Non-timber forest products **Fact sheet no. 1**

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Beeswax

In today's world of aromatic gel candles, it is very easy to forget the role of beeswax. It has a long history of use in lamps for illumination. Beeswax has played an important role in religious services providing raw material for candles and votive lights.

The Aborigines of Northern Australia have used beeswax to sculpt waxen figurines to be used in religious ceremonies. Beeswax was used in casting metals prior to the Bronze Age. It has been used in commerce and business in the form of wax seals for documents. One of the more interesting uses of beeswax is in the decorative cloth dying process known as batik used by artists in Southeast Asia.

Turpentine mixed with beeswax makes good polish for household articles such as furniture. Adding resin and linseed oil to the mixture makes a good waterproofing for shoes. Fruit bottle covers are made from melting resin and Vaseline together with beeswax.

Beeswax has been traditionally used to make small hanging ornaments for Christmas. This is an opportunity for small business with great market potential

Production of beeswax

Beeswax has been considered a secondary honey bee product. In 1744, H. C. Hornbostel discovered that beeswax is synthesized by four pairs of wax-secreting epidermal glands on the ventral side of worker abdomens. Beeswax is produced by quiescent bees about 14 days old by the conversion of floral and extra-floral sugars and worked into the double-sided hexagonal comb.

Beekeeping equipment and beeswax

Bees are reared primarily for production of honey. Beeswax is generally a secondary by-product. To understand the use of

beeswax in honey production it is useful to learn how a beehive functions.

A wooden beehive housing a full colony of bees consists of hive stand, bottom board, brood chamber, queen excluder, super, inner cover, and hive cover. Most are made from wood with some metal (aluminum) components. The hive stand keeps the hive off the ground making it less likely to rot, flood, or be attacked by termites. The bottom board closes off the bottom of the hive. The hive body or the brood chamber rests on the bottom board, and holds the frames of comb. The queen excluder is sometimes placed above the brood chamber. This ensures that brood rearing is confined to this area. The supers are chambers above the brood chamber and are used to store surplus honey. The wax cappings that seal the honey in the cells are commonly cut away with a steam-heated or and electric uncapping knife. After the cappings on both sides of the frame are cut, the frame is placed in either a radial or basket-type honey extractor. Fresh honey cappings produce the best grades of commercial beeswax.

There is a huge demand for beeswax in the wax industry. Wax foundation is a sheet of wax which is pressed between metal dies so it comes embossed on both sides with the cell pattern bees follow in constructing cell sized for raising workers. The foundation is expensive. Therefore, beekeepers should save all cappings, old combs, and bits and pieces of extra wax scraped from frames and other hive parts. These should be stored in airtight containers or frozen to prevent infestation by wax moths. The wax can be melted down to trade for wax foundation. Old combs contain non-wax substances and, therefore, should not be melted with the almost pure wax cappings. The non-wax substances could impregnate and reduce the value of the almost pure wax cappings.

Extreme care should be exercised while melting wax. Wax is highly flammable and it is difficult to extinguish wax fires.

Melting beeswax

There are many devices available for melting wax cappings, old combs, and scrapings. Some of the commonly used ones are the electric wax melter, solar wax melter, double boiler, steel chests, and steam heated wax press.

Very often the wax cappings, old combs, and scrapings are placed in a burlap bag and boiled in a tub of water. This method requires using heavy weights to submerge the bag in the water. The water is heated to 190° F for many hours and the bag is occasionally poked with a stick to allow the melted wax to move through the fabric of the bag to the surface of the water. The

water is allowed to cool after the wax has melted. The wax then solidifies on the surface of the water.

The drawback of this method of extraction of wax is that it tends to discolor the wax because the resins and other substance are boiled with it. Therefore, it is better to use an electric or solar wax melter.

A solar wax melter consists of a box that is painted black inside and outside. The box is made airtight by covering it with glass. The box should contain a metal pan to place the wax cappings, old combs, and scrapings. It should be placed tilted at right angles to the sun's rays. The box acts like a greenhouse in which the interior is heated up by the sun, melting the wax inside which is then collected in a pan. The box can be made more efficient by using two pieces of glass (with a gap in between) for better insulation and retention of heat.

Marketing

The demand for beeswax in the United States is much higher than what the domestic market can meet. The country, therefore, imports beeswax from Mexico, Central and South America, the West Indies, Africa and China.

Beeswax is sold for candle making and wax foundation. The cosmetic and related industries are the single largest consumer of beeswax which uses it in many products such as facial beauty creams, ointments, lotions, and lipsticks.

The candle industry is the largest industry using beeswax as a raw material. There is a great demand for pure beeswax candles to be used during church services. Beeswax candles burn much longer. They are aromatic with a wonderfully warm honey fragrance.

The beekeeping industry is one of the largest users itself, which recycles beeswax for the production of the hexagonally-stamped beeswax foundation. Beeswax is also used in waterproofing materials, for floor and furniture polishes, for grinding/polishing lenses, children's crayons, candy and chewing gum, ski and ironing wax, and wax for bow strings used in archery
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References and information resources

(You may be able to find some of these or other publications in your local library. Another valuable resource is your local cooperative extension office.)

Crane, Eva. 1990. Bees and Beekeeping: Science, Practice and World Resources. Cornell University Press. Ithaca, New York. 614 p.

_____. 1999. The World History of Beekeeping and Honey Hunting. Routledge. New York. 682 p.

Mace, Herbert. 1976. The complete handbook of Bee-keeping. Van Nostrand Reinhold Company. New York. 192 p.

Sammataro, Diana and Alphonse Avitabile. 1986. The Beekeeper's Handbook. Macmillan Publishing Company. New York. 148 p.

Schmidt, Justin O. and Stephen L. Buchmann. 1992. Other products of the hive. In Graham, Joe M. (ed.). The Hive and the Honey Bee. Dadant & Sons. Hamilton, Illinois. 1,324 p.

Electronic resources

The following are some websites of the companies manufacturing beeswax products.

Dadant & Sons Inc
http://www.dadant.com/can4.htm

Burt's Bees, Inc.
http://www.burtsbees.com/index.phtml/g13rax.22to/index.phtml

Alberta Beeswax & Candlemaking Supplies
http://www.telusplanet.net/public/tegart/abw

ThistleDew Farm Inc.
http://www.thistledewfarm.com/

The following is the web site of the Apiculture and Social Insect Programs at Virginia Polytechnic Institute and State University
http://everest.ento.vt.edu/~fell/apiculture/apicult.htm

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This is part of a series of fact sheets on non-timber forest products. The full set of fact sheets is available at the Non-timber Forest Products website: http://www.sfp.forprod.vt.edu/

Please give us your comments on this fact sheet and suggestions for future fact sheets. Direct your comments to Tom Hammett, Department of Wood Science and Forest Products, 210 Cheatham Hall (0323), Virginia Tech, Blacksburg VA 24061. Phone: (540)-231-2716. E-mail: himal@vt.edu.