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HONEY SOURCES IN SOME TROPICAL AND SUBTROPICAL COUNTRIES

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Introduction

The honey-yielding plants of some countries have been reported on in books and journals, and their relative importance assessed. Pollen grains of the plants concerned have been measured and described, and drawings or photographs of them have been published. The honey plants of some other countries are less well documented, but some information is nevertheless available in print. In assembling the sources of information available on honey plants of the world for a forthcoming book on honey, there were about thirty tropical and subtropical countries known to produce honey, for which no published material could be found, except perhaps isolated comments relating to a single locality. Enquiries were therefore sent to these countries. As a result, unpublished information was supplied about sixteen countries, either from existing local records or from surveys conducted specifically in order to answer the enquiry.

The information is published or described here, in the belief that it may be needed by others, for instance those engaged in the honey industry, those needing to identify imported honeys, and those looking for suitable sites for honey production either as an occupation or as an investment. The information is presented in various forms, according to what was received from the country in question. Where a list of some hundreds of honey plants was provided, this has been deposited in the Bee Research Association Library for future reference, and only a short summary is included here. All lists of plants have been "converted" into a standard form, and are presented with the plants grouped in their families, both family and plant names being in alphabetical order. Where a common name (in any language) is known, this is also given, together with available details of location, relative importance, and honey characteristics. A few of the plants may be sources of pollen rather than nectar, since the term "melliferous" (*mellifère, melifera,* etc.) is often used to denote any food source of bees.

Countries reported on are listed below:

Africa: Botswana, Cameroon, Ethiopia, Mauritius, Morocco, Mozambique, Nigeria, Somalia, Zanzibar

America (South): Equador, Guyana, Venezuela

Asia: Afghanistan, India, Iran, Pakistan

I am greatly indebted to those who supplied the information requested; many of them went to much trouble to obtain it. It has not always been possible to establish complete names of plants, and there may still be errors of identification, because of the use of vernacular names; any assistance in amplifying and correcting entries would be appreciated.

Africa

Botswana

The Botswana Ministry of Agriculture reported (1971) that all the main veld species recognized as good honey producers are trees, as listed below; Setswana names are included in brackets.

Combretaceae
- *Combretum apiculatum* (mohudiri)
- *C. imberbe* (motswere)
- *C. zeyheri* (modubana)

Leguminosae
- *Acacia caffra* (morutlhatshana)
- *A. tertilus* (musu)
- *A. mellifera* (mongana)

Oleaceae *Olea africana* (motlhware sigwana)
Protaceae *Faurea saligna* (monyena)
Rhamnaceae *Zizyphys mucronata* (mokgalo)
Sterculiaceae *Dombeya rotundifolia* (Hoechst.) Planchon
Umbelliferae *Pappea capensis* (mothata)

There are also many herbaceous plants, especially *Aloe* L. (Liliaceae), for pollen in particular, and introduced ornamental species.

Cameroon

The Secretary of State for Rural Development in West Cameroon kindly undertook to have observations made, and the information below was assembled from field reports in the early dry season (September/October) of 1971. The following plants were observed to be frequented by bees.

Compositae
- *Helianthus* spp. L. (sunflower) Visited for pollen and nectar, also wild marigolds.

Cucurbitaceae
- *Cucurbita pepo* L. (pumpkin) Very important nectar source, mostly April-June.

Leguminosae
- *Berlinia* sp. Soland. (*ebiara* or *abem* in Yaounde language) Copious white flowers heavily visited by bees.
- *Trifolium* spp. L. (clover) Buea Mountain and the highlands of the Bamenda Plateau.

Musaceae
- *Musa* spp. L. (plantain, banana) Visited throughout the year, as the flower bracts open and expose young flowers containing copious quantities of nectar.

Palmaceae
- *Elaeis guineensis* Jacq. (oil palm) Visited for nectar and copious pollen.
- *Raphia vinifera* Beauv. (wine palm) Visited for the floral nectar, and also for the sweet sap which is tapped to provide drink for most African societies.

Rubiaceae
- *Coffea* spp. L. (coffee) Flowers profusely in the early dry season (September/October) and is heavily visited.

Rutaceae
Citrus L. (orange etc.) Also frequented by bees.
Solanaceae
Nicotiana tabacum L. (tobacco) Flowers contain plenty of nectar, which is collected by bees but can produce a bitter honey, possibly because of the nicotine content.

No separate information is available for East Cameroon.

Ethiopia

Short lists of important honey producers among cultivated and wild plants in Ethiopia have been supplied by Ato Tadesse Haile, Head of the Holetta Bee Institute (Ministry of Agriculture), Addis Ababa, and by Tewodros Tolesa, Beekeeping Officer of the Ministry of Agriculture in Lekempti. These are combined in the list below. They are amplified by a further list of 165 Ethiopian honey plants provided by Tadesse Haile and now deposited in the Bee Research Association Library. This list is especially valuable in that it includes both Ethiopian (Amharic) and Latin names. In Ethiopia, as in many other African countries, a plant may be well enough known by names in one or more languages of the region concerned, but the botanical identification of the plant can be a difficult and time-consuming exercise.

Caricaceae *Carica papaya* L. (pawpaw)
Compositae
Guizotia abyssinica Cass. (niger)
Helianthus annuus L. (sunflower)
Leguminosae
Robinia pseudoacacia L. (acacia)
Trifolium spp. L. (clover)
Vicia faba L. (horse bean)
Musaceae *Musa* spp. L. (banana)
Myrtaceae *Eucalyptus* spp. L'Her. (eucalypts)
Oleaceae *Olea africana* (wild olive)
Rubiaceae *Coffea* spp. L. (coffee)
Rutaceae *Citrus* spp. L. (orange, lemon etc.)

Mauritius

Mr. J. Brouard, with the aid of the late Mr. L. Ernest Wiéhé, made a list of 52 plants on the island from which honey is produced. Most of the honey comes from the following 7; similar details of the remaining 45 (in so far as they are available) are deposited in the Bee Research Association Library.

Botanical and vernacular names	*Habitat*	*Flowering months*	*Honey*
Anacardiaceae			
Schinus terebinthifolius Raddi. (poivrier sauvage)	low altitude	3–4	dark, second grade
Leguminosae			
Haematoxylon campechianum L. (campêche)	dry-coastal	7 & 9	one of the best honeys in the world, light colour, fine flavour

Botanical and vernacular names	*Habitat*	*Flowering months*	*Honey*
Tamarindus indica L. (tamarin)	dry-coastal	12–1	dark, second grade
Myrtaceae			
Eucalyptus citriodora Hook. (citriodora)	low altitude	8–10	usually mixed with *E. tereticornis*
Eucalyptus robusta Sm. (eucalyptus rouge)	upland forest	4–5	often mixed with other honeys
Eucalyptus tereticornis Sm. (eucalyptus blanc)	medium-low altitude	9–12	most important honey producer; first grade, strongly flavoured honey
Sapindaceae			
Nephelium litchi Comb. (letchi)	medium and low altitudes	8	excellent fine-flavoured honey

Morocco

Dr. E. C. Barbier, in charge of the Station de Recherches Apicoles, El Koudia, Temara, and a botanist of standing, reported the following to be the most important honey plants in Morocco.

Boraginaceae

Echium australe, as widely distributed as *L. maritima* below, especially on sandy soils, but this plant is not eaten by grazing animals.

Fagaceae *Quercus suber* L. (cork oak), honeydew honey

Labiatae

Lavandula dentata L., abundant in the Atlas mountains, and round Agadir and Essaouira.

Lavandula maritima, from the sea to the Atlas mountains, and from Tangier to Casablanca; in danger of extinction in some places through careless management of pastures.

Rosmarinus officinalis L. (rosemary), dense stands in the north-east.

Thymus spp. L. (thyme), various species very abundant in the Atlas, around Marrakesh and Agadir.

Pinaceae *Cedrus atlantica* Manetti. (Atlas cedar), honeydew honey.

The following species are important in the build-up of colonies to take advantage of the above flows:

Anacardiaceae *Rhus pentaphillum*

Cruciferae

Biscutella spp. L.

Diplotaxis spp. DC.

Sinapis spp. L.

Species below are of local importance for honey production:

Amaryllideae *Agave americana* L. (American agave)

Cactaceae *Opuntia ficus-indica* Mill. (Indian fig)

Compositae *Artemisia herba alba* (wormwood)

Ericaceae *Arbutus unedo* L. (strawberry tree)

Euphorbiaceae *Euphorbia resinifera*
Rhamnaceae *Ziziphus lotus*

The following plants are sources of important quantities of honey, from colonies taken to them for their flowering period:

Myrtaceae
Eucalyptus camaldulensis Dehnh. } 150 000 ha in the Sabon valley alone,
Eucalyptus cladocalyx F. Muell. } 100–120 kg/colony
Rutaceae
Citrus sinensis Osbeck (sweet orange, clementine orange) 55 000 ha, 40–50 kg/colony

The average yield from the Station in 1968 was 140 kg/colony.

Mozambique

Eng. Eduardo L. de S. Ferreira, of the Reparticas Distrital de Agricultura e Florestas, sent an extensive list of important honey plants, obtained from "bibliographical prospecting", which is deposited in the Bee Research Association Library. In Eng. Ferreira's estimate, the most important plants are included among the following [some may well be worked for pollen rather than nectar].

Anacardiaceae *Sclerocarya caffra* (canho, ocanho)
Annonaceae *Annona muricata* L. (anona muricata, soursop, guanabana)
Apocynaceae *Thevetia peruviana* Schum. (loendro amarelo)
Cactaceae *Opuntia* spp. Mill. (prickly pear, etc.)
Caricaceae *Carica papaya* L. (papacira, papaya, pawpaw)
Casuarinaceae *Casuarina* spp. L. (casuarina)
Compositae *Helianthus annuus* L. (girassol)
Convolvulaceae *Ipomoea batatas* Lam. (batata doce)
Cucurbitaceae *Cucumis melo* L. (melão)
Lauraceae *Persea americana* Mill. (abacateiro, avocado)
Leguminosae
Albizia gummifera (mepepe, galinga)
Cajanus cajan (Millsp.) (feijão boere)
Crotalaria spp. L. (crotolária)
Dolichos spp. L. (feijão)
Medicago sativa L. (luzerna)
Parkinsonia aculeata L. (parkinsónia)
Pterocarpus rotundifolius
Linaceae *Linum usitatissimum* L. (linho)
Meliaceae *Trichilia emetica* (mafurreira)
Musaceae *Musa* spp. L. (bananeira)
Myrtaceae
Eucalyptus spp. L'Her (eucalipto)
Melaleuca leucadendron L. (melaleuca, cajeput)
Psidium guajava L. (goiabeira, guava)
Syzygium cordatum (mecurre, curre)
Palmaceae *Cocos nucifera* L. (coqueiro)
Polygonaceae *Fagopyrum esculentum* Moench (trigo mourisco, trigo sarraceno)

Punicaceae *Punica granatum* L. (romanzeira, pomegranate)
Rosaceae *Mespilus germanica* L. (nespereira, medlar)
Rutaceae *Citrus* spp. L. (citrinas)
Sapotaceae *Achras zapota* L. (sapodilha, sapotilheira)
Verbenaceae *Lippia* spp.

Nigeria

Dr. A. M. Gorenz, of the Cocoa Research Institute of Nigeria, knows of no work in his region (Ibadan). He reports that the best areas for bees are in the central to north-central copper belt, and that it is doubtful if observations have been made there either. Round Ibadan the plants mainly worked by bees are trees, many Leguminosae (e.g. *Gliricidia* spp. HBK), and in Euphorbiaceae *Manihot glaziorii* (Muell.) Arg. (tree cassava). The latter is sometimes used as shade for cocoa. Flowers are large, with much nectar, and before they open (around 10.00 h) the "roar" of the bees can be heard as they try to force the flowers open prematurely. A few years ago Dr. Gorenz intended to try to identify nectar sources from the pollen in the honey, but was unable to get the help necessary in identifying the pollen grains.

Somalia

Mr. P. D. Paterson wrote a 3-page "Report on a beekeeping survey of Somalia and recommendations for its possible development" after visiting the country in October 1970. He saw only two groups of hives, and could not establish honey sources, but believes that the numerous banana plantations might provide a useful nectar source (*Musa* spp. L., Musaceae).

Zanzibar

Of the two regions that comprise Tanzania, Tanganyika is comparatively well documented, through publications of the Beekeeping Section of the (now) Ministry of Natural Resources and Tourism, and Dr. F. G. Smith's thesis "Bee botany of Tanganyika" (1956). The Bee Research Association Library also has a collection of coloured drawings and descriptions of bee plants of Tanganyika, made and presented by Mr. S. W. Hubbert.

Mr. G. Ntenga, Chief Field Officer (Beekeeping) in Tanzania, reports that there is no beekeeping tradition on the island of Zanzibar, although honey is taken from wild nests which occur profusely in hollow baobob trees (*Adansonia digitata* L.). Mr. E. Mdemu of the Forestry Division, Ministry of Natural Resources and Tourism, carried out the first observations on honey plants in November 1972, and these contribute substantially to our knowledge of Zanzibar's beekeeping potential. Beekeeping activities have now (1973) been commenced on both Zanzibar and Pemba islands.

Compositae *Tridax procumbens*
Hypericaceae *Harungana madagascariensis*
Myrtaceae *Syzygium cuminii* Skeels (jambolan)
Palmaceae *Cocos nucifera* L. (coconut palm)
Rubiaceae *Pentas purpurea*
Verbenaceae *Avicennia officinalis*

South America

Equador

Patricio Eastman L., who runs a farm near Quito, has collected together a list of some 200 plants that are honey sources in Equador. This list, with Latin and common (mainly Spanish) names, is deposited in the Bee Research Association Library. The following are the basic honey plants at the farm.

Leguminosae
Medicago spp. L. (lucerne)
Trifolium repens L. (white clover)
Myrtaceae
Eucalyptus spp. L'Her. (eucalyptus)

Guyana

The Guyana High Commission in London has been helpful in obtaining descriptions and flowering information in Guyana. The full descriptions of the plants, listed below with their months of flowering, are deposited in the Bee Research Association Library.

Anacardiaceae *Anacardium occidentale* L. (cashew nut) 1–2, 8–9
Bignoniaceae *Tabebuia* spp. Gomez. (cockwood) 4–6
Compositae
Mikania parkeriana (bitter tally) 3–4, 10–1
Wedelia trilobata (daisy) 1–12
Leguminoseae
Haematoxylon campechianum L. (logwood) 3, 10–11
Hymenaea courbaril L. (locust) 3, 9–11
Inga spp. Scop. (whykee) 3–5, 9–11
Myrtaceae *Eucalyptus* spp. L'Her. (eucalypts) 3–4, 10–12
Polygonaceae *Triplaris surinamensis* (long john, Christmas candle) 8–11
Simarubaceae *Quassia amara* L. (quasi-bitters) 4, 8–9
Verbenaceae *Citharexylum* spp. Mill. (fiddlewood) 4, 11
Avicennia nitida (courida, black mangrove) 3–4, 9–11

Venezuela

Professor M. Stejskal, of Universidad de Oriente in Jusepin, assembled data available and published it in "Plants melíferas de Venezuela" [*Turrialba* 21(1) : 119–120 (1971)]. Plants listed, and their months of flowering, are as follows:

Anacardiaceae
Mangifera indica L. (mango) 1–4, 9–12
Spondias mombin L. (jobo) 4, 9
Bombacaceae *Ceiba pentandra* Gaertn. (ceiba) 1–4
Cochlospermaceae *Cochlospermum vitifolium* (Willd.) Spreng. (bototo) 1–4
Compositae *Oyedaea verbesinoides* DC. (tara) 1, 12
Labiatae *Hyptis suaveolens* (L.) Poit. (mastranto) 1–2, 9–12
Lauraceae *Persea caerulea* Mez. (aguacatillo) 3; yields bitter honey
Leguminoseae
Cassia siamea Lam. (casia de Siam) 6–10
Lonchocarpus pictus Pitt. (majomo) 4

Malpighiaceae *Byrsonima crassifolia* (L.) DC. (chaparro) 2–4, 10–11
Onagraceae *Jussieua nervosa* Poir (cariaquito) 6–12
Rubiaceae
Coffea arabica L. (café, coffee) 2–4
Palicourea crocea Sw. (café de monte) 9
Rutaceae
Citrus aurantium L. (naranjo) 2–4
Citrus limon Burm. (limon) 2–4

Asia

Afghanistan

M. and Mme R. Verhagen, who travelled through Afghanistan in 1970 and 1971, report the following to be important honey sources.
Cruciferae *Brassica* spp. L. (rape etc.)
Leguminosae
Acacia spp. L. (acacia)
Alhagi pseudoalhagi (camel-thorn)
Cassia spp. L. (senna)
Robinia pseudoacacia L. (acacia)
Malvaceae *Gossypium* spp. L. (cotton)
Myrtaceae *Callistemmon* spp. R. Br. (bottle-brush)
Rosaceae
Eriobotrya japonica Lindl. (loquat)
Pyrus/Prunus spp. L. (tree fruit)
Rutaceae *Citrus* spp. L. (orange etc.)
also mountain flowers

Iran

Professor M. Esmaili of the University of Tehran (Faculty of Agriculture, Karaj), has sent the following tentative list of important honey plants in Iran.
Bignoniaceae *Catalpa spinosa*
Boraginaceae *Borago officinalis* L. (borage)
Compositae
Centaurea iberica
Cirsium spp. Miller (thistles)
Solidago virgaurea L. (goldenrod)
Taraxacum officinale Weber (dandelion)
Tussilago farfara L. (coltsfoot)
Cruciferae *Brassica napus* L. (rape)
Dipsacaceae
Dipsacus sylvestris Huds. (teasel)
Dipsacus pilosus L. (shepherd's rod)
Elaeagnaceae *Elaeagnus angustifolia* L. (oleaster)
Hippocastanaceae *Aesculus hippocastanum* L. (common horse-chestnut)
Labiatae
Dracocephalum moldavicum L. (Moldavian balm)
Mentha spp. L. (mint)
Ziziphora spp.

Leguminosae
Astragalus spp. L. (milk vetch)
Lotus corniculatus L. (bird's-foot trefoil)
Medicago falcata L. (lucerne)
Melilotus alba Desr. (white sweet clover)
Melilotus officinalis Lam. (yellow sweet clover)
Melilotus altissimus Thuill. (melilot)
Onobrychis viciifolia Scop. (sainfoin)
Trifolium hybridum L. (alsike clover)
Trifolium pratense L. (red clover)
Trifolium repens L. (white clover)

Lythraceae *Lythrum salicaria* L. (purple loosestrife)

Onagraceae
Chamaenerion angustifolium (L.) Scop. (rosebay willowherb, fireweed)

Polygonaceae *Fagopyrum esculentum* Moench (buckwheat)

Umbelliferae *Coriandrum sativum* L. (coriander)

India

India is by no means an undocumented country as far as honey plants are concerned, but the opportunity is taken to draw attention to the carefully compiled "List of important plants suitable for apiculture" that forms Appendix D of draft document AFDC 11 (1017) from the Indian Standards Institution (1971) "Code for conservation and maintenance of honey bees". This list gives the botanical name and family of 35 + 15 herbs, 7 + 19 shrubs, 30 + 59 trees, grouped as cultivated plants (first figure) and wild plants (second figure). The flowering period of all 165 plants is given, and an assessment of their value as sources of nectar and of pollen.

Pakistan

M. and Mme R. Verhagen, who travelled through (Western) Pakistan in 1970 and 1971, report rather similar honey sources to those in Afghanistan.

Compositae *Helianthus* spp. L. (sunflower)

Cruciferae *Brassica* spp. L. (rape etc.)

Leguminosae
Acacia spp. L. (acacia)
Cassia spp. L. (senna)
Robinia pseudoacacia L. (acacia)

Malvaceae *Gossypium* spp. (cotton)

Myrtaceae
Callistemmon spp. R. Br. (bottle-brush)
Eucalyptus spp. (eucalyptus)

Rosaceae
Eriobotrya japonica Lindl. (loquat)
Pyrus/*Prunus* spp. L. (tree fruit)

Rutaceae *Citrus* spp. L. (orange etc.)
also mountain flowers

Conclusion

Information is still lacking for the following countries, some of which may produce little or no honey. Details of any published or unpublished data would be most welcome.

Asia

Bangladesh
Burma
Cambodia
Indonesia
Jordan
Laos
Malaysia
Mongolian Republic
Syria
Thailand
Vietnam

Africa

Central African Republic
Chad
Dahomey
Gabon
Ghana
Guinea
Ivory Coast
Liberia
Mali
Mauritania
Niger
Réunion
Sierra Leone
S.W. Africa
Spanish Sahara
Sudan
Swaziland
Togo
Upper Volta

South and Central America

Bolivia
Colombia
Guiana
Panama
Peru