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Where There is no Beer: *Arenga pinnata* and Sagueir in Sulawesi, Indonesia

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Those who have lived or worked in isolated areas of the tropics may be familiar with the classic medical self-diagnosis and treatment guide—"Where There is No Doctor" (Werner 1977). While invaluable, this reference has always seemed to beg for a companion guide—something that reviews locally available alternatives for where there is no beer.

Humans have utilized carbohydrates to make alcoholic beverages since prehistoric times. Corn, wheat, and potatoes are widely used throughout temperate regions, while rice, cassava, and palms are commonly used in the tropics. In Southeast Asia, three palms in particular are widely used for the production of alcoholic beverages: coconut (*Cocus nucifera* L.), nipa (*Nypa fruiticans* Wurmb.), and the sugar palm (*Arenga pinnata* (Wurmb.)Merr.)

In the Philippines, coconut palm beer, known locally as "tuba", is ubiquitous. As the world's premier producer of copra (dried coconut), it is not surprising that tuba can be found in virtually every Filipino village and market, and it is a rare day that doesn't end with villagers clustered around their homes sipping tuba. But the drinking of tuba appears to be primarily a Filipino phenomena; little is consumed in other Southeast Asia countries. Even where coconut is abundant, such as Central and North Sulawesi, the trees are rarely tapped for alcohol.

In swampy coastal areas throughout insular and mainland Southeast Asia, the extensive monotypic stands of nipa palm are tapped to produce a toddy. Brown (1920, citing Gibbs, 1911) reported that over ten million liters of alcohol were produced annually in the Philippines in the early 1900s and over 85% of this was from the nipa palm. Nipa palm is considered to be superior to almost any other plant for the production of alcohol as the sap has a sugar content of 14–17% and can produce up to 15,000 liters of 95% alcohol per hectare (Whitten et al. 1987). Nevertheless, since the end of World War II, the commercial production of nipa alcohol has declined (Mastaller 1997). Today nipa toddy is produced in relatively small quantities in the Philippines and Indonesia.

While coconut and nipa palm toddy are certainly tasty and provide serviceable alternatives to beer, they are, in my opinion, no match to the smooth refined taste of "sagueir," Indonesian for the toddy produced from the sugar palm. Indeed, Burkill (1966) concluded that *Arenga pinnata* is "without rival for toddy". My experience, based on years of sampling and countless tastings, affirms Burkill's observation—sugar palm "sagueir" reigns supreme.

This paper reviews the production of palm toddy as currently practiced in forest villages in Central Sulawesi, Indonesia. I consider how "sagueir" is produced, how trees are managed to maximize and sustain production, and the role of "sagueir" among village households.

Arenga pinnata

The sugar palm, *Arenga pinnata*, is a single stemmed hapaxanthic, monoecious feather palm, 7–12 m tall which occurs from northeastern India through Malesia to the Philippines (Purseglove 1972). In Central Sulawesi, sugar palms are abundant and widely distributed throughout forests and cultivated fields (Fig. 1). If the trees are established, they are retained when forests are cleared for agriculture and thus are particularly common in and around villages. Sugar palms are occasionally cultivated as well, further increasing the density of this stately palm. A typical rural scene in contemporary Central Sulawesi may not differ much from that observed by Alfred Russell Wallace when he resided in

1. *Arenga pinnata* retained in hillside farm, Central Sulawesi.

2. Bamboo ladder used to access *Arenga pinnata* for daily tapping and sagueir transport tube.

3. Sagueir collecting tube being attached to male inflorescence of *Arenga pinnata*; note small bamboo tube (center bottom) that conveys excess sagueir into second bamboo tube.

Macassar (now Ujung Pandang), South Sulawesi in November, 1857. Wallace (1989) observed great quantities of *Arenga saccharifera (pinnata)* throughout South Sulawesi and reported that the palm was used for the production of both beer and sugar. While in Macassar, Wallace stayed with the Mesman family and noted that their palms provided a year-round supply of "sagueir." Unfortunately, Wallace did not comment on how he found the beverage.

Arenga pinnata Sagueir Production

The tapping of *Arenga pinnata* for the production of "sagueir" can commence when trees begin to flower at about 7–10 years of age and the large quantities of starch stored in the trunk are converted to sugar (Purseglove 1972). Only male inflorescenses are tapped as female inflorescenses produce little sap (Burkill 1966). In Central Sulawesi, tappers typically construct a simple bamboo platform and ladder to access the palm crown and facilitate daily sap collection (Fig. 2). Collection of sap begins with the selection of a vigorous male inflorescence consisting of a heavy, stout peduncle with numerous flower spikes. Prior to sap collection, the peduncle is beaten repeatedly for several days with the side of a machete or wooden mallet to stimulate sap flow. Burkill (1966) reports that beating of the peduncle results in the rupturing of internal tissues, creating "something approaching an inflammation" that raises internal temperatures, thereby facilitating sap flow. The end of the peduncle containing the flower spikes is then cut off and the collection begins.

Central Sulawesi collectors utilize pairs of bamboo tubes (approximately 5–7 liters each) for sap collection (Fig 3). The primary bamboo tube has a small hole near the top that is fitted with a smaller bamboo tube which takes the

overflow into the second collection tube. The mouth of each bamboo tube is stuffed with thick, dense, black fibers from *Arenga pinnata* leaf sheaths (gamuti fibers, Purseglove 1972) to exclude flies, rats, and fruit bats. The last two are of particular concern because they are very fond of the sap and will consume it all in short order if they are given the opportunity.

Collectors take great care to keep their bamboo tubes as free as possible of bacteria and yeast so as to prevent spoilage and more rapid fermentation of sap into vinegar. The tubes are cleaned daily and several slices of fresh wood are placed in each tube to enhance the flavor and color of the sap, and to retard fermentation. *Schleichera oleosa* Merr. (Bayur in Indonesian) is the preferred wood, but some collectors use *Koordersiodendron pinnatum* Merr. (Siuri) as well. Burkill (1966) observed that bamboo is the least hygienic of possible vessels and that pots or tins are preferable. In recent years, the widespread availability of plastic containers has resulted in a shift away from bamboo in some areas, but most tappers in forest villages on Central Sulawesi continue to use bamboo.

Collectors in Central Sulawesi gather the sap once a day, usually in mid to late-afternoon after completion of other agricultural work. Burkill (1966) reported that tappers visited trees twice a day in the early 20th Century which would probably yield a higher quality "sagueir" with less fermentation. Irrespective of how frequently the sap is collected, each time the tree is visited several millimeters are cut off of the end of the peduncle and it may be be beaten again to maintain sap flow.

A typical *Arenga pinnata* in Central Sulawesi produces approximately 5–6 liters of sap each day and there is reportedly little variation in yield or taste between wet and dry seasons. This is somewhat surprising, but may result from the fact that most of the tapped trees are located near streams or rice paddies and thus are not likely to be affected by reduced water availability during the dry season. Exceptionally large and vigorous trees may produce as much as 10 liters per day. These yields are high in comparison to reported average sap flows of 3.5 liters per tree per day elsewhere (Purseglove 1972). Irrespective of tree size or vigor, there is usually only a single tap per tree. Fresh sap contains up to 15% sucrose (Purseglove 1972) and a single peduncle can be tapped daily for 2–3 months. After three months, collectors report that yields begin to decline and the inforescence dies. At this time, collectors typically select another male inforescence and begin the process anew. Flowering continues without interruption for about two years after which the entire palm dies and a new individual must be selected (Purseglove 1972).

Household Consumption and Sale of Sagueir

The inhabitants of forest villages in Central Sulawesi are primarily Christian (Salvation Army) and thus, unlike their Muslim neighbors, are ready consumers of alcoholic beverages. Young men are the principal consumers of "sagueir," but women and elderly people occasionally partake as well. In the village of Moa, "sagueir" sells for Rp 400 per liter (approximately US $0.05 at the current exchange rate). Most "sagueir" produced in Moa is consumed by households or immediate friends (i.e., it is not sold). However, several households tap two or more trees and produce up to 20 liters each day. These households regularly sell "sagueir," earning up to Rp 8000 daily, which is more than the average daily wage labor rate for agricultural work. Nevertheless, even among these households, "sagueir" contributes a relatively small proportion of total household income and is significantly less important than the production of perennial cash crops (i.e., coffee and cacao) and annual food crops.

Arenga pinnata yields a fine, smooth and refreshing alternative for where there is no beer. "Sagueir" also facilitates simple, inexpensive daily socializing and is a source of supplementary income for some households. While "sagueir," like beer, may be abused by some, particularly teenage boys, its relatively low alcohol content, propensity to ferment into vinegar after a few hours, and limited availability seem to prevent widespread drunkenness. Over the many field seasons I have lived and worked in the forests of Sulawesi, I am certainly grateful for *Arenga pinnata* and my late afternoons sipping "sagueir."

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Centerfold: *Coccothrinax munizii* in its natural habitat, between Cajobabo and Jauco, Cuba. (Photo by Carlo Morici)