Actual situation of American Foulbrood in Chile, according the Project Fondo SAG N° 24 and projections

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In Chile, Servicio Agrícola y Ganadero (SAG) is the official government institution, in charge of support the agriculture, woods and ranching’s development, by means of the protection and improvement of the animals and vegetable’s health.
SAG’s vigilance.

Passive epidemiological vigilance system
- Attending of notices about possibles diseases that could damage to honey bees
- Confiscations done in frontier points
- Information obtained from veterinarian diagnosis labs of privates, the universities and the state of Chile.
SAG’s vigilance.

Active epidemiological vigilance program.
- Located samplings in high risks’ areas. It’s done focused in detection of agents which cause exotics and obligatory notice’s diseases.

Besides, they execute **Sanitary Programs Under Official Control** for European Foulbrood (*Mellisococcus plutonius*) and American Foulbrood (*P. larvae larvae*).
Honey bee’s diseases in Chile

<table>
<thead>
<tr>
<th>Endemic diseases</th>
<th>Disease’s name</th>
<th>Pathogenic or parasitic</th>
<th>Present in Chile since</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nosemosis</td>
<td>Nosema apis</td>
<td>1978</td>
<td></td>
</tr>
<tr>
<td>Varroosis *</td>
<td>Varroa destructor</td>
<td>1992</td>
<td></td>
</tr>
<tr>
<td>Chalkbrood</td>
<td>Ascosphaera apis</td>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>Acarapisosis *</td>
<td>Acarapis woodi</td>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>American Foulbrood*</td>
<td>Paenibacillus larvae larvae</td>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>European Foulbrood*</td>
<td>Melisococcus plutonius</td>
<td>2009</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exotic diseases</th>
<th>Disease’s name</th>
<th>Pathogenic or parasitic</th>
<th>Present in Chile since</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small bee beetle*</td>
<td>Aethina tumida</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tropilaelaps infestation*</td>
<td>Tropilaelaps clareae</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Historic situation of American Foulbrood in Chile

- **2001:** First official SAG report about the disease’s presence: Atacama, O’Higgins y Los Lagos’ regions.
- **2005:** Second report about the disease’s presence: Valparaíso and Maule’s regions.
- **2006:** Third report about American Foulbrood’s presence: Metropolitana, O’Higgins and Los Lagos’ regions.
Nowadays, the government have defined monetary resources with public postulation that allows to universities and other research centers make actions support the chilean beekeeping.
V Postulation of the SAG’s Fund of Improvement of the Sanitary Patrimony.

“Medidas estratégicas que contribuyan al fortalecimiento de la vigilancia, diagnóstico y control de lo que americana en Apis mellifera” (“Strategic actions to make vigilance, diagnosis, and control for American Foulbrood disease in Apis mellifera”) (2008 – 2012), project developed by the Equipo Apícola of the Universidad Austral de Chile.
General goal

Implementation of strategical actions to improve the vigilance, diagnosis and control of American Foulbrood.

Specific goals

1.- Make an initial diagnosis about the American Foulbrood situation in Chile.
2.- Monitoring the honey bee’s health in risks’ zones of the diseases’ presence.
3.- Establishment of alert's system for potential or effective areas to the diseases’ presence.
Project’s area of influence

Territory among Antofagasta and Aysén del General Carlos Ibáñez del Campo regions.

21° 40’ L. S.

46° 33’ L. S.
Specific goal Nº 1. Make an initial diagnosis about the American Foulbrood situation in Chile in the Honey’s Bank of the Universidad Austral de Chile (UACH).

The UACH Honey’s Bank started in 2004 with the first sampling, done in whole Chile, with monetary resources of the Fondo SAG Nº 64 project.

It’s material has been obtained directly from the beekeepers, who always have allowed to visit their apiaries and let us get study’s material.
Honey’s Bank UACH

<table>
<thead>
<tr>
<th>Year</th>
<th>Nº of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>114</td>
</tr>
<tr>
<td>2005</td>
<td>181</td>
</tr>
<tr>
<td>2006</td>
<td>301</td>
</tr>
<tr>
<td>2007</td>
<td>344</td>
</tr>
<tr>
<td>2008</td>
<td>241</td>
</tr>
<tr>
<td>2009</td>
<td>137</td>
</tr>
<tr>
<td>Total</td>
<td>1.318</td>
</tr>
</tbody>
</table>
Characteristics oh the Honey´s Bank UACH.

-Every sample is geo located.

-It has productive and sanitary information and other dates related to the management’s action of the apiary.

-It has and complete profile about physical, chemical and melisopalinological parameters of the honey; analysis of residues of organochlorinated and organophosphorated pesticides, sulfamides, tetracyclinas y pyrethroids.
Storage’s condition of samples of the Honey’s Bank UACH
Specific goal Nº 1. Make an initial diagnosis about the American Foulbrood situation in Chile.

In the Laboratory of Phytochemistry of the Universidad Austral de Chile, have been implemented the diagnosis’ techniques to American Foulbrood, based in the protocols defined by the World Organization for Animal Health (OIE) and made official in Chile by SAG.
Identification of the agent by means of cultivation techniques.
Simple confirmation tests.

- **Gramm test** – Positive (microscopy).

- **Test of nitrates’ reduction** – Positive (biochemical)

- **Catalase test** – Negative (biochemical).
Identification by means of Polimerase Chain Reaction (PCR).
Specific goal N° 1. Make an initial diagnosis about the American Foulbrood situation in Chile. Results.

- Is confirmed the presence of the bacteria that originates the disease in the analyzed honeys. The hives which the honey were taken from didn't present clinical signs.

<table>
<thead>
<tr>
<th>Nº of analyzed samples</th>
<th>Nº of samples that resulted positive to the presence of <em>P. larvae</em> spores</th>
<th>Positive samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,318</td>
<td>48</td>
<td>3,64</td>
</tr>
</tbody>
</table>

- SAG’s results were confirmed, because were found viable spores in the areas where existed official reports.
Actions in process
Specific goal Nº 2. Monitoring the honey bee’s health in risks’ zones of the diseases’ presence.

- Together with the beekeepers, making monitoring's actions in the hives, looking for clinical signs of the disease.
Specific goal Nº 2. Monitoring the honey bee’s health in risks’ zones of the diseases’ presence.

- Relating presence of spores of American Foulbrood between honey's samples and presence of clinical signs in field.
Specific goal Nº 3. Establishment of alert's system for potential or effective areas to the diseases’ presence.

- Utilization of SIG tools to define risks’ zones of the diseases’ presence.
Specific goal N° 3. Establishment of alert's system for potential or effective areas to the diseases’ presence.

- The information obtained by the project will be given to every beekeeper that gave study’s material and SAG, who will define actions for manages the verified situations.
Project impacts and projections
Importance of knowledge and monitoring's actions related to honey bees diseases’ detection, by SAG and the own beekeepers.

In Chile, the utilization of antibiotics is forbidden, nevertheless, are used with negative effects over the innocuousness of honey and bee wax.

In Chile exists the need to develop norms related to the multiplication of biological material, today are uncompleted and are focused only to the foreign trade.
Acknowledgements.

SAG’s Fund of Improvement of the Sanitary Patrimony

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and specially...
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