A bait and trap method for sampling symphylid populations in pineapple.

P.A. Marie-Alphonsine, P. Fournier, B. Dole, J.C. Govindin, P. Quénéhervé, A. Soler
Symphyllids = main soil-borne parasites for pineapple in many production areas

• Like well aerated and gravelous soils

• Yield loss evaluation
  (yield may be reduced up to 50%)
Symptoms very similar to nematodes

- Plot level = irregular patchwork of wilted plants with heterogeneous growth
Root symptoms

- Symphylids feed on root tips leading to « witches broom » symptoms
Pest management

• Classical: pesticides
  but new regulations tend to eliminate the efficient molecules for environmental problems

• Classical Fallows are inefficient because symphylids are polyphagous parasites

• Looking for Ecologically-based integrated pest management

need for efficient sampling methods
Bait and trap device

how to use it?

• *traps 15 cm into the soil, meaning the whole pot was covered with soil.*

• *The potato bait + soil consisted in the same soil sample but with three calibrated potato slices (diameter: 2.5 cm, thickness: 1.5cm) inside the soil at 1/3 of the height, and covered with soil.*
Set up of the bait and trap system

Different baits

Combining bait and soil sample
Symphylids extraction from soil samples

Manual extraction  Floating extraction
Advantages and drawbacks of the 2 extraction methods

<table>
<thead>
<tr>
<th></th>
<th>Manual extraction</th>
<th>Floating method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symphyllids alive</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Juveniles Number</td>
<td>12,9</td>
<td>7</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>7,1</td>
<td>8,5</td>
</tr>
<tr>
<td>Extraction time</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Adults Number</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
About the sampling

A: grass fallow after bananas; B: pineapples

Numbers of Symphilids trapped

4-14 cm | 16-26cm | 28-38cm | 40-50cm

Depth
Statistical analyses

Statistical methods developed for nematodes have been adapted for symphylids.

The spatial distribution of the populations was evaluated using the “variance/mean” ratios (Ferris, 1984, Perry et al., 2006).

Variance > Mean indicates Symphylid populations distributions follow a negative binomial law which characterizes aggregated populations.
Spatial analyses

- Spatial analyses based on Moran’s and Geary’s indices:

Symphylid populations are highly aggregated and the range area for the development of symphylid populations appeared to be 4 to 6 meters wide.

Full paper: Soler et al., submitted to Pest Management Science
Maps of smoothed abundance data of symphylids

Mucuna pruriens cv utilis

Grass fallow

Map scales in metres
Variations in symphylid populations under MD2 pineapple

Plots included 300 plants on 6 ridges giving 50m² plots. Five traps with bait were placed with a minimum space of 4 m between 2 traps. Simple samplings were made 6 times at different periods of the year for each stage of development of the pineapple plants. Forcing at 12 months and Post harvest at 18 and 24 months.
Evaluation of rotation crops for pineapple

Left: the trap is placed inside the plot with the potato baits. The traps are collected 3 days after and the operation is repeated during several times during the growth of the crop.

Right: partial view of the experimental site with Crotalaria spectabilis in front and Crotalaria juncea behind.
Thank you for your attention