

## FEEDING AND MAINTENANCE OF DRONES

There are difficulties with keeping the drones in the colony late in the season. They can be kept in colonies without queens. But when a queen cell is overlooked and a queen emerges, the drones are lost within a short period of time. We have lost in this way many haploid as well as diploid drones. At first we confined the drones for artificial insemination and other studies in the cages of Laidlaw. Later, on a comb with honey and young brood where many nurse bees were present. It seemed that better care of the drones has been taken here. When a queen emerges the drones on the comb survive a little longer than those in the cages, although the workers behave in the same way to both. Thus, what is the role of the worker bees and the food in the comb on the survival of the drones? Some authors like Perepelova /1928/ believe, that the drones can not feed themselves from the comb.

### Material and methods

Drones confined in colonies on combs with brood and food were observed at first. The combs with drones were placed in plastic queen excluder isolators. Two isolators with 500 drones in each were placed the 20th of July into two different colonies. In both colonies young queens were present, but in the first one the queen was confined together with the drones, and in the second she was free and could mate.

Then 70 diploid drones were observed in a colony where they were confined for about one month. In the meantime a queen emerged, mated and about the 20th of July started to lay eggs.

To know the phenomenon better, special investigation was undertaken in controlled conditions.

In August and September per about 50 living drones /once 104/ were caught on the entrances of queenless colonies, or of those headed by laying workers. First group /A/ was placed on a comb without food and without worker bees. Second group /B/ was placed on drone comb filled with honey and without worker bees. And the third one /C/ - on drone combs filled with honey but here also worker bees were introduced into this isolator. All the isolators were placed in an incubator with temperature of 34° C. Number of dead drones was noted each day.

### Results

All 500 drones were alive the fourth day after being confined at the end of July on a comb, together with a virgin queen. On the other hand all 500 drones were dead within four days after being placed at the same time into a colony where the young queen just started to lay eggs.

Out of 70 diploid drones confined on a comb for 1 month all of them were alive the 22nd of July. In the meantime a virgin queen emerged, mated and started to lay eggs. The 25th July all the drones were dead.

Thus the drones supplied with plenty of food died in a colony within few days, when the workers stopped to take care of them.

The question of the role of food and care of worker bees in the life of drones could be solved in the experiment with drones placed in an incubator.

Fig. 9 A shows, that most of the drones put on comb without food died on the first day. Till the next day survived only 15,5 % of drones. On the third day after confinement all the drones were dead.

Observations made many times on drones confined on combs with food but without workers /B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>/showed, that the drones feed themselves with honey from the cells. Up to the second day more than 80 % and in one case even 95,5 % survived till the third day after confinement. This means that the drones can feed themselves unaided from the comb and so prolong their life.

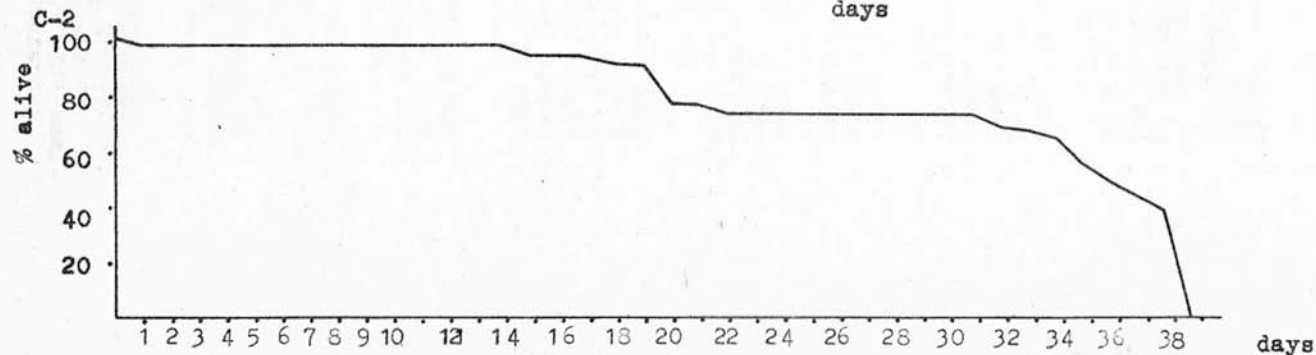
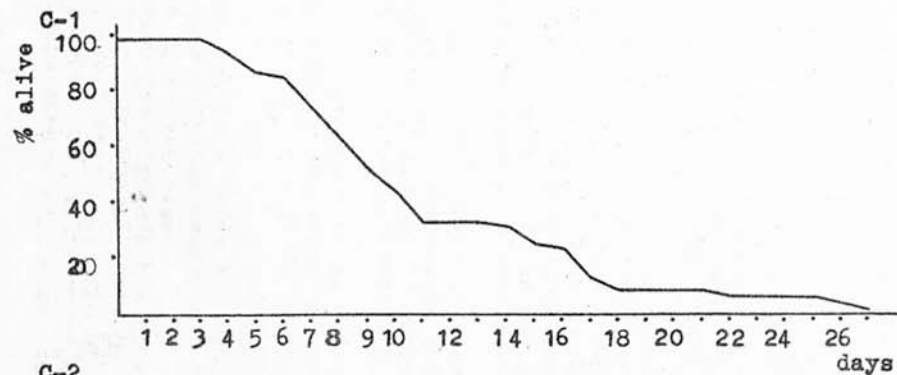
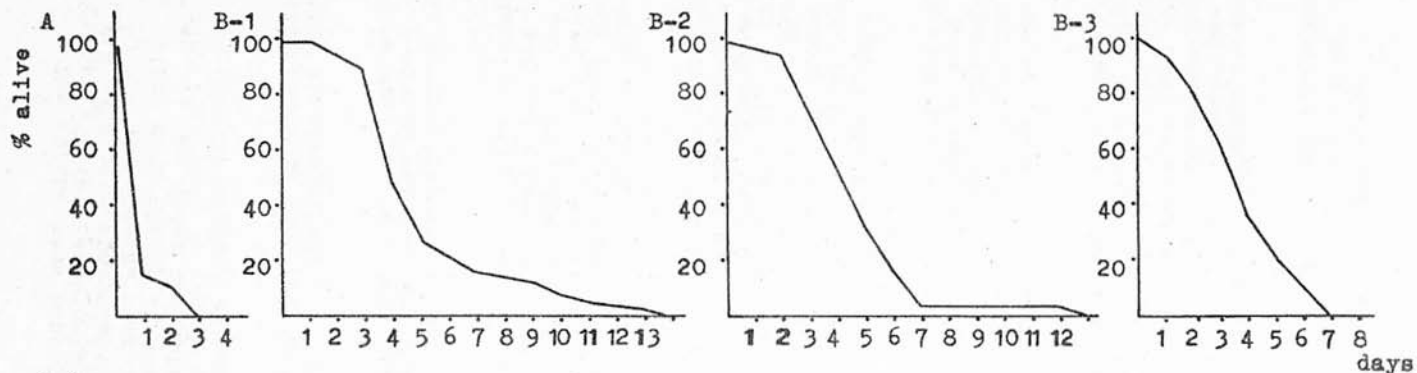
But beginning from the second or third day the drones die each day in high percentage. The higher loss occurred on the 4th day - 21,2 to 45,5 %. To the 7th day survived from 0 up to 16,5 %. So practically, most of the drones or even all of them died to the end of the first week. But in some cases few drones survived almost to the end of the second week. So drones having plenty of food but without worker bees die practically within 4 to 7 days. They can feed themselves but the honey alone prolongs their life only for a few days.

Fig. C<sub>1</sub> and C<sub>2</sub> shows, that the company of worker bees prolonged the life of the drones very much. More than 90 % of drones survived in one case up to the 4th day and in the other case even up to the 19th day. In the first case C<sub>1</sub> more than 30 % drones survived till the end of the second week and the last drone died on the 27th day.

In the second case C<sub>2</sub> even one month after confinement 75 % of drones were still alive and the 38th day still 40,4 %. The differences in the two cases are great. In the first case C<sub>1</sub> the isolator was supplied additionally with water from the 15th day and in the second case C<sub>2</sub> from the beginning. But the water can not be the only factor of better results, because addition of water in the first case did not improve the living conditions.

Many other factors can be responsible for that difference. Nevertheless, it is very well visible, that the company of worker bees prolonged the life of the drones very much.

The worker bees supply the drones with some substance /probably with royal jelly/ necessary for their life. The energetic food of carbohydrates can prolong the life of drones only for a few days. Thus it is now clear, that the drones in a colony with plenty of stores die within a few days, when they are not under the care of worker bees.



**FIG 9** Influence of Confinement Conditions on the Survival Rate of Adult Drones  
 A - on Comb Without Food and Bees  
 B-1, B-2, B-3 - on Comb With Honey, Without Bees  
 C-1, C-2 - on Comb With Honey and Bees

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BIOLOGY OF REPRODUCTION AS A BASIS FOR  
PRODUCTION OF NEW VARIETIES OF HONEYBEES

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