" or "palma del suelo" (ground palm) was applied to trunkless juveniles that were harvested for weaving. "Palma del taco" (fruit palm) and "palmilla" were alternate names for the tall adults that were seldom used. Local people did not know that "palma del suelo" grew into "palma del taco," i.e. that they were juveniles and adults of the same species. *Sabal uresana*'s size-class structure in this area is bi-modal with very few seedlings and intermediate-sized individuals but with many juveniles and a few adults (Joyal 1995). It is very slow-growing and the gap in establishment between juveniles and adults likely represents 50 to 100 years. It is possible that this is a recent perceptual change due to the long period of time that has elapsed without recruitment into the intermediate size-class and thus the failure of local residents to connect the two. *Brahea elegans*, the other palm here, is used only for thatch and was dismissed as "palmilla verde." In Ures and Buena Vista, where populations have more even size-class distributions, "palma del suelo" and "palma del taco" were applied in a similar fashion but they were recognized as juveniles and adults of the same species.

Native names for palms were generally less common than the Spanish "palma" and its variants (Tables 5, 6). Guarihio (Gentry 1942), Pima

Bajo (Amadeo Rea pers. comm. 1996), and Seri (Felger and Moser 1985) names have been recorded for *S. uresana* (Felger and Joyal n. d.). "Babiso" was applied to *Brahea elegans* in north central Sonora and to *B. nitida* in northeast Sonora. Similarly, "coguegue" was applied to two species, *B. aculeata* by the Guarihio and *B. elegans* by mestizos in east central Sonora. In nearby Chihuahua the Tarahumara name "ra'ku" was recorded for *B. dulcis* (Bye 1976:273, Bye 5804 (ECON)).

#### MATERIAL PREFERENCES

Most Sonoran palms and palm-like plants are or have been used (Table 7). Because its fibers are sturdier and more even and its leaves are larger than other species, *S. uresana* (Fig. 2) is generally preferred for weaving and for thatching (when available). It is the only species employed in hat-making. Several other palm and palm-like species are sometimes interchangeable with it and occasionally favored over it. In central Sonora where "palma del taco" is less frequent, *Brahea elegans* is more often used for thatch. Both *S. uresana* and *B. aculeata* are used for weaving mats and for thatching in the Alamos area and there are differing opinions as to which is the better, longer-lasting material. People in the Buena Vista area say that "babiso" is more supple and of better quality for weaving than *S. uresana*. It is not used much because it is harder to obtain and its cojoyos are smaller. Also, because it is more challenging to work, only the best weavers use it.

TABLE 7. PALMS AND PALM-LIKE SPECIES USED IN FIVE DIFFERENT AREAS WITHIN SONORA, ARRANGED BY PALM PART. ORIGINAL DATA EXCEPT FOR CENTRAL COAST.

Area	Trunk	Leaf			Fruit/seed
		Cojoyo	Open	Petiole	
Ures	<i>Sabal uresana</i>	<i>S. uresana</i>	<i>S. uresana</i>	<i>S. uresana</i>	<i>Brahea elegans</i>
Buena Vista	<i>S. uresana</i>	<i>S. uresana</i> , <i>Brahea nitida</i>	<i>S. uresana</i> ,	<i>S. uresana</i>	<i>S. uresana</i>
east central	<i>S. uresana</i>	<i>S. uresana</i>	<i>S. uresana</i> , <i>Dasyllirion wheeleri</i> , <i>Nolina matapensis</i>	<i>S. uresana</i>	<i>S. uresana</i>
Alamos		<i>S. uresana</i>	<i>S. uresana</i> , <i>B. aculeata</i> , <i>D. wheeleri</i>	<i>S. uresana</i>	<i>S. uresana</i> , <i>B. aculeata</i>
central coast <sup>a</sup>	<i>S. uresana</i>		<i>S. uresana</i> , <i>B. elegans</i>		

<sup>a</sup> Felger and Moser 1985.

Several palm-like species may be used for weaving. *Dasyllirion wheeleri*, sotol, is preferred for sturdy storage baskets in the sierra east of Alamos. Pennington (1980:288) reported that the Onavas Pima generally preferred *S. uresana* baskets but that they used *D. wheeleri*, obtained in the mountains to the east, for the heavier and larger baskets. He added that *Nolina matapensis* "collected at locales even farther away" was

also used for baskets and that *Agave yaquiana*, a maguey, was used for fiber and for cordage. *Nolina* cf. *microcarpa* Wats., palmilla, is used for cheese-making baskets by the Mountain Pima in the Yécora-Maycoba area.

#### GENERAL USE

Sonoran palms and palm-like plants have been utilized primarily for their fiber and sec-



Fig. 2. *Sabal uresana*, habit, Rancho La Noria Aguilareña, Mpio. Ures. The two palms at right have been harvested for thatch. The two to the left are too tall to reach to be harvested.

TABLE 8. PRODUCTS MADE OR USED FROM PALMS AND PALM-LIKE SPECIES IN FIVE DIFFERENT AREAS WITHIN SONORA, ARRANGED BY PALM PART. ALL ARE MADE FROM *SABAL URESANA* UNLESS OTHERWISE INDICATED. ORIGINAL DATA EXCEPT FOR CENTRAL COAST.

Area	Leaf				Fruit/seed
	Trunk	Open	Cojoyo	Petiole	
Ures	corrals, crossbeams	thatch, brooms, sponges <sup>1</sup>	hats, baskets, mats	cheese or storage racks	[only some] fruit edible <sup>2</sup>
Buena Vista	benches, planters	brooms, thatch	hats, baskets, <sup>2</sup> mats, rope, wrapped bottles, misc. woven	broom handles, cheese or storage racks	fr. eaten, buttons (seeds)
east central	corrals, crossbeams, <sup>2</sup> benches	brooms, thatch, saddle blankets <sup>1</sup>	hats, baskets, <sup>3</sup> mats, rope	broom handles, cheese or storage racks	fr. eaten
Alamos		thatch <sup>2</sup>	hats, baskets, <sup>4</sup> mats, rope	cheese or storage racks	fr. eaten
central coast <sup>4</sup>		thatch	hats		fr. eaten

<sup>1</sup> Felger and Moser 1985. <sup>2</sup> *Brahea* spp. also used; <sup>3</sup> *Nolina* spp. also used; <sup>4</sup> *Dasyllirion* also used.

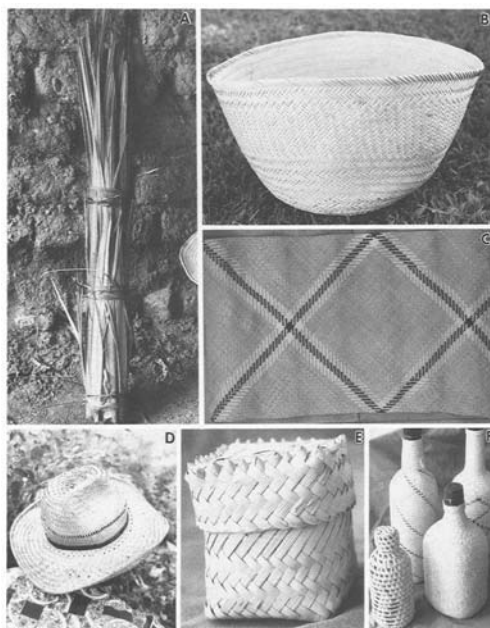
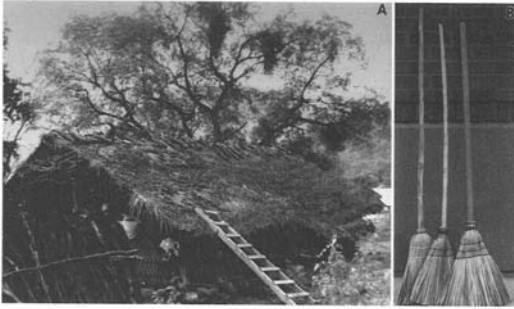


Fig. 3. Cojayos and woven products made from them: a) bundled for transport, Rancho Napopa, Mpio. Nacori Chico, ca. 1.0–1.2 m length. b) *jimara* (twilled round basket) for tortillas, Tepoca, Mpio. Yécora, 18 cm height and 28 cm diameter. c) tri-colored petate (twilled sleeping mat) with pattern created by using two different ages of cojayos and añil dye, Guisamopa, Mpio. Sahuaripa, 1.2 m width × 1.9 m length. d) sombrero (double-woven twilled), Los Bajíos, Mpio. Alamos. e) miniature *guaris* (twilled 4-cornered baskets), Buena Vista, Mpio. Nacori Chico, 7 cm height and 6 cm across. f) *frascos* (twill- and coiled wrapped bottles), Buena Vista, Mpio. Nacori Chico, front left, coiled, 18 cm height; front right, 28 cm height; back two, 30 cm height.

ondarily as food (Table 8). The leaves are the part most used. Cojayos (Fig. 3a), are highly valued for woven products (tejidos) including hats (sombrosos), baskets, mats (petates), rope (mecate), wrapped bottles (frascos), and miscellaneous items (Fig. 3b–f). Hats are almost always double-woven and come in several forms and qualities. Basket types include coiled “canastas” and several twilled shapes: round “jimaras” [applied to different basket styles from east central to northeast Sonora—origin unknown], rectangular “petaquitas,” lunch-bags (morrales), and square “guaris” [Cahitan language (Sobarzo 1966:155); “wari” called “hašas” by Onavas Pima and “not often made today” (Pennington 1980); Piman word for sha-



**Fig. 4.** Penca products: a) thatched roof of *Brahea aculeata* undergoing repair (new pencas are visible on roof), Los Bajíos, Mpio. Alamos. b) brooms: left, Guisamopa, Mpio. Sahuaripa, 32 cm height of palm fibers, tied with two strands of sisal twine, and wired to 105 cm handle of “guácima” (*Guazuma ulmifolia*); center, Tepoca, Mpio. Yécora, 32 cm height of palm fibers, tied with two strands of wire and wired to 99 cm handle of guácima; right, El Sauz, Mpio. Ures, 36 cm height of palm fibers, tied with three strands of wire and wired to 95 cm purchased milled handle.

man’s rectangular medicine basket which eventually transferred to square baskets (Amadeo Rea, pers. comm. 1995)]. All may have tops (tapaderas). Mats, laid across a wooden-framed bed laced with hide, are standardly found on ranches in rural eastern Sonora. Guarihio who do not own chairs use them as sitting mats. Palm rope, made from cojoyo leaflet sections and reportedly strong enough to hold a cow, was formerly important in rural Sonora. It is now used as a child’s toy (Mpio. Alamos) or in emergencies (Mpio. Yécora). Small whisk-brooms for cleaning ovens (escobitillas or escobitas) are made from the leaflet edge. Several weavers told me that escobitillas were given as change in the past when pesos were scarce.

Fully-expanded leaves, (pencas) are used for thatching roofs (techa) and in broom (escobas) manufacture (Fig. 4a–b). The filiferous fibers that hang between the leaflets were used by the Mountain Pima to weave high-quality saddle blankets (Gabriel Carlton, Onavas, pers. comm. 1994). Hooded orioles (*Icterus cucullatus*) make nests from these fibers. Locally, the bird is called carpintero for the manner in which it constructs its nest and hangs it from the lower surface of a palm leaf. In the Ures area, people have used the old nests as sponges (estropajos) when luffas (*Luffa aegyptiaca* Miller) were not available. Petioles (tallos) cut from pencas are employed as small crossbeams (sarsos) to make hanging



**Fig. 5.** Corral of *Sabal uresana* logs, Rancho La Noria Aguilareña, Mpio. Ures, comprised of approximately 200 logs cut ca. 10 years ago from standing dead palms on the ranch.

racks for cheese-making and as stirring sticks and broom handles.

Desert regions are the only place where palm logs (palos) are used regularly for construction of corrals and as house crossbeams (Fig. 5). In the sierra, the logs are used occasionally in construction and as benches (banquitos). They are also hollowed out to make planters (macetas, maceteros).

Ripe fruits, “tacos” [“taco” is Ópata, “tacu” is Cahitan (Sobarzo 1966:309)], are eaten in Buena Vista and Onavas but considered unpalatable in Ures. The Ures fruit are smaller, often bitter (agarosas), brown, and mature in August, while those in Buena Vista can be almost twice as large, sweet, and black at maturity in September and October (Joyal 1995). One possible explanation for these differences in color and taste may be that there is not enough precipitation in the desert in an average summer to develop the sugars and thus ripen the fruit completely. The fruits of *Brahea elegans* are eaten in the Ures area.

The use of palm heart (corazon) as food in Sonora has been recorded (Gentry 1942:66, 1963:98; Nentvig 1977). While I interviewed people who knew that palm hearts were edible, no one had first-hand experience nor knew anyone who had eaten them. This practice kills single-stemmed palms.

Except for that of a few foreign collectors in the later half of the 19th century, there has been little effort to cultivate native palms in Sonora. The fast growing *Washingtonia* species and the date palm, *Phoenix dactylifera* L., are preferred. *Sabal uresana* is rarely planted. A collection

TABLE 9. PALM PRODUCTS USED/MADE AND KNOWN BY RESPONDENTS: SUMMARY FROM INTER-VIEWS.

Area	Number products made/used <sup>1</sup>		Number products known <sup>1</sup>		n
	Mean	CV	Mean	CV	
Ures	1.25	0.40	4.75	0.20	4
Buena Vista	3.70 <sup>2</sup>	0.55	7.25 <sup>2</sup>	0.20	20
east central	2.50	0.46	3.50	0.61	13
Alamos	1.82	0.69	4.27	0.21	10
Total	2.73	0.65	5.31	0.43	47

<sup>1</sup> = nine total palm products identified: hats, all baskets, mats, miscellaneous woven, thatch, brooms, logs, petioles, edible fruit.

<sup>2</sup> = Tukey test: Buena Vista significantly different from all other areas.

made in 1910 by Rose et al. (12518 at US) stated that "palma real", collected in the vicinity of Hermosillo, was cultivated in the Plaza Principal. Alberto Búrquez (pers. comm., 1994) says that *S. uresana* is planted in Hermosillo's Central Plaza. Several people stated that one must plant the seed of *S. uresana* where you want it to grow because it does not like to be transplanted. There is one large *S. uresana* in Bacadéhuachi, several seedlings in a garden in Buena Vista, and one juvenile along a street in Guisamopa. The only transplanted *S. uresana* that I know of are at the fairly affluent Rancho Los Pescados (Mpio. Nácori Chico) and outside an Alamos hotel. Several babiso (*Brahea elegans*) are planted with *W. robusta* along the entrance to Arizpe in north central Sonora.

Respondents made or used an average of 2.73 palm products and recognized an average of 5.31 palm products from the total of nine items (Table 9). The highest averages for both categories were for residents of northeastern Sonora who made or used 3.70 products and who recognized 7.25 products.

### COJOYOS

Cojoyo quality is critical to weaving and as such ultimately affects harvest practices. Twenty weavers each sorted a set of cojoyos after being instructed to sort them "as they would use them." While there was never unanimous agreement among weavers on the use of any one cojoyo, some patterns emerged. Suppleness (blandito), whiteness (blanco), and length (largo) were stated as important qualities. However, the value ascribed to these factors varied with the product made.

As a leaf emerges from the apical meristem, the fibers elongate and toughen and the leaf turns from a creamy white to green. The most supple cojoyos are used for weaving the common double-woven hats (sombrosos corrientes). Fibers in an unexpanded leaf are not fully developed. As they mature and get a bit tougher they are used for coiled baskets (canastas de nuditos) and then twilled baskets (jimaros, guaris, petaquitas). Still tougher cojoyos are used for mats. Some of these toughest cojoyos, about one in four of all cojoyos, are at precisely the right stage of development such that they can be peeled (see below) to make the finest-quality hats (sombrosos finos or sombrosos de palma pelada). Fully-expanded pencas are tough and green and are never used for weaving.

A creamy white color is preferred for weaving material. Because they reach their full length with minimal development of chlorophyll they are more or less white with at most a tinge of green along the leaflet edges. The few cojoyos that mature through the winter do so at a very slow rate. They are invariably green and tough and thus are used mostly for mats. Ideally, a cojoyo is harvested when its petiole has emerged sufficiently to cut it (rather than the blade) but before the leaf blade begins to fan out and color. The exception to this is in the Ures area where palm workers insist that the best cojoyos must be pulled from the ground with a lever (palanca) before the petiole has emerged. Drying is the final determinant of color. Cojoyos are hung to dry in the sun for several days after harvest in order to obtain the whitest, sun-bleached material for weaving. Many cojoyos are cut in June because the palms begin to grow faster at this time and drying is easier before the arrival of the monsoon rains. Rita Moran, a Bacadéhuachi weaver, stated that the cojoyos cut in August, about mid-monsoon, were the best quality. She added, however, that one must be both careful and lucky to dry them well at this time. Whereas mats and baskets are often greenish, hats, especially those of palma pelada, must be white. This may be due to a combination of practical and aesthetic reasons. That is, the easiest-worked fibers are the most supple and almost always the whitest. Therefore, white may have come to be associated with the best quality material. Palma pelada provides the greatest color challenge for weavers. These cojoyos are at about the same developmental stage as those

used for petates, i.e. they are more or less turning green. However, those that can be peeled must not have turned green. It is only possible to obtain the right color and texture from cojoyos that are being produced rapidly enough to meet both requirements simultaneously, i.e. during the monsoons.

Some weavers incorporate the softest green fibers into their weavings to create a contrasting green on white design. A few weavers in central Sonora use the legume shrub, añil or rama tiñadora (*Indigofera* cf. *suffruticosa* Mill.), with salt as the mordant to dye palm fibers a deep chestnut brown color. These fibers are then woven into hats, baskets and mats to make designs (Fig. 3f). The Guarihio use the legume tree brasil (*Haematoxylon brasiletto* Karst.) in a similar fashion.

Cojoyos  $\geq 1$  m long and with a petiole  $\geq 2.5$  cm wide, as measured just below the hastula (the juncture of the blade with the petiole), are preferentially harvested (Joyal 1996). These are cut from large palma del suelo. As a consequence, the best quality and largest quantity of material is obtained for the least effort. Cojoyos are also more easily carried with an intact hastula. In addition, a few harvesters noted that cojoyo harvest harms palms (lastima la palma). They added that it was best to not cut too many cojoyos so that the palms could rest and to not cut the smallest ones. Small palms are harvested in some areas. Ures harvesters claimed that cutting cojoyos, no matter what size, did not harm the palms.

#### WEAVING

Preparations for weaving include harvesting, drying, sorting, and stripping the cojoyo. In the field, a cojoyo is usually cut immediately below the hastula. The shorter, peripheral leaflets are sometimes stripped away to reduce weight and bulk during transport. The cojoyos are then sun-bleached and sorted according to quality. Next, the leaflets (a leaf has  $\geq 36$  leaflets) are removed from the petiole (Fig. 6a). Each measures 2–3 cm wide and  $\geq 1$  m long. The upper leaf edge, or vein (orilla or codito), and the lower edge, or midrib (tallo) (Tomlinson 1990:274–279) are stripped away from each leaflet with a sturdy sewing needle or a small awl. The orillas are bundled together to make escobitillas or discarded when excessive quantities accumulate. The tallos are used to form the central support strand



**Fig. 6.** Cojoyo use: a) separating palm leaflets, Bacadéhuachi, Mpio. Bacadéhuachi. b) peeling palm, Buena Vista, Mpio. Nácori Chico. c) weaving a double-woven twilled hat, Buena Vista.

in coiled baskets (el empiezo de nuditos). The remaining flat, central portion of the leaflet (corazon) is used in both twilled (dos rositas) and coiled (nudos, nuditos) basketry (Adovasio 1977). For mats and most baskets, the corazon is used without further preparation. To make common double-woven hats, jimaras, and for wrapping bottles, a needle is used to divide the leaflet further into sections that average  $\leq 1$  mm wide. The prepared material is then bundled until needed for weaving.

Leaves that can be used for palma pelada are prepared differently. Prior to separating the corazon into thin strips, the weaver folds the cleaned leaflet across its width. One side of the leaflet breaks and she then peels it away from the other side, usually with her teeth, to separate the adaxial and abaxial surfaces (Fig. 6b). The first side, or primero, is used for sombreros finos and the second coarser side, or segundo, is used for canastas or for wrapping bottles. These are then divided into thin segments as described. Palma pelada is technically the most difficult to work (batalloso) and only the best weavers attempt to do so (Fig. 6c). Hats made from it are the highest quality and can be folded like a "Panama" hat. Villagers considered them impractical because they stain when wet. Also, at \$50 US (in 1993) they cost 3–5 times as much as a common hat and thus are a luxury afforded only by tourists who wear them to the beach. Palma pelada is restricted to northeastern So-



Fig. 7. *Juqui* semi-subterranean room for weaving, Buena Vista, Mpio. Nacori Chico.

nora. Weavers in other areas recognized neither the term nor the technique.

Weaving is almost exclusively the domain of women whereas thatching is most often men's work. The most experienced weavers make everything from high-quality hats to baskets and mats using both twilled and coiled techniques. Many weavers work only during the monsoon season when the higher humidity softens the fibers and makes weaving easier. The more serious weavers use a small, semi-subterranean earthen room, a *juqui* [Ópata (Sobarzo 1966: 180)] or *húuki* (Brugge 1956, 1961) (Fig. 7). *Juquis* keep humidity high permitting handling of fibers, especially those used for hats, year round.

Traditionally, woven products, with the exception of hats, were made primarily for local use. They are now often replaced by commercial products. There is a small but steady demand for hats and baskets as tourist goods, often from rural Sonorans who have migrated to metropolitan areas such as Hermosillo and their acquaintances. Baskets and mats are commonly used in rural homes and are popular tourist goods. Only the poorest of local residents and tourists wear the common hats. The latter are also the major purchasers of fine hats made from *palma pelada*. A weaver working a few hours each afternoon can finish a hat in a week that she can sell for \$12–15 US. Her husband, working as a day laborer (“fornalero”), earns \$7 US/day, if and when he can find a paying position. Thus, money received from weaving contributes substantially to the family income.

#### PENCAS, THATCHING AND BROOM-MAKING

Pencas are used for thatching roofs and “jacales” (Sonoran huts: see Hinton 1959) and for broom-making (Fig. 4), the other major uses of palms in Sonora. Requirements for *penca* harvest are simpler than those affecting *cojoyo* harvest. The primary considerations in selecting *pencas* are size, quantity, durability, and transportability, i.e. large, abundant, durable, and easy to transport leaves are the most desirable. These factors apply to material for both thatching and for broom-making with one exception. While larger leaves are preferred, in the Ures area some broom-makers harvest *pencas* from all but the very smallest palms. I do not know how the small palms that were harvested in east central Sonora near Nuri were used or why.

*Palma del taco* produces larger *pencas* in greater quantities than *palma del suelo* and thus are preferable. The entire standing crop of leaves, except the emerging *cojoyo*, is cut from non-flowering palms during the spring or fall dry seasons according to lunar cycles (Fig. 2). Harvesting in the right phase of the moon ( $\geq$  half full) is said to increase the life span of *pencas* (Joyal 1996). In addition, depending on the species used, proper thatching insures that a roof will last 10 to 30 years. If the pitch of the roof is not steep enough (ca.  $45^\circ$ ) it will rot in a few years (see also Joyal 1994). The *Guarihio* know this but construct roofs with a gentler pitch (ca.  $60^\circ$  from upright) (Fig. 4a). This is done as a tradeoff. The lower pitch makes it easier to warm their houses during the cold season, an important consideration for poor people who live in the *barrancas* where babies and the elderly commonly die from the winter cold.

Thatch roofs are cooler than those of laminated tin (*lamina*). *Pencas*, however, are large and bulky and frequently difficult to reach. They are used most often when they can be easily transported in a truck. Thus many people now have tin roofs. A sickle lashed to a long pole is used to reach the *pencas* of moderately tall palms but the tallest ( $>5$ – $10$  m) are seldom harvested. The Mountain Pima reportedly climb tall palms and I have seen footholds chopped into their trunks, e.g. Highway 14 near El Rodeo between Ures and Moctezuma. The *Guarihio* at Los Bajíos and Bavícora, whose houses all have roofs of *Brahea aculeata* thatch, carry *pencas* on burros from palms that grow within sight of the



Fig. 8. Transporting pencas of *B. aculeata* by donkey, Los Bajíos, Mpio. Alamos.

two villages (Fig. 8). For the most part, thatch roofs are increasingly restricted to "palapas" in coastal resort areas and to create a rustic look in the more affluent parts of Sonora.

### CONCLUSIONS

Traditionally, the use of palms in Sonora was primarily local. While palm use is still important in rural Sonora, especially in the northeastern part of the state, it is changing. Woven products are now often replaced by commercial items in the home and tin roofs have all but replaced thatch. At the same time, the demand for hats and baskets as tourist goods and for thatched palapas is steadily increasing. Weaving, although long considered an indigenous craft, is no longer exclusively nor predominantly so. Many people, particularly the youth, have abandoned weaving. Part of this is undoubtedly due to assimilation and to the relatively low status afforded palm workers, who are among the poorest people in Sonora. The handiwork that is still practiced is high quality in comparison with much of the basketry now produced in southern Mexico. Sonora's location close to the U.S. border is a double-edged sword for its weavers. They can get higher prices for the weaving but the high price of their products makes them unable to compete with the volume of inexpensive baskets produced to the south. Tourists want cheap souvenirs. Only other Sonorans and dis-

criminating collectors elsewhere are willing to pay the price for a Sonoran guari. This may be best for the palm. Its populations probably could not survive the development of palm weaving into a major cottage industry (Joyal 1995). However, while the future of Sonoran palm weaving is not particularly bright, with careful marketing it could be developed into a steady source of income for weavers who could market relatively high-quality goods to a select clientele while carefully regulating harvest practices to maintain the palm resource.

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