

# Indigenous Management Practices of *Chit* (*Thrinax radiata*) in Quintana Roo, Mexico

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*Thrinax radiata* Lodd. ex Schult. & Schult. f. (*Chit* in Maya) is an important non-timber forest product in the Yucatan Peninsula. Since 1994, *Chit* is listed as a threatened species in Mexico (NOM-ECOL 59-2001). The major threat for *Chit* populations is habitat destruction due to human activities, mainly tourism, agriculture and cattle raising, but also direct use by local people. Actually, commercial harvest of this species requires a permit based on a management plan that establishes the potential effects of harvesting on natural populations. Nevertheless, illegal cutting and commercialization of this palm is frequent in the Yucatan Peninsula (Calvo-Irabién & Ceballos-Gonzalez 2004).

User's perception of non-timber forest products extraction provides valuable insights for the development of conservation and management strategies (Ticktin 2004). In this paper we describe the local use of *Chit* as well as the practices associated with harvesting and commercialization. We discuss the potential for sustainable harvest of *Thrinax radiata* in the Yucatan Peninsula.

## Species and study site

*Thrinax radiata* is the only species of this genus in Mexico. Its distribution is restricted to the semi-evergreen forests and coastal vegetation of the Yucatan Peninsula (Quero 1992). *Thrinax radiata* is also found in the Bahamas, Cuba, Jamaica, Haiti and Florida. It is a solitary palm with a slender, straight stem reaching to 17 m

in height. The leaves are fan-shaped, from five to 25 in number, and up to 1 m in width. Olmsted and Alvarez-Buylla (1995) reported that reproductive palms, above 3 m, produce between 300 and 3000 white fruits. Palm growth is slow, an 8 m trunk of *Thrinax radiata* may be 100–145 yrs. old (Olmsted & Alvarez-Buylla 1995).

The study area is located within the ancient Mayan province known as Ecab in NW Quintana Roo. The region has been populated since pre-Hispanic times. Local ethnic groups are Maya and Mestizo, coming from Yucatan and Quintana Roo, and a small group of Totonac descendants from Veracruz (La Torre-Cuadros & Islebe 2003). Their main livelihood activities are agriculture and extraction of

forest products. Cattle raising, fishing and apiculture are complementary activities.

Fieldwork was conducted in three *ejidos*, Chiquila-San Angel, Kantunilkin and Solferino, that surround the Natural Protected Area of Yum Balam (21°13'N and 87°26'W; Fig. 1). (*Ejid*os are grants given to peasant communities that hold land collectively in usufruct for farming and natural resource use. *Ejidatarios* are members of the *ejido* with land rights according to needs.) The climate in the region is warm, sub humid with summer and winter rains. The vegetation of the area is a dry semi-evergreen tropical forest, with a canopy stature of 15–20 m. *Manilkara zapota*, *Simarouba glauca*, *Swartzia cubensis*, *Bursera simaruba*, *Sabal yapa* and *Thrinax radiata* are the most abundant tree and palm species in these forests (La Torre-Cuadros & Islebe 2003).

### Methods

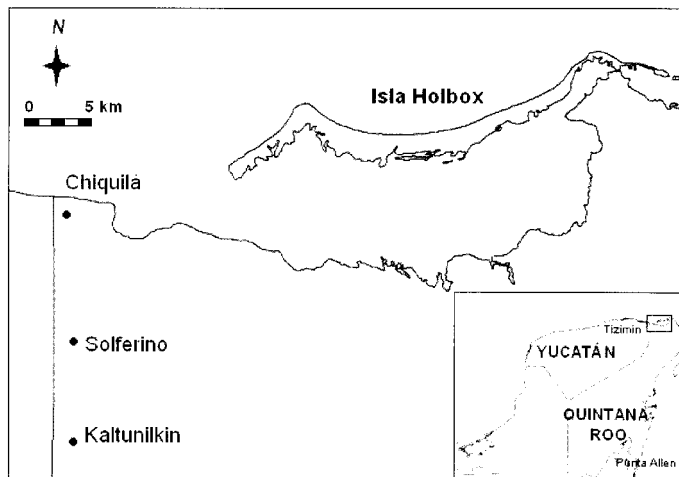
To explore the importance of *Chit* uses in relation to other forest species, we conducted a free listing exercise (Bernard 1994) in which men and women were asked to name the useful forest plants and describe particular uses. In Kantunilkin, 250 people participated, 125 in San Angel and 125 in Solferino, representing ca. 25% of *ejidatarios*, who are the main resource users. Based on this information and combined with *Chit* uses reported in the literature, detailed semi-structured interviews related to local use, harvesting practices, commercialization and ecological knowledge of *Thrinax radiata* were conducted with 50 *ejidatarios* in Solferino. Additionally, day trips into the forest were organized to accompany key informants when harvesting *Chit* and participant observation was used to obtain

information on harvesting methods and ecological knowledge.

### Traditional usage

Results from the free listing exercise showed that the use of *Thrinax radiata* differed between communities. Solferino was the community where *Chit* was more frequently mentioned as a useful forest species (Table 1). In addition, assuming that the species listed first are the most important to the person providing information (Bernard 1994), Solferino was also the community with the highest percentage of *Chit* listed among the first three forest species (Table 1). This result might be due to the fact that Solferino is the *ejido* with the most intense and well organized forest extraction and with a higher reliance of household economy on forest products, while in San Angel and Kantunilkin the most important economic activities are horticulture and commerce, respectively. The economic importance of this palm species at the household level needs further study. Differences in *Chit* densities and distance to harvesting places could also explain the observed results. Solferino is the communal forest with the highest densities (44 individuals >7 m height per hectare) and accessibility (Calvo-Irabién & Ceballos-González 2004).

Results from the 50 semi-structured interviews showed that every participant knew *Thrinax radiata*, 82% reported to actually have used it in the past year. The trunk was the most frequently used plant part and was considered of major economic importance to households. *Chit* poles are appreciated for their strength, endurance, slenderness and straightness. For housing, 2 m long poles are set up together to construct walls (30% of responses), roofs (30%)



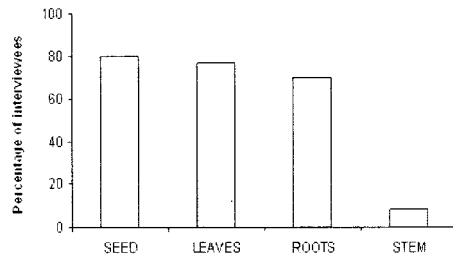
1. Map showing study area and locations mentioned in the text.

or fences (13%). A typical Mayan house is built with 250 to 300 *Chit* poles and has a lifetime between 15 and 40 years (Calvo-Irabién & Ceballos-Gonzalez 2004).

*Chit* trunks are also used for building lobster traps, as was mentioned by 27% of the interviewees. Lobster traps, together with broom-making, represent the main products for commercialization. One additional use, cited by one man, was for manufacturing shoe brushes, which so far had not been reported in the literature.

Leaves were the plant part with the highest diversity of uses, half of the participants mentioned to have used *Chit* leaves in the previous year. Palm leaves are mainly used for thatching, broom making, for handicrafts, and for wrapping food to be cooked in underground ovens. Additionally, a number of leaf uses are clearly associated with rubber extraction. *Chit* leaves are used to build campsites, as rubber containers and as a cataplasm for machete injuries during sap harvest. Sword leaves (unopened) are chosen for particular purposes such as weaving fishing nets, hats, baskets and other handicrafts. Fruits were reported as edible (1% of the interviewees).

Our findings coincide with those previously reported for *Chit* (Roys 1931, Olmsted & Alvarez-Buylla 1995). Nevertheless, none of the uses reported by Pulido-Salas and Serralta-Peraza (1993) for medicinal purposes were mentioned. We found two medicinal uses, which had not been reported before. *Chit* leaves are used as a cataplasm to stop bleeding; leaves are cut and peeled to make a plaster that is placed over the wound. Fibers from the leaf sheath are also used for this purpose. The second medicinal use was mentioned by a participant, who explained how to prepare an infusion of *Chit* roots, to treat kidney stones and nervous disorders.



2. Percentage of interviewees that mentioned biological interactions with different plant parts in *Thrinax radiata* (N = 50).

### Ecological knowledge

Seventy five percent of all interviewees had knowledge of biological interactions between *Chit* and other species, mainly animals. Men whose jobs were related to the extraction of forest products showed most detailed ecological knowledge. The seed was the plant part with the highest frequency of mentioned biological interactions (Fig. 2). The following species were reported to eat *Chit* seeds: bats, spider monkeys (*Atelles geoffroyi*), chachalacas (*Ortalis vetula*), toucans (*Ramphastos sulfuratus*), great curassow (*Crax rubra*), deer (*Odocoileus virginianus*), armadillos (*Dasypus novemcinctus*), and collared peccaries (*Tayassu tajacu*). Animal interactions with *Chit* leaves were also frequently reported; bats use leaves as a refuge and spider monkeys eat young leaves, "in search for water during the dry season." In the case of roots, a frequent interaction was mentioned but with one animal species only. Tuza (*Orthogeomys* spp.) eats *Chit* roots apparently causing palm death. Additionally, four men stated that trunk borers caused holes in *Chit* stems.

### Harvesting techniques and commercialization

Techniques related to harvesting and commercialization are described only for *Chit* trunk, because this was the plant part most

**Table 1.** *Thrinax radiata* uses according to a free listing exercise in three Mayan communities of NW Quintana Roo.

	Listing frequency (%)	Listing order*	N
Kantunilkin	12.0	30.8	250
San Angel	11.2	15.4	125
Solferino	34.4	48.9	125

\* = percentage of interviewees that mentioned *Thrinax radiata* within the first three useful forest species.

frequently used and with the highest economic and ecological importance.

Cutting *Chit* trunks is a common practice in Solferino. More than half of all participating ejidatarios (54%) reported to have cut this palm in the year previous to the interview.

Two kinds of *Chit* are distinguished for harvesting. The young ones, palms that reach 2–3 m in height, non-resistant to seawater and that are used only to harvest leaves for thatch, handicrafts, and brooms. The other type is adult trunks reaching between 6 m and 12 m tall. In this case, trunks are considered strong enough for building houses or lobster traps and therefore, palms are completely felled. Among these harvestable trunks men preferred the taller ones, between 8 m to 10 m, arguing that “they will soon fall down anyway.” Dense stands of *Thrinax radiata* (*Chitales*) are well known places among land holders, and are frequently visited for harvesting purposes.

In order to increase the durability of *Chit* products men mentioned the need to harvest during the right phase of the moon, “few days before or after the half moon.” This practice has been previously reported for *Sabal uresana* in Sonora (Joyal 1996).

As for commercialization, only 18 men (36%) declared to harvest *Chit* for outside selling. The most important selling locations are fishing communities; 65% of all participants cited Isla Holbox and 28% Chiquila, both communities located no more than 50 km away. Another 7% quoted Punta Allen, a fishing town at approximately 400 km in southeast Quintana Roo (Fig. 1).

There are no sales records, but when asked, harvesters stated that before the ban in 1994, annual sales varied between 5,000 and 30,000 trunks. Recently, Isla Holbox has developed into an important tourist area where *Chit* trunks and leaves are highly demanded to build restaurants and eco-tourism huts. When prompted about selling prices for *Chit* trunks interviewees said between 50 cents and 10 Mexican pesos, per 2 m trunk.

The market demand for *Chit* trunks, used for building lobster traps in Holbox and Chiquila, was between 42,000 and 151,000 trunks. Each lobster trap is built with approximately 36 trunks of 1.5–2 m length, lasting 5–10 years underwater (Calvo-Irabién & Ceballos-Gonzalez 2004).

Leaves are usually sold for thatching and less frequently for broom making, 76% of the

harvested leaves are sold in Holbox, 18% in Chiquila, and only 6% in Tizimin, a town ca. 200 km from the study area (Fig. 1). It is understandable that for both trunk and leaves a larger proportion of total sales occurred in nearby localities.

The harvesting limitations imposed by the ban have considerably changed the communal mechanisms that controlled access to this non-timber forest product. Nowadays it is illegal to harvest *Chit*, for commercial purposes, without a permit. These changes have generated intra-community conflicts, as well as conflicts between community members and environmental authorities. Moreover, *Chit* harvesters and other community members do not perceive *Chit* as a threatened species. In the 1994 law, no information is provided on the specific reasons to declare the ban for this and other listed species and very few governmental efforts are made in order to inform of the rationale of listing species as threatened, nor of the new rules governing the use of *Thrinax radiata*. Additionally, the costs associated with the new harvesting and selling conditions (technical studies for the management plan, permits, reforestation and organized commercialization) are prohibitive for *Chit* harvesters. Besides, fishermen, the main *Chit* trunk buyers, are not willing to pay higher prices derived from new management costs.

In relation to markets, there is some potential for market diversification of *Thrinax radiata*. In our study, none of the interviewees used or sold *Chit* as an ornamental plant. Nevertheless, this palm is highly appreciated for its aesthetic properties (Evans 1981), particularly in urban areas of the Yucatan Peninsula. *Chit* cultivation in nurseries is low-cost and relatively simple. Seed germination and survival of young palms are high, ca. 90% (Perez et al. 2005). Another potential use for this palm species is the manufacturing of handicrafts for tourists. In the two previously mentioned alternatives, adult palms, the most vulnerable life cycle stage (Olmsted & Alvarez-Buylla 1995), are not felled. Therefore, harvest of seeds for ornamental purposes, and of leaves for handicrafts, would have a smaller impact on population dynamics than trunk cutting.

### Conclusions and recommendations

Traditional use patterns of *Thrinax radiata* are changing. Commercial items such as tin or cement roofs, synthetic fibers, non-wood building materials, as well as plastic brooms

and containers, are replacing *Chit* products. At the same time, mechanisms that controlled access to a common property resource have changed drastically due to the ban imposed in 1994. In the studied communities, harvesting *Chit* for commercial purposes has disappeared, or is performed illegally, generating conflicts. Although studies on population dynamics for *Thrinax radiata* have shown the potential for sustainable harvest (Olmsted & Alvarez-Buylla 1995, Calvo-Irabién & Ceballos-Gonzalez 2004), under the current situation, the management-related costs imposed by the ban are prohibitive for peasant communities. As proposed by Balmford and Whitten (2003), it is necessary to find mechanisms that more widely disperse the conservation costs of threatened species and habitats, which are actually borne largely by local communities.

On the other hand, changes in land use patterns, increasing demand by fishermen and the tourist industry, and uncontrolled illegal cutting could jeopardize the maintenance of *Thrinax radiata* populations in the Yucatan Peninsula.

A long-term adaptive management strategy for the sustainable use of *Chit* needs to be formulated through close cooperation with managers, local harvesters, consumers, and scientists. Such a strategy needs to take into account socio-economic and ecological factors and use monitoring information to revise the management of this palm species.

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