Survival of honey bees during winter in colonies infested by Varroa destructor

Lonne Gerritsen
lonne.gerritsen@wur.nl

Introduction
When honey bee brood is infested by Varroa destructor mites the bees have a shorter lifespan. Especially for winter bees this is of great importance. To ensure healthy winter bees Varroa has to be controlled before winter bees are produced.

The objective of this research is to determine when most winter bees are produced in the Netherlands and to what extend different periods of Varroa control in autumn affects survival of winter bees.

Methods
In 2005 between August 10 and November 2 every two weeks freshly hatched grey bees were marked and the sealed brood area was measured. From this the amount of bees hatching in this period was estimated. The survival of the marked bees was counted every two weeks till November 2 and after winter on April 19. Mite fall was counted every week.

The differences between the treatments (mite infection pressure in July and date of Varroa treatment) is shown in Table 1. Each treatment contained 6 colonies. All colonies were treated with oxalic acid in December.

<table>
<thead>
<tr>
<th>Treatment number</th>
<th>Mite date</th>
<th>Thymomar treatment (3 weeks)</th>
<th>Survival of colonies</th>
<th>Mean # of winter bees per colony</th>
<th>Mean # of colony on April 19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>NO</td>
<td>100</td>
<td>1814</td>
<td>7200</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>Aug 10-Sep 5</td>
<td>100</td>
<td>1279</td>
<td>6300</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>Sept 8-Sep 30</td>
<td>100</td>
<td>1269</td>
<td>5800</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>NO</td>
<td>33</td>
<td>369</td>
<td>4000</td>
</tr>
</tbody>
</table>

Results
The winter 2005/2006 was not representative for Dutch winters. Autumn was very warm, till end of October and spring was very cold, till April. The first major cleansing flight was seen on March 20 when temperature was above 12°C for the first time that year. Therefore, the experiment will be repeated next winter. Results are shown in table 1 and figures 1 to 3.

Conclusions
- In healthy colonies most winter bees surviving till spring are produced between half September till half October, in Varroa infected colonies this is later.
- When colonies are infested with Varroa mites till late in autumn (treatment 3 and 4) they produce a higher amount of brood for a longer period (fig 2).
- Only few bees hatching from infested colonies survive winter, resulting in a low amount of bees in spring and colony loss of 67% of the colonies that had no Varroa control (table 1, fig 3)
- It is clear that only after the Varroa population is diminished the colonies produce bees that survive well over winter.
- In treatment 2 and 3 more bees survive from the second cohort than from the first cohort after the Varroa population is diminished. This might be due to the fact that the bees nursing the young bees are still suffering from the effect of Varroa infestation.