

PP
F14

TO WHOM IT MAY CONCERN.

We have today received notice of plans to introduce *Apis mellifera* honeybees to the Malnad areas in South India (Karnataka) and have been requested to give our opinion on the matter.

Three major and a number of minor reasons argue strongly against this scheme. The three major points alone, as enumerated below, works decisively against the project.

1) The various honeybee diseases of European bees have hitherto not been seen in India. These diseases are of viral, fungal, bacterial and parasitic nature. The European honeybee have developed some resistance to most of them which is understood by the fact, that only part of a local population of bees develop symptoms, when a disease is introduced. Thus, it may be considered virtually impossible to introduce *A. mellifera* to India without bringing at least a minute portion of infestation along with the bees, since *A. m.* may be carriers and most probably are of various organisms of which they show no symptoms. No areas of the world is known to be completely free of all honeybee disease agents. As such, no "safe" bees can be obtained for the introduction.

Experience with *Apis cerana*, partly from North India, where sackbrood disease has ravaged the population of bees, and partly from experimental colonies introduced to Europa for research purposes, has clearly shown that *A. cerana* has no resistance whatsoever against *Apis mellifera* born diseases.

2) The accidental introduction of the parasitic bee-mite *Varroa jacobsoni* into Europe has disclosed, that the European honeybee, whatever subspecies, has no natural resistance to the mite. Colonies in the hundred of thousands have died in Europe and no efficient and agreeable remedy has hitherto been developed, to combat the parasite. Chemical treatments are difficult to manage, expensive and tend to contaminate honey and wax even when they are applied very accurately. The loss to European beekeepers and pollination-dependent growers is incalculable.

Three species-dependent bee mites are found in India: *Varroa jacobsoni*, adapted to *Apis cerana*. *Tropilaelaps clarea*, adapted to *Apis dorsata* and *Euvarroa sinhai*, adapted to *Apis florea*. Those three species of *Apis* all have mechanisms of resistance to their specific mites and can live peacefully without serious harm to the host. But all three kinds of mites thrive on *Apis mellifera* and are each able to kill the host colony in 2-5 years.

3) Research has shown, that the various species of honeybees indigenous to India have the same mating pheromone as *Apis mellifera*. They have solved the problem of inter specific matings (causing death to the embryos) by developing different timing of the day for their mating flights. But in contrast to the three Indian species, *Apis mellifera* may perform mating flights both queens and drones at any time of the day between dawn and dusk. Inter-specific matings will therefore occur very frequently, causing death to colonies of all four species.

In this context it is obvious, that no breeding schemes for queens of *Apis mellifera* can be undertaken, since there are no honeybee free areas in India, where pure matings can be performed. The consequence is therefore, that queens must be continuously imported from outside India, with the constant threat of introducing new diseases. At the same time, the population of the four *Apis* species will slowly dwindle and perhaps die out, with all the ecological consequences following, i.e. disappearance of wild flora, lack of crop pollination etc. - not to mention the loss to beekeepers.

It should be emphasized, that no one to this day have been able to devise a way in which the three facts given above can be bypassed. On the other hand, there seems to be no way by which one may hope to stop the process, once it has been started, i.e. *Apis mellifera* has been introduced.

Further information on this subject should be sought from:

Prof. L. R. Verma, Dept. of biology, University of Himachal Pradesh, Simla, H.P.

Prof. Mishra, Entomology, Agricultural University of Haryana, Hisar

Prof. F. Ruttner, A 3293, Lunz am See, Austria

Prof. N. Koeniger, Institute für Bienenkunde, Oberursel, Germany.

Prof. Jerzy Woyke, University of Warsaw, Poland

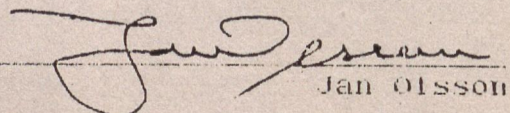
and other workers who have studied both *A. cerana* and *Apis mellifera* in the field.

The above statement is given by Beemaster Jan Olsson, Research Orchard "Edelgave," 2765 Smorum, Denmark, who has worked in Coorg on management of *Apis cerana* in 1980-1985 and whose paper on the subject was presented on the 4th International Congress of Tropical Beekeeping in Cairo, 1988. A leaflet based on this paper was published in 1990 by IBRA (Leaflet 4, 1990). He is considered an authority on management of *Apis mellifera* in Scandinavia. He is chairman of the Danish Queenbreeders Association of 1921.

Any party wishing to obtain further elaboration on the subject from Mr. Olsson are welcome to address their enquiry to the above mentioned address of Mr. Olsson.

It would furthermore be advisable to contact Mr. A.S. Chengappa, Honey valley Apiary, 571212 Yavakapadi, Coorg. Mr. Chengappa is probably one of the single largest, private honeyproducers in South-east Asia, topping around 6,000 kgs. of honey per year in his apiary.

Copenhagen, February 23, 1991


Jan Olsson

COPY NO. 2/10 TO: _____

PKL
FM

PRELIMINARY REPORT

ON

A NEW HONEYBEE DISEASE IN SOUTH INDIA

March 15, 1992

A Honeybee disease is spreading in south India. To our best knowledge this is the first time disease of honeybees has been reported in south India. The disease is virulent and threatens to wipe out beekeeping in Kerala, Karnataka and Tamil Nadu, perhaps spreading further.

The impact on the environment, pollination of crops and production of honey is at present incalculable, but is undoubtedly very serious. This disease appear to be so virulent that 98% of the *Apis cerana* bee colonies in south India may die within the next couple of years. We may very well come to witness the same tragedy which has taken place in the Himalaya region for the last 2 decades, where virtually all beekeeping with *apis cerana* (the indian bee) has been wiped out due to Thai sacbrood Virus.

Research on management of *apis cerana* in North India has either not taken place, (the honeybee researchers tending to be infatuated with *apis mellifera* (the european bee) or has been unsuccessful, whereas *apis mellifera* has received much attention and seem to be able to live in certain areas of the north, and even be doing fairly well in the plains of Punjab. There has been many reports on the performance of *apis mellifera* in the North, but they tend to be biased, un verified or contradictory. Whatever being the cause, beekeeping with *apis cerana* in the north is practically at a standstill and may not be revived.

The situation is quite reverse in south India. Beekeeping with

apis cerana has taken place in a widespread and regular manner for many years. But a regular, large scale industry like the one that has been created in China during the last four decades. was not seen. This was owing to negligence on the part of science to take interest in the subject, as well as lack of support by the government. Thus, beekeeping has remained a widespread, but small scale village industry.

The reason for the lack of development of the tremendous potential for large scale beekeeping in South India, particularly the Western Ghats, Nilgiris, Palni Hills, Annamalai etc. is, that there has been some management problems which nobody has made an honest attempt to overcome. These problems all led to the same result. The bees absconded, and the beekeeper found himself without bees. Our work since 1980 has found a solution to these problems and new management practises has been introduced. These include the maintainance of strong colonies, annual removal of old brood comb, supplying sugar syrup to ensure the bees have adequate provisions throughout the year. By applying these new methods, the beekeepers find themselves very successful with their work, and hundreds of rural poor have taken up large-scale beekeeping. They obtain average yields of 20 kgs. per colony, persistently year after year, producing several tonnes of honey in each apiary. The largest of them (the apiary where we conducted our experiments) is Honey Valley Apiary in Coorg. He produced 6.000 kg in 1991 from 300 colonies. Some of these colonies yield over 40 kg. Asfar as we know, he is now the single largest honey producer in India.

A controversy concerning the introduction of apis mellifera to south India came to our notice in may, 1991, when worried

beekeepers and environmentalist wrote letters expressing concern, that disease could be introduced to the disease free South along with beecolonies brought from the North. We replied by way of warning against such an experiment and pointed out, that *apis cerana* was already successful in the south, that *apis mellifera* was unlikely to succeed in that climate and that there was a danger of introducing diseases. Professor Ruttner, Austria, Professor Woyke, Poland, Dr. Nicola Bradbear, IBRA, (UK), Dr. M.C. Suryanarayana, CBRI (Pune), Beemaster Jan Olsson, Denmark and other experts on tropical beekeeping all agreed on this. However 10 colonies were brought from North India to Bangalore Agricultural University, of which 7 quickly died. There was a lot of hubbub, and Jan Olsson decided to look into the matter personally (on invitation by the university). After a tour to Bhutan in October (where, by the way, beekeeping has been established very successfully with *apis mellifera*) he went to South India in November and in January the colonies on the campus were thoroughly examined. By way of dividing the colonies, the number had again been increased to 10. (We have been told, that the 7 colonies had died for lack of food). Jan Olsson, (who hold a disease in the 10 colonies. Comb samples and samples of bees were collected and send to the Danish government laboratory for final examination. The laboratory found the bees free from AFB and EFB disease, and free from the parasites Nosema and Acarine. From this we conclude, that no disease has been introduced via the university in Bangalore.

The New disease

During a survey of beeraces (*apis cerana*) in Malnad, in company with the Beekeeping Development Officer Mr. K.M. Joyappa, Madikeri,

Kodagu, in January 1992, Jan Olsson came across beecolonies with apparent symptoms of European Foulbrood (EFB). He found the discovery dismaying, and assuming that the disease was EFB, and that we had caught it at a very early stage of the epidemic, decided to take immediate action to stop the disease before it became widespread. In company with Mr. Joyappa, he went to Bangalore, met some govt. people who promised financial support for combating the disease, obtained an antibiotic (TM 50) to medicate the colonies, and went back to Sulya Taluk, where the disease was discovered. Before all this, 2 comb samples from the first inspected colonies were send to Denmark.

Hereafter, apiaries were visited to establish the extend of the spreading of the disease. About 300 colonies in the locality was lost by then. The beekeeping dev. staff was gathered, instructed and sent out to all the remote areas. The Coop. honey societies were mustered, seminars with hundreds of beekeepers were held and by and large, unexpectedly fast and efficient action was taken. Diseased comb was eat away and burnt, dry feeding of TM50 (= 1:10 TM50 mixed with powdered sugar) was applied. Everything went smoothly according to strategy, and we expected success in our effort to control the epidemic.

Then we got a telegram from Denmark. It confirmed, that the symptoms were typically EFB, but that the disease was in fact NOT EFB. They couldn't say what it was, and suggested it could be a virus. Other samples were sent to CBRI in Pune. They were also unable to diagnose the disease.

The Symptoms

It lies close at hand to suggest, that the disease could be the well known sacbrood disease, which wiped out beekeeping in the Himalayas. That disease is caused by a virus, and there is no treatment against it. But it doesn't appear so. The symptoms are different: * The disease works at lightning speed. Within 10-12 days after infection, brood mortality approaches 100%.

- * The larvae die in the third, fourth and fifth moult. Those who make it to prepupae, survive.
- * There is no discoloration of the dead larvae for many days. They remain pearly white, turning to a light yellow as they begin to dry up.
- * The diseased larvae stretch and twist in the cells, as with EFB and finally collapse flatly on the lower cellwall.
- * There is no sack formation, as in sackbrood, and the head is not raised and discolored.
- * There is no smell.
- * The final mystery: A distinct, very characteristic black spot, $\frac{1}{2}$ - 1 mm, appears on the anterior end of the larvae. Until we know exactly what it is, we have chosen to call it BLACK SPOT DISEASE.

The Spreading

The bees abscond very soon from the dead brood, and after migrating to another area, try to establish a new nest. We have tried to cut away all combs from diseased colonies, transfer the bees to a clean box and feed sugar and TM. The disease reappear instantly. From this experiment we assume, that the disease spread with the bees to new localities when they abscond and try to establish

a new nest. It is not yet known, whether the disease affect *apis dorsata*, *apis florea* and *apis mellifera*, (the other 3 species of honeybees). This is being investigated by the govt. staff (according to plan). Inquiries among many beekeepers in the affected areas indicate, that they started losing colonies in November, 1991. They assumed it was due to normal incidents of absconding. This may be so, so we cannot precisely establish, when the disease first appeared, and whence it has come. The last reports (march 10, 1992) talk of estimates of 5-10.000 lost colonies in Kerala, "several thousand" in Dakshina Kannada and a spreading into Tamil Nadu. In one location, which Jan Olsson personally visited on February 2nd, and found disease free, 1.500 colonies were lost during the month of February. Hence, we must conclude, that the disease spread with unprecedented speed. The mortality of colonies in the affected areas is over 90%.

Short term aspects

Considering the speed, by which this disease spread, and the very high mortality, we must expect the disease will strike everywhere within a short time (less than a year). Thus, no beekeeper may escape. It is a very pathetic tragedy to these poor people, and we suggest that they are given some compensation and help (f.i. stalling the repayment of loans). Furthermore, those very few colonies that remain unaffected in disease areas, must be protected at all cost, as they would seem to be resistant and could constitute the stock from which a new, resistant strain could be bred, to repopulate the diseased apiaries.

Long Term Aspects

Nature has a way of inflicting disease on living creatures, but she never wipes them out completely in that way. Few individuals survive due to freak resistance. Because of lowered competition, they have excellent surviving conditions and soon multiply again into a new, resistant stock. There are so many cases where this has happened, and the time gap in-between the wiping out of the old population and till a new is established and has reached the old multitude, depends on many factors. In the case of honeybees, we theorize that it will take 20-50 years.

What can be done to shorten this time span?

We suggest the following plan of action:

- * Surviving colonies from disease-affected areas must be found and their queens must be preserved at all costs.
- * A breeding, testing and selection programme must be initiated and carried out.
- * When testing and selection is over, a large number of breeder queens with controlled mating must be produced and distributed
- * Large nurseries must be established with these breeder queens, and thousands of nucleus colonies, headed by queens of resistant stock, must be produced and distributed.

We have never heard of anyone, who has developed a large-scale, reliable and cheap method of queenrearing with *apis cerana*, much less regular, systematic breeding work. This is obviously needed in any case of husbandry. This year, Jan Olsson finally succeeded in devising such a system, and it may come in very useful in this context of disease. One problem is, however, that Jan Olsson have

been working all these years on his own time and expense, without any support-the work was his hobby, done in his spare time during winter in Denmark. If his services are to be obtained fast and for the necessary period, it will be necessary to employ him by way of a foreign development agency DANIDA, f. instance. This would be of great help, as he is competent, well versed with the bees and their management, accustomed to South Indian people and conditions and independent. However, in any case He intends to keep coming in the winter and give his advice and support, only the amount of help he can extend in this way will be limited severely by time and financial factors.

The next step, now, is to distribute samples of diseased comb to various bee laboratories, who have the capacity and expertise to diagnose the disease. This will be done shortly, and a report will be prepared on the findings of these laboratories along with their suggestions.

Beemaster Jan Olsson
Frederiksvej 52/2
DK 2000 Frederiksberg
DENMARK