Beekeeping has been practised in Israel for thousands of years and is frequently mentioned in the Bible. In fact, Israel is known the world over as the “land of milk and honey”. As elsewhere, it all started very simply with the gathering of wild swarms and reaping the fruits of their labour. This brief introduction describes how Israel’s modern, well-developed bee industry evolved from those “primitive” encounters.

Organisation

Today, in Israel there are over 70,000 beehives (Langstroth type) in the hands of some 700 beekeepers. Until quite recently — no more than thirty years ago — bees were raised mainly in large jars and reed baskets. Many of these are still in use in some Arab villages and are very similar to those used in other countries.

The modern Israeli bee was originally bred from selected local stock (Apis mellifera syrica). Over the past 20 years, it was crossed and continuously upgraded with Italian strains imported from U.S. bee breeders. The average Israeli yield varies from 20—30 kg for the smaller beekeepers to 50—60 kg for the large commercial apiaries. Almost 75% of all the honey produced derives from orange blossoms and is of the highest quality; the rest of the honey comes from a wide variety of wild flowers and herbs, thistles, eucalyptus trees, orchids (especially the subtropical varieties) and legumes.

The industry is organised and administered by a number of institutions:

The Department of Beekeeping in the Ministry of Agriculture, together with a small team of instructors of the Agricultural Extension Service, is responsible for the training of beekeepers and helps them solve their problems in the field. They also transmit the latest research information and actively participate in field trials and the development of the breeding stock. This latter activity is conducted at a government breeding station and includes the use of artificial insemination to guarantee the continuous improvement and testing of colonies.
The Veterinary Service, through its bee disease veterinarian, is responsible for the bees health throughout the country, including all matters concerning bee diseases, pests and the related import and export regulations for bees and their products.

The Agricultural faculty of the Hebrew University maintains a Bee Biology Research Center which conducts both basic and applied research and holds courses and seminars for students and professional beekeepers.

The Israeli Beekeepers Association represents the beekeepers in all official and professional matters, supervises the quality and modernisation of all beekeeping equipment and maintains contact with beekeeping organisations around the world.

The Israeli Honey Board supervises the official registration of all beekeepers and the equitable distribution of pastures and crops through a strict and detailed system of assignment of prescribed areas, which are delineated on official maps. The board also supervises all channels of marketing — both private and cooperative — and is responsible for the export of surplus honey.

To coordinate these various activities and determine their financial and research priorities, an official Management Council was established to assist the Beekeeping Department. It is composed of a representative of each of the above-mentioned organisations and departments plus two beekeepers representing the public.

As with other agricultural branches in Israel, beekeeping is conducted within three forms of communal organisation: several dozen kibbutzim (collective villages) and a larger number of moshavim (smallholder villages) and private farms. More than a third of these apiaries are large commercial enterprises with several hundreds to over one thousand colonies, constituting about three-quarters of all the colonies in the country. This is in distinct contrast to most developed countries, where large-scale commercial beekeeping is only a small percentage of the overall bee industry. This basic factor has undoubtedly contributed a great deal towards reaching the high professional standards of modern and partially mechanised bee management, with a very high level of efficiency.

As in most countries with a modern agriculture, Israel's bees have become increasingly indispensable for the pollination of a constantly growing number of crops, e.g. avocado, melons, cucumbers, sunflowers, strawberries, winter vegetables and many seed crops. The contribution of Israel's beekeepers to food production through pollination is of far greater economic importance than the production of honey and other hive products.

2. Modernisation

The transition from wild swarm hunting to modern apiculture did not come about by merely distributing some modern equipment or a
few superior queens; it developed slowly through a long process of “trial and error” field experimentation and patient and repeated training operations. The goal was to translate the old, and not necessarily uneconomic methods into modern, more efficient ones, usually involving some measures of mechanisation. It all took a lot of hard work and dedicated effort on the part of both the professional instructors and researchers and the ever-patient beekeepers. Only after many years of concerted cooperative efforts did the results become convincing enough to develop a countrywide programme and an organisational framework on which to base it. Some of the factors on which this development was based are the following:

**Breeding:** Local strains of bees were small and aggressive with very low yields, but with a high degree of adaptability to adverse conditions and resistance to diseases and pests. The first step was to change their habitat from the jars and reed baskets to modern hives with movable frames so that they could be examined, changed, fed, etc. This vastly increased the opportunity for a steady selection process leading the gentler and more productive strains, which could then be further improved by crossing them with the imported “tested” queens. Eventually, this led to much greater efficiency in handling and, of course, considerably higher yields, but it took a great many years before the difference was felt countrywide.

**Migration:** The modern, movable equipment made it possible to transfer the bees to better seasonal pastures, thereby strengthening the colonies and increasing their production potential still further. In most parts of the world where modern agriculture is practised, with its encroachment on natural bee pastures, some forms of migration of at least a part of the apiary have become an integral part of commercial beekeeping.

**Mechanisation:** The higher yields achieved by breeding and migration enabled the beekeepers to invest in various forms of mechanisation in order to make their work easier and more efficient:
- **Tractors** with trailers, and later, **trucks** were used for transport, instead of camels and donkey-drawn carts;
- **Blowers** of various types were used to facilitate the shaking of the bees from the combs at the extracting time;
- **Handcarts** and, later, truck-installed **cranes and loaders** (hydraulic or electric) moved or lifted the heavy honey supers onto the truck;
- Instead of squeezing the honey from the combs by hand or in wooden presses, honey began to be extracted in manually operated **centrifugal barrels**, later electrified and further improved in **radial or tangential systems**;
- **Uncapping** tools were added, first steam, than electrically heated and, finally, completely automated.

**Sanitation and marketing:** The increased efficiency in management and production in turn made
it possible to intensity the professional supervision of all phases of management, including the prevention and eradication of all bee diseases and pests, especially through periodic examinations and broodnest renewal. The latter encouraged an increased wax production.

Increased production stimulated more intensive marketing methods through cooperative organisation, more attractive packaging and wider advertising. Modern equipment allowed more modern and sanitary storage facilities in open and closed sheds and permitted the periodic disinfection of farms and supers. Comb preservation was made possible through fumigation with ethylene dibromide to prevent the spread of damage caused by the wax moth. The wasp pest was greatly reduced by a novel approach to nest destruction—wasps caught in large numbers in traps were dusted with a mild but persistent contact poison and then released to return home, in turn, poisoning the entire nest.

Seasonal management

The following are a few simple rules for successful beekeeping.

1. Start spring build-up as early as possible by providing adequate space for brood development and food storage; feed only when absolutely necessary and use a queen excluder to balance the population and food potential.

2. Prevent swarming through adequate space provision, ample opportunity for comb building and early removal of artificial swarms in over-strong colonies.

3. Never remove excess honey from the broodnest; on the contrary, check and add if needed.

4. Always provide a nearby source of water.

5. After a main flow, concentrate the colonies in their original hive space as soon as the population size permits. Excess space in late summer and fall makes for weaker colonies due to food waste and inefficient ventilation.

6. Provide sufficient honey (and sugar syrup as needed) in the late fall to last through the winter, and spring and insulate the hives only under severe winter conditions (roof insulation is often quite sufficient).

Pesticide management: The excessive use of pesticides is an increasing threat to the survival of the bee industry throughout the world, particularly to the continuity of pollination services. No overall solution has so far been found and, until the economic necessities of food production force growers and beekeepers to cooperate, none is likely in the near future. Again, some simple principles of management help reduce the damage.

1. Strong, healthy colonies withstand prolonged exposure better than the weak ones.

2. Some systems of protected and unlimited supply of water and pollen increase this ability to resist.

3. Closure of the hives for the first few critical hours (only in the early morning) with a screen or partial closure with a wet burlap "curtain" is helpful only if the
notification system is foulproof and the limited size of the apiary makes the operation practical.

4. The only true protection against damage is the removal of the colonies from the area to be sprayed to a distance of at least 3—4 km, again only practical for small apiaries.

3. Summary

The purpose of the material in this kit is to help in the teaching and promotion of modern beekeeping methods. It can best be used by instructors in their fieldwork and courses, to stimulate the interest of beginners and transmit know-how to more experienced beekeepers.

The kit is based on many years of practical experience and experimentation by Israeli beekeepers and researchers. It presents the basic principles of modern and sanitary management through colour slides and explanatory tests. A future kit will deal with bee biology, bee breeding, seasonal work schedules, pollination and advanced mechanisation.

Israel can serve as a realistic model of development from “natural” to modern beekeeping. This process, the Israeli experience has shown, has to develop slowly enough to include a cooperative mobilisation of all local resources — both the local bee strains and, especially, the local “natural” beekeepers who, as a rule, are the most important source of experience and know-how and later become the most dedicated developers of the programme. If in some small measure, we can share and cooperate with you in this process, you will find us to be a most willing and helpful partner.

The challenge always was and still remains to wrest a few more secrets from this most elusive creature in nature and develop our own, original methods and equipment for taming it, thus taking one additional step forward towards our economic independence.

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