

## BEE-KEEPING

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The scope of this note is limited. Its object is only to introduce the reader to the possibilities of bee-keeping in India and will not, therefore, include what a hand-book on the subject may be expected to contain. Bee-keeping has several advantages over other similar occupations, such as poultry-keeping, gardening, fruit-raising, etc., and in fact is very much easier and almost inexpensive; but yet, the subject is so vast that all about bee-keeping cannot be dealt with in a short note such as this.

In the western countries bee-keeping is pursued not only as a hobby but also as a money-making business. The introduction of modern bee-keeping in the year 1852 marks the commencement of the new era in this industry. Tons of honey are produced every year for local consumption as well as export. Scientific research and practical work among bees have advanced so much in these days that this new industry is being taken up by increasing numbers of people with profit to themselves. Apiaries with several thousands of hives are very common in Europe and America.

Bee-keeping in India is still in the primitive stage. It is under the bright rays of the sun that flowers can secrete that sweet fluid known as *nectar*, which bees gather and elaborate into honey. Ours, being a hot country, can afford to provide more work for bees almost throughout the year than the countries of the west. It is interesting to note that the giant bee of the world (*Apis dorsata*) which gathers the largest quantity of honey is a native of India known as the Indian Rock Bee. From the single comb which it builds in the open air plenty of honey is gathered, 50 to 60 pounds being a very modest estimate. Unfortunately, this type of bee has so far thwarted all human efforts at domesticating it. Introduced into the wilds of Europe over and over again, it successively proved a failure in those regions. The moment any disturbance is caused to a colony of these bees, they chase the intruder several miles to avenge themselves. One or two stings are unbearably painful and many of them fatal. Even if the man dives under water and hides himself no safety is ensured. The bees hover over the surface of the water to victimise him the moment he sticks out his head to breathe. The writer once witnessed the sight of a man chased by a number of these bees. As he ran to dive into the waters of an adjacent river, he picked up a piece of wood and with it plunged into the water. The wood was let go floating on the surface of the water. It moved slowly with the current down the river. The bees mistook it for the man and in numbers attacked and stung it, as it went along. The man under water came out and went home with a hearty laugh.

There are three other kinds of bees in India, whose habits make them cluster and live in colonies. They are the Indian Bee, the Little Bee and the Dammer Bee. The little Bee, like the Rock Bee, is not domesticable,

nor does it give much honey. The Dammer Bee, though domesticable, does not gather honey in any appreciable quantity to justify its being kept for that purpose.

The Indian Bee (*Apis indica*) is the only variety of the honey bees in India, which it is possible to domesticate for honey production. This bee responds well to gentle treatment and seldom stings. The sting is not after all painful. A number of stings received over a short period of time soon makes the human body immune to the poison, so that any more stings cause little pain. In the Y.M.C.A. Rural Centre Apiary it has been possible to extract as much as twenty pounds of honey from every hive in a year. This means Rs. 25 from each hive per annum at Rs. 1-4 a pound. Incidentally, to show what demand there is for pure honey in these parts, it may be said that after the honey flow stops in the end of August, several orders for honey are received and registered with advance payments for early execution in the next honey season.

The Indian Bee can be found to live in colonies almost anywhere. Even in the most unlikely places they are found to thrive. All they want is a dark cavity—in tree, wall, or hedge—to protect their combs from sun, rain and wind, so that brood rearing and honey collection may be safely done, and a pasturage for collection of floral nectar within a radius of 2 or 3 miles from their combs. The population of every colony is made up of one single mother bee, known as the Queen Bee, several hundreds or thousands of what are known as the Worker Bees and (in certain seasons) a few male bees called Drones. They can be easily distinguished by their different sizes and colours. The queen is by far the largest member of the colony, beautiful with golden legs, short wings and copper-coloured abdomen. She is the only fully developed female bee in the colony and therefore she alone can lay eggs for hatching out more bees; the workers are the smallest members with a few dark and brown lines alternating across their backs, active and busy all the time; they are really females, but their sex is undeveloped. The drones are of medium size, thick and black. Lazy in nature and not designed for any work except for the perpetuation of their species, the drones contribute no labour to the economy of a bee colony. For this reason the worker bees kill and throw them out when no longer required in the colony.

The process of hiving a natural colony of these bees is very simple. The bees gathering their combs are gently blown aside with a short bamboo or rubber tube and the combs taken out one by one and tied with any kind of fibre to the frames in the hive. When all the combs have thus been transferred, the hive with combs is gently taken to the place where the bees blown aside still cluster. The smell of their own combs will attract them into the box. They will at once walk in. If they are slow to enter, they can be jerked, or with a soft feather brushed down into the hive. After they have occupied the combs in the box, the hive is located wherever the bee-keeper desires. It is always best to place the hive under shade with its entrance hole towards the east so that the morning sun may direct its rays to the entrance holes to induce the bees to start work early every day. The new colony thus hived will commence work at once, attaching the combs to the frames, clearing the house and throwing out all bits of dust and debris and thus settling down to normal life. Ordinarily, nothing more need be

done for them. They will go on rearing brood and storing honey in the proper seasons. For very good results, however, the bee-keeper has to give some attention to them with a view to helping them in their work. Examination of combs, exclusion of enemies like the lizard, the spider, the ants, the wax-moth, etc., from the hive, prevention of swarming, re-queening, increase of colonies, uniting and dividing them—are some of the most important factors in successful bee-keeping.

Honey need not be squeezed out of the combs. The Centrifugal Honey Extractor, which is easy to make, can be used for taking out honey without destroying the combs, which, when emptied, are returned to the hive for being used again by the bees for storing honey. This is a great help to them as well as to the bee-keeper, for frequent comb-building is hard work to the bees, which do it at the expense of the honey which will be lost to the bee-keeper.

In the case of combless colonies, say a newly captured swarm, the provision of artificial comb foundations, which can be made of pure bees-wax for a nominal making charge of 8 annas a pound will be a great help to the bees and their owner, as the bees quickly draw out the wax of the foundations and finish them into combs fit for their brood rearing and stores. It is reckoned that if the bees were left to produce their own wax for comb-building they have to eat five pounds to seven pounds of honey to produce one pound of wax. The advantage, then, of using the artificial comb foundations is clear.

The hive and frames may be made of any cheap wood and do not cost more than five rupees. If properly protected from the sun and rain, the hive ought to last a life-time. The bees will repay the investment more than five or six times within the first year, if conditions are not below normal. Apart from such appliances as have already been mentioned in this note, no other need be employed in this country where the climate is all in our favour.

Pieces of unserviceable combs and cappings may be easily converted into wax and rendered into foundation, or, if obtained in large quantities, sold. Wax is used in several industries such as polishing and varnishing wood, electro-typing, the manufacture of boot polishes, harness oil and lubricants. Some churches prefer to use bees-wax candles to any other.

As was said at the very commencement, this note has been written with the single object of creating some interest in the art of bee-keeping. To know all about the art, however, the reader will do well to read some very good books on the subject. To begin with, *Bee-keeping* by C. C. Ghosh, published by the Imperial Agricultural Institute, Pusa, Bihar, as its Entomological Bulletin No. 46, should be studied. It is about the best book for bee-keepers in India. Anybody desiring to undergo practical training in any apiary may apply to the Secretary, Y.M.C.A., Rural Reconstruction Centre, Ramanathapuram, Coimbatore.



## STUDIES IN THE COST OF PRODUCTION OF CROPS

### Paddy.

By P. L. NARASIMHAM,

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*Village* :—Kondalagraharam.      *Name of ryot* :—Gavireddi Tatayya.

*Taluk* :—Golugonda.              *Area* :—3.00 acres.

*District* :—Vizagapatam.        *Year* :—1930-31.

The soil on which the crop was cultivated is a light reddish loam, which permits of dry ploughing. Hence the ryot cultivates Ragi or Ooda in the *punasa* season (May to August), paddy in the main crop season (August-December), and gingelly, ragi, or onions in the *paira* season (January to April). Sugarcane is rotated with the above crops once in three or four years.

The land is supplied with water from the Varaha river through permanent channels, and there is also a good well to supply water to the garden crops in summer.

Most of the field operations are generally pushed through without the assistance of hired labour, except in the busy seasons of transplantation and harvest. The wages then paid to a man are As. 4/- and to a woman As. 2/- a day. The hire for a pair of cattle was As. 8/- per day.

Season.	Name of operation.	Men.	Women.	Cattle (pairs).	Estimated amount.	Actuals paid.	Remarks.
1930	Seedbed (30 cents)—				Rs. A. P.	Rs. A. P.	
Apl.-June	Ploughing six times ...	6	...	6	4 8 0	...	Own labour.
May	Cost of 3 cartloads of manure ...	...	...	...	3 0 0	...	Own.
	Carting, spreading, etc.	1	1	1	0 14 0	...	Own labour.
	Cost of seed 60 <i>kunchams</i> (300 lbs.) @ 4 <i>kunchams</i> per rupee ...	...	...	...	15 0 0	15 0 0	Purchased.
June	Sowing and covering seed ...	2	...	2	1 8 0	...	Own labour.
July-August	Lifting seedlings ...	12	...	...	3 0 0	1 8 0	6 men engaged.
	Total ...	21	1	9	27 14 0	16 8 0	

Season.	Name of operation.	Men.	Women.	Cattle (pairs).	Estimated amount.	Actuals paid.	Remarks.
	Transplanted area (3.00 acres)—				Rs. A. P.	Rs. A. P.	
July-August	Puddling three times and levelling ...	27	...	27	20 4 0	...	...
August	Trimming bunds, etc....	6	...	...	1 8 0	1 8 0	Hired labour.
"	Transplantation ...	...	60	...	7 8 0	6 6 0	51 women engaged.
September	Weeding ...	12	...	9	4 2 0	...	Own labour.
December	Harvesting ...	8	40	...	7 0 0	4 4 0	Labour partly engaged.
December	Stacking ...	5	3	...	1 10 0	...	...
1931 January	Threshing, winnowing, etc....	24	9	18	13 14 0	2 4 0	Labour partly engaged. Cattle pairs at As. 6 per pair for threshing and As. 8 for ploughing.
	Grand total ...	103	113	63	83 12 0	30 14 0	
	Cost per acre ...			34½	37½	21	Estimate 27 14 8
	Add land-tax Rs. 15/- per acre ...			...	...	...	Actuals 10 4 8
							15 0 0
					Total ...		42 14 8
	Yields 36 bags of paddy (164 lbs. each) at Rs. 4-8-0 per bag...						162 0 0
	6 carts of straw at Rs. 4/- per cart ...						24 0 0
					Total ...		186 0 0
	Value of yield per acre ...						62 0 0
	Net profit per acre ...						19 1 4
							36 11 4

### KOYYATHOTAKURA (AMARANTHUS SP.) AS GREEN FODDER

By G. JOGI RAJU, DIP. AGRI.

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This species of *Amaranthus* is cultivated in many places on a small scale for human consumption. But it is noteworthy that in some villages of the Vizagapatam District, it is raised solely as a fodder crop. A short account of its cultivation at Denkada may interest readers of this journal.

2. Rich high level garden lands are selected for this crop. *Pati* soil is also admirably suited to this. The crop is often raised year after year in the same plot, occupying it from January to August-September. Sometimes it is alternated with other garden crops or ragi nurseries. The land is ploughed well and does not generally receive any manure, as, being near the village, it gets enriched by night soil and pig droppings; but if