Eva Crane Trust

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Bee Products

Bumble bee honeys and others

The production and storage of honey are by no means confined to the so-called honeybees, and honey from any source may be a welcome food upon occasion. From time immemorial, nests of all the *Apis* species have been exploited for their honey in Asia, and *Apis mellifera* in Europe and Africa as well. In tropical and subtropical America, Africa and Australia, nests of stingless bees (meliponins) have been similarly robbed. Yields from stingless bees are not in general very large, often less than a kilogram, although nests have occasionally been reported to yield 10–20 kg or more.

Bees that form temporary summer colonies, such as bumble bees, store even less food, but they and their nests may be sought out in areas where food is scarce—and by children and animals anywhere. The boy referred to in Gilbert White's "Natural history of Selborne" was a specialist in this form of hunting around 1750. "In the summer he was all alert, and in quest of his game in the fields, and on sunny banks. Honey-bees, humble-bees, and wasps, were his prey wherever he found them: he had no apprehensions from their stings, but would seize them, . . . disarm them of their weapons, and suck their bodies for the sake of their honey-bags". A most interesting ethnological study of bee hunting in the Carpathian mountains in eastern Europe[3] has recently been published by Dr. Bela Gunda. This includes a description of the hunting of bumble bee nests, and also of their transference to clay pots ("bumble-houses") which were taken to the village for subsequent use.

Although honeybee honeys have been described and studied for a very long time, it was reported[2] as recently as 1959 that "little seems to be known about the composition of 'honey' found in bumblebees' combs . . . Bumblebee honey may also [i.e. like honeybee honey] be very concentrated but to what extent its sugars have been similarly converted appears to be unknown". Research since then has provided some interesting information about bumble bee honey.

Observations on nests of four North American bumble bee species[4] showed that two types of honey were stored. The "thick honey" contained 70–87% sugar or more; the percentage in honeybee honey in the same area at the same time was 83–84%. This thick honey was stored in empty cocoons near the centre of the nest. The other type, "thin honey", was stored in peripheral wax honey pots, and contained only 52–42% sugar or even less. At any one time a nest might contain both, or one, or neither type of honey. Bumble bees have apparently never been observed to collect water, and the thin honey may perhaps be used to dilute the thick honey for use as larval food.

"Thin" bumble bee honey would be likely to ferment, and it has recently been sought out and examined by Canadian biologists[7] as a likely source of a yeast isolated from flowers in 1954. The yeast is of potential commercial interest because it produces high yields of hydroxy fatty acid sophorosides. In 189 samples of bumble bee honey, five species of yeast were found (compared with nineteen in flowers), the commonest being *Torulopsis bombicola* and *Candida* species.

The main sugars of honeybee honey are fructose and glucose, which are present in fairly similar amounts; an F/G ratio of 2 would be considered very high. In a study of European bumble bee honeys published by Dr. Maurizio in 1964[5], most were found to contain much more fructose than glucose; the F/G ratio was usually above 2 and sometimes as high as 5–11. The reason for this is not yet known. Dr. Maurizio also compared the pollens in honeys from the European bumble bees with those in honeys from honeybees in the same areas. Many of the bumble bee honeys contained red clover pollen, but there was also a great variety of other pollens, showing that bumble bees visit many of the food sources available to them, and not only those designated "bumble bee flowers". In contrast, the pollens in five honeys from Brazilian stingless bees were largely derived from a single plant species[5].

In South America, various Indian tribes collect honey from honey wasps, a group of tropical species (including *Nectarinia* and *Polybia*) which build permanent nests of "paper" made from wood pulp. Nests, which are hung in trees, may contain 15 000 individuals; some of the wasps are not aggressive, and are easily robbed of their honey. Samples of *Polybia scutellaris* honey analysed had a high solid content, with only 17·5% water[6].

There are also ants that store honey, but they are unable to build storage vessels as bees and wasps do. Instead, the honey is stored within the bodies of some of the young workers of the colony, such a worker being known as a "replete". Returning foragers empty their crop contents by feeding the "replete", whose abdomen becomes greatly distended; in the end the ant is so incommoded that it can only hang motionless from the roof of the underground nest. It may remain there for months, but will regurgitate the honey store from its crop when stimulated to do so by other workers. These honey ants are found in parts of Africa, America and Australia. Aborigines in central Australia dig out the nests of the local honey ant, *Meliphorus inflatus,* and obtain the honey from the "repletes" by biting off the abdomen. This honey has been found to contain 59% reducing sugars, and an F/G ratio only 0·67[1].

There is a whole new area for research in the honeys and comparable products of different insects, for which refined analytical methods are now available. Results should provide interesting information on enzyme systems, foraging behaviour, and social life, of the insects concerned.

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