STINGLESS BEES: A VANISHING ART

D.M. CARON

CANADA

The first American beekeepers were the Indians of Central and South America who kept stingless honeybees. Stingless bees are social, with large permanent colonies of workers and one queen. They are relatives of *Apis mellifera*, our common honeybee, but are classified in two different genera – *Melipona* and *Trigona*. Stingless bees can be found today in Southern Mexico southward to Argentina as well as in the tropics of Africa and Asia. They have never been in the US., apparently even when our climate was much warmer. And as their name indicates, these social female bees are stingless.

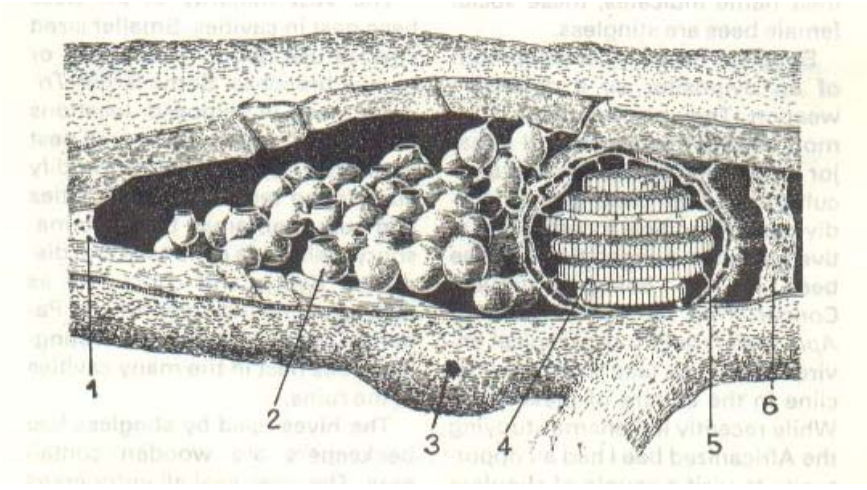
Stingless bees lack development of an ovipositor as a defensive weapon. They are the most common bees in the tropics and a major crop pollinator in tropical agriculture. As man continues to rapidly destroy tropical forests, the native habitat and vegetation of these bees is also being destroyed. Concurrently the introduction of *Apis mellifera* into the tropical environment, has lead to a rapid decline in the culture of these bees. While recently in Panama studying the Africanized bee I had an opportunity to visit a couple of stingless bee beekeepers.

As with our bee, people keep stingless bees for honey which is prized as a medicine. Some nests of *Melipona* may yield up to 5 Ibs. of honey but most yield far less than 2 Ibs. The honey, called Miel de Palo, is higher in water content and often bitter in taste. It does not store well. It is very valuable to native healers who view this honey as different from the honey we know. It is used in treatment of people for a wide range of aliments.

Nesting Sites

The vast majority of stingless bees nest in cavities. Smaller sized species use hollow tree trunks or hollow branches. Some larger *Trigona* nest in exposed locations building a tough multilayered nest in a tree. Other species modify abandoned termite nests. In cities and suburban areas they use masonry wall voids of houses and discarded debris and containers as nest sites. In the ruins of old Panama City, a large number of stingless bees nest in the many cavities in the ruins.

The hives used by stingless bee beekeepers are wooden containers. The bees seal all entry areas to one single entry tube that they can defend. One side of the cavity is removed to harvest their honey. Styrofoam containers would seem to be an acceptable substitute for most species kept by man but they haven't been widely utilized. Some nests are kept in the hollow trunks or branches the bees originally inhabited. Many nests are not moved from their original founding site – the beekeepers know each site and visits "his" nest to annually harvest honey, typically near the end of the dry seasons when yield is greatest. Such nest sites are closely guarded secrets to avoid discovery by anyone else.



*A diagram of typical stingless bee (*Melipona*) in a hollow branch*
1. Batumen plate; 2. Storage pot; 3. Entrance; 4. Brood comb; 5. Involucrum; 6. Batumen plate

Nests of stingless bees are made of wax mixed with resins (propolis) – a mixture called cerumen. Some species mix mud, vegetative material, dung and other materials in as well. The exposed nests are more likely to have more resins and other inclusions in the nest materials. As shown in the diagram, nests are enclosed by a Batumen that closes off cavities and serves as an insulation layer for exposed nests. The nest itself has 2 portions – one for storage of honey and pollen and another for brood combs. The brood area has a layered covering or involucrurm. The brood cells are in horizontal comb which open upward.

In the storage area some species mix pollen and nectar together while others have pots of different size for each food. Pollen storage cells are narrower and more cylindrical compared to honey storage cells. In most nests storage cells for honey are enlarged as the amount to be stored increases.

Brood cells are of two sizes with queens and males produced in the larger cells. Usually this is only during a portion of the year. Brood cells are mass provisioned and cell sealed after the egg is laid by the queen. Often the wax is removed once the pupa has spun its cocoon. As in honeybees, the developing queen gets a richer and larger amount of food in her larval development. Mating of queen and male occurs near the entrance to the nest where males form large aggregations. Stingless bee queens mate only once in their lifetime.

Stingless – Yes
Defenseless – No

Stingless bees do in fact lack functional stings but they are by no means defenseless. They occur in large colonies and store, in some cases, abundant pollen and nectar so they are attractive targets for predators including man. When disturbed a large portion of the population may rush out of the nest to bite an intruder. The bees crawl into the eyes, nose, ears and hair. This is very disconcerting and the action usually causes intruders, except for the most persistent honey collectors, to retreat.

A few stingless bees have evolved a further defense. Some *Trigona* are capable of producing a chemical from enlarged mandibular glands that is placed on the skin of intruders opened by bites. This is an extremely painful burning sensation and lesions develop at each bite site that last for many days and leave permanent scars. I earlier described an encounter beekeeper Bolivar Apiaricio had as a teenager with these stingless bees of which the scars were still evident, 10 years after the attack.

One of these stingless bees with chemical defense, *Trigona tataira* is called the fire bee by natives. I witnessed an attack of this bee on 2 adjacent honeybee colonies where they were robbing pollen traps. This bee also attacks and robs other bees nests in the tropics. An interesting finding about this chemical is that in addition to causing painful longlasting reactions in humans, it disrupts normal defensive behaviors of the honeybees. It is thought that this bee can plunder other bees nests with impunity owing to the chemicals of their secretion. Other species seem also to use chemicals to repel more common enemies like ants, wasps and flies but are docile and easily robbed by humans.