The *tungog* (*Ceriops tagal*) industry and prospects for mangrove rehabilitation

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Did you know that the red color of *tuba*, the fermented coconut drink daily imbibed by countless Filipinos all over the islands, comes from a dye obtained from the dried extract (called cutch) of mangrove bark? The cutch from *tangal* (a mangrove species whose scientific name is *Ceriops tagal*), called *tungog* or *baluk*, is traditionally used for *tuba* because it is effective in retarding fermentation. But because the supply has been depleted due to excessive *tangal* harvesting, *tungog* nowadays is routinely mixed with cutch from *Rhizophora*, another mangrove locally called *bakhaw* (hence the term *bakhawan* or *bakawan* to denote a mangrove area) although tuba prepared using *bakhaw* extract can cause indigestion.

Mr. Juan de Jesus, a tuba gatherer of Ibajay, Aklan has been planting and harvesting tangal trees for over 20 years now

Uses

Tungog (from which *katunggan*, another term for mangrove is derived) is also used as the fermenting agent for *bahalina,* a special variety of *tuba* that gets mellower with age, unlike ordinary *tuba*. It is produced only in Cebu, Bohol, Leyte and Samar. *Tuba* is also combined with a carbonated drink (Royal Tru-Orange) and beer into a cocktail called mestiza. Old women drink *tuba* mixed with *tsokolate* (made from *cacao* beans) every evening to ease tensed muscles. *Tungog* is also believed to cure anemia. Because of the great demand for *tungog* cutch, especially in eastern Visayas, the region has to import hundreds of tons of cutch yearly from as far away as Zamboanga and Sabah in North Borneo.

An Indo-Pacific species, *Ceriops tagal* is widely distributed from East Africa and Madagascar, throughout tropical Asia and northern Australia to North Caledonia and Micronesia in the South Pacific and to Hong Kong. It is called the yellow mangrove because of its bright yellow-green leaves which may be dark green in shaded areas. It is a typical constituent of the inner (middle and landward) mangrove zone and forms pure stands of small trees (2 to 7 meters high) in well-drained clay soil but grows as a short shrub (1 meter tall) in poorly drained soils frequently inundated by tides.

Aside from fermenting tuba, cutch from *tungog* is also used to color rice, to dye thick leather, cotton, nylon, mats, etc. and to prevent scales from forming in water boilers. One hectare of well-developed mangrove forest can produce 17,700 kilos of dried tanbark. The export of mangrove tanbarks and cutch extract is an important industry in some tropical countries but not in the Philippines where the barks are used locally to only a limited extent (Brown & Fisher 1918).

Stripped of its bark, the *tangal* tree provides hard, straight-grained, fine-textured wood used as poles for *baklad* (fish corrals) and material for furniture and house construction. This species is also a favorite for Christmas trees.

The *tungog* industry: 1930s-1950s

The following account of the industry was provided by former Boholano *tungog* gatherers, now 60-70 years old. They started their trade at the age of 14-15 years during the peak of the industry in the 1930s to the 1950s. At this time, around 100 sailboats for *tungog* gathering were based in four villages in Pangangan Isiand, Bohol.

Each sailboat had a keel 60-90 feet long, two masts each measuring 70 feet, a *buwang* (opening) of 12 feet, and *dagpak* of 8 feet. The largest sailboat could load 6,000 kilos of dried *tungog*.

Among the crew, it was the *maestro* who directed the trip (e.g., the route to take, where to sell and at what price) while the

segunda maestro supervised the crew and the *tungog* gatherers. The *manunong* guarded the boat and kept watch for *bahura* (coral reefs) which could ground the boat.

Financiers and the sharing system

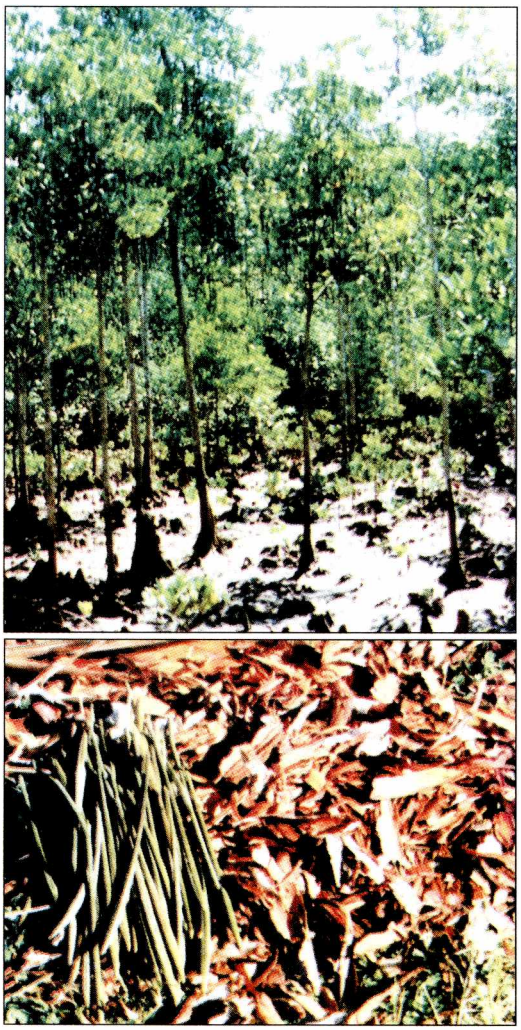
Although there were many boat owners in Pangangan in the 1930s, only four people had enough capital to finance a trip. A boat owner and financier would usually combine resources in a partnership called *kompanya*. From the gross income for each trip, the financier would deduct the capital plus 5-10% monthly interest. The net income was divided into three equal parts, one each for the financier, boat owner, and crew.

Sharing or *partida* was according to the skills of the crew. A crew member who could untangle the boat's anchor from coral stones was paid more incentives or *pabor* than one who could neither dive nor swim. Diving and swimming skills were needed for the gathering of *samung* (shells made into buttons for export), a side activity of the crew. The cook and apprentices or those from farming villages usually did not get incentives. One system of sharing among the crew followed this scheme: one *maestro* - one part and 10 *pabor*, one *segunda maestro* - 1 part and 7 *pabor*, one *manunong* (diver) - 1 part and 6 *pabor,* 20 *manunungog* (*tungog* gatherer) - 1 part each, and one cook - 1 part. However, a hardworking gatherer could be given an incentive by the *maestro*.

Another system was by percentage or *porsiento*. From the gross income was deducted the capital including 5-10% monthly interest. The net gain was divided in two: 30% to the boat owner (20% to the owner and 10% to the *maestro*) and 20% to the crew (5% to the *maestro,* 2% to the *segunda maestro* and 3% to all *kasko* leaders). Each *kasko* (or canoe for entering the mangroves) had 2 crew members and a number of gatherers.

The scale of a gathering operation or trip could be gauged by the food supply

A tangal (Ceriops tagal) *plantation in Aklan, northern Panay with pencil-like propagules dangling from tree branches.*



Tungog or the extract from dried bark of tangal (shown above beside propagules) gives tuba its typical red color

(because it is difficult to retrieve figures for the operational costs). For example, a trip to Zamboanga with 20 crew required 60 sacks of corn, 1 sack of *monggo,* 2 sacks of sugar, 1 sack of salt and 300 liters of drinking water. Fish was caught by crew members (or purchased) during the journey.

Trips were undertaken in March to July (during the northwest monsoon or *amihan*) and the return during the *habagat* or southwest monsoon to take advantage of the wind. Trips lasted 4-5 months within the country and longer to Borneo.

Places for collecting *tungog* bark were Dumaran in Palawan, Ulutanga in Zamboanga, Surigao, Cotabato, Tungkil Island near Jolo, Mindoro, Camotes, Polilio Island in Luzon, Kudat and Banggi in North Borneo.

Philippine mangroves used to be divided into concessions by the Bureau of Forestry. Two financiers from Pangangan were granted concessions in Palawan and Polilio Is. in Luzon. Gatherers paid fees to these concessionaires. In Borneo, gatherers paid 14 bundles of dried *tungog* to a certain Datu Mustafa, governor of Kudat, North Borneo. To enter Borneo however, they had to pay protection money (2 sacks of rice) to a Muslim leader in Balabac, Palawan.

Bark removal

Because a Department of Forestry ordinance prohibited the sale of mangrove bark less than one-fourth to one-half of an inch thick, gatherers look for mangroves with thicker bark. Trees with thick bark could be found only in Banggi, North Borneo. Therefore, Banggi bark was used as a sample for showing to prospective buyers but not for sale.

Unlike other mangroves such as *pagatpat, tungog* easily dies when stripped of its bark. There are two ways of removing the bark: by *kuyo* for short mangroves (e.g., *parang-parang*) and by *padyag* for tall mangroves (e.g., *tabyog*). In the *kuyo* system, most of the bark is removed but the tree is left standing. In the *padyag*, the tree is first cut and then stripped of its bark.

Dried *tungog* were classified as big or small. Bundles of 20 pieces each were sold at P0.10 for small pieces and P2.00 for big ones. The bundles were peddled by the crew by means of "*suroy suroy*" in Waray speaking places, e.g., Tacloban, Ormoc, Calbayog, Carigara, Maasin. Or dried bark was sold wholesale by the financier mostly to Chinese buyers in Cebu.

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Whether as source of cutch for *tuba* or *baklad* poles or wood for house construction, *tangal* is an important reforestration species whose products can be sold for cash or used for domestic purposes by coastal families.

Its characteristics of year-round reproduction and relatively large size of propagules make *tangal* an ideal species for rehabilitating degraded areas. Flowers and fruits of *tangal* may be found throughout the year; the 15-20 centimeter long propagules look like pencils dangling from the parent tree (see photo). However, seedlings should be planted in the inner mangrove areas because mortality rates are high in the seaward zone.

Old timer Juan de Jesus, a *tuba* gatherer from Bgy. Naisud, Ibajay in northern Aklan (see photo) has been planting *tangal* for over 20 years now. Because of its popularity as housing material, they say that a man needs to plant as many *tangal* trees as the number of his children multiplied by 4, representing the posts of the future houses they will build. The trees are harvestable in 5 years.

REFERENCES

Baconguis SR, Ociones FT, Panot IA, Lavega RM, Siapno FE, Cariño CR, Holgado DY and Reyes FM. A guidebook on the mangroves of Puerto Galera. ERDB-MAB Puerto Galera Ecosystems Special Report. Department of Environment and Natural Resources, Ecosystem Research and Development Bureau, Laguna, Philippines, 63 p.

Brown WH and Fischer AF. 1918. Philippine mangrove swamps. Department of Agriculture and Natural Resources. Bureau of Forestry Bull. No. 17. Bureau of Printing, Manila, 132 pp.

Melana EE and Dagalihog SD. 1993. Feasibility of tangal (*Ceriops tagal*) for enrichment planting of degraded mangrove stand. Ecosystems Research Digest 3 (2): 76-83.

Tomlinson PB. 1986. The botany of mangroves. Cambridge University Press, 413 p.

Yao CE. 1983. Tangal for the bahalina industry. *Canopy International* June 1983: 9-10.

Zeller BM and Moore NG. *Ceriops tagal* var. *australis*. Queensland Department of Primary Industries Leaflet No. 5: Know your mangroves. Department of Primary Industries, Brisbane, Australia, 2 p.

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were conducted in 1994 and 1995. Shrimp samples were taken from 23 grow-out ponds, 14 of which had disease outbreaks. Luminous bacterial (LB) load of the shrimps' hp with [mean = 2.4 x 10^1 colony forming units (CFU)/hp] and without [mean = 0.3 x 10^1 CFU/hp] disease outbreaks were comparable during the first 15 days of culture (DOC). During disease outbreaks at 18 to 32 DOC, however, LB load of affected shrimps (mean = 9.0 x 10^4 CFU/hp) were higher than healthy shrimps (mean = 7.0 x 10^1 CFU/hp). At 50 to 60 DOC, levels of LB were comparable in older shrimps with or without disease. Total viable and presumptive *Vibrio* counts were also comparable in both shrimp samples from 1 to 60 DOC. Characterization of the 172 bacterial isolates collected showed that most (90.12%) were *Vibrio* species dominated by *V. harveyi* (27.91%), *V. splendidus* II (13.37%) and *V. parahaemolyticus* (10.46%).

Lio Po GD, Albright LJ, Michel C, **Leano EM. 1998**. Experimental induction of lesions in snakeheads (*Ophicephalus striatus*) and catfish (*Clarias batrachus*) with *Aeromonas hydrophila*, *Aquaspirillum* sp., *Pseudomonas* sp. and *Streptococcus* sp. Journal of Applied Ichthyology 14 (1-2): 75-79.

Abstract. Isolates of *Aquaspirillum* sp., *Pseudomonas* sp., and *Streptococcus* sp. recovered from epizootic ulcerative syndrome (EUS)-affected snakeheads (*Ophicephalus striatus*) in Thailand as well as an isolate of *Aeromonas hydrophila* recovered from EUS-affected snakeheads in the Philippines were characterized and identified. Each isolate was injected intramuscularly (IM) into healthy catfish (*Clarias batrachus*) and snakeheads (*O. striatus*). Results showed in tests with *C. batrachus* that 24 h after injection, *Aquaspirillum* sp., *Pseudomonas* sp., *Streptococcus* sp. and *A. hydrophila* induced slight, slight, moderate and severe dermomuscular necrotic lesions, respectively. Among *O. striatus*, only *A. hydrophila* induced severe lesions. *Streptococcus* sp. induced slight lesions 2 days post-injection which healed rapidly, while *Aquaspirillum* sp. and *Pseudomonas* sp. did not manifest any dermal lesions. Experiments indicated that among the four EUS-associated test bacteria, *A. hydrophila* was the most pathogenic, inducing severe dermomuscular necrotic lesions in intramuscularly injected catfish (*C. batrachus*) and snakeheads (*O.striatus*). Differences in the susceptibility of *O. striatus* and *C. batrachus* to *Aquaspirillum* sp., *Pseudomonas* sp. and *Streptococcus* sp. were evident. Furthermore, this is the first evidence of the association between *Aquaspirillum* sp. and diseased fish.

Focken U, Groth A, **Coloso RM,** Becker K. 1998. Contribution of natural food and supplemental feed to the gut content of *Penaeus monodon* Fabricius in a semi-intensive pond system in the Philippines. Aquaculture 164 (1-4): 105-116.

Abstract. Juvenile *Penaeus monodon* were stocked in grow-out ponds and fed a compound diet at high rates for 19 weeks under semi-intensive conditions. At three stages of the rearing period (weeks 6, 11 and 16), the gut content of the shrimp was analysed microscopically at every hour of the day. Additionally, possible sources of natural food (*lablab, lumut*, zoobenthos, etc.) were analysed microscopically and where possible for proximate composition. At week 6, the gut content consisted of 28.9% supplemental feed, 42.3% plant materials (other than from the pelleted diet),

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