COMBINED USE OF PHOSMET AND NEW CROPPING SYSTEMS TO CONTROL CABBAGE STEM FLEA BEETLES (*Psylliodes chrysocephala*)

March 2015  
March 2016

Luc WESTERLOPPE – Gowan Crop Protection  
EU Technical – Development Manager for Oilseed crops
WG formulation containing 50% of Phosmet
Organophosphate insecticide (IRAC group 1B) acting by contact and ingestion.
CLP classification: Danger – Category 1 - H301, H318, H410
France: 2 applications / season / 7-days interval
CABBAGE STEM FLEA BEETLE
LIFE CYCLE

Adults move to new OSR crops for feeding (Sept-Oct). And lay their eggs on soil at the bottom of the plants (Oct-Nov).

After hatching, larvae climb on plants and colonize the petioles (and stems).

Adult in summer diapause.

From June to July, new adult generation feeds on plants (leaves and pods).

Larvae leave stems to pupate into the soil.
<table>
<thead>
<tr>
<th>Country / year</th>
<th>Origine</th>
<th>% KDR</th>
<th>% Super-KDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK / 2016</td>
<td>Boxworth (Cambridgeshire)</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>UK / 2016</td>
<td>Swaffham Prior (Cambridgeshire)</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>UK / 2017</td>
<td>Elton-on-the-Hill (Nottinghamshire)</td>
<td>76,5</td>
<td>0</td>
</tr>
<tr>
<td>UK / 2017</td>
<td>Bucknell (Oxfordshire)</td>
<td>57,9</td>
<td>0</td>
</tr>
<tr>
<td>UK / 2017</td>
<td>Blo Norton (Suffolk)</td>
<td>73,7</td>
<td>0</td>
</tr>
<tr>
<td>UK / 2017</td>
<td>Devizes (Wiltshire)</td>
<td>26,3</td>
<td>0</td>
</tr>
<tr>
<td>DE / 2017</td>
<td>Kuhlraed (North East)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>DE / 2017</td>
<td>Neschow (North East)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>DE / 2017</td>
<td>Warnkenhagen (North East)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>FR / 2016</td>
<td>Auchy-la -Montagne (60360)</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>FR / 2017</td>
<td>Catillon-Fumechon (60130)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>FR / 2016</td>
<td>Saint Victor (47140)</td>
<td>86</td>
<td>0</td>
</tr>
<tr>
<td>FR /2016</td>
<td>Moulin-en-Tonnerrois (89310)</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>FR / 2016</td>
<td>Nitry (89310)</td>
<td>0</td>
<td>70</td>
</tr>
<tr>
<td>FR / 2017</td>
<td>Foret-Bréault (89310)</td>
<td>13,3</td>
<td>86,7</td>
</tr>
<tr>
<td>FR / 2017</td>
<td>Bonnard (89400)</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>
TRIAL TARGETING ADULTS 2016:
TERRES INOVIA C16LLA47003 - SAINT VICTOR (SOUTH EAST)
KDR : 86% RR +/- METABOLIC (MORTALITY OF 80 TO 100% IN VIAL TESTS)
APPLICATION SEPTEMBER 25TH - BBCH 10-11 / 30% OF ATTACKED PLANTS

Feeding damages 14 DA-A

- UTC: 98% of plants with < 25% of damages, 2% with > 25% damages
- Deltamethrin: 69% of plants with < 25% of damages, 31% with > 25% damages
- Phosmet 500 g/ha: 95% of plants with < 25% of damages
- Phosmet 750 g/ha: 98% of plants with < 25% of damages
UNTREATED Boravi WG 1,5 kg

Photo 25/11

Until Oct 12, insects’ pressure was low, but in Oct 19, yellow traps have shown high population of *Ceutorhynchos picitarsis* (> 20/ trap) and CSFB adults (15/ trap).

As in this area, the risk of pyrethroids’ resistance for *C. picitarsis* is also very high, decision was taken to apply experimental treatments 2 times.

TA : 19/10/2015 *C. picitarsis adults*
TB : 12/11/2015 CSFB larvae (1,5 / plant)

* C. picitarsis larvae (0,8 / plant)
**TRIAL TARGETING LARVAE (2016)**

*BPE16030IGC01 MOULINS-EN-TONNERROIS (BURGUNDY)*

**SUPER Kdr 80% RR + Kdr 5%RR + METABOLIC RESISTANCE**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of CSFB larvae/plant</th>
<th>Yield dT/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORAVI WG 1 kg/ha + Lambda-cyhalothrin 0.05 L/ha</td>
<td>1,0 d</td>
<td>17,8 a</td>
</tr>
<tr>
<td>BORAVI WG 1 kg/ha + UTC</td>
<td>5,5 ab</td>
<td>13,7 b</td>
</tr>
<tr>
<td>BORAVI WG 1 kg/ha + Sticman</td>
<td>6,2 a</td>
<td>10,5 c</td>
</tr>
<tr>
<td>BORAVI WG 1 kg/ha + Actirob-B</td>
<td>1,6 cd</td>
<td>19,7 a</td>
</tr>
<tr>
<td>BORAVI WG 1.5 kg/ha + CHLP-E + Cyperm. 0.5 L/ha</td>
<td>1,9 cd</td>
<td>17,3 a</td>
</tr>
<tr>
<td>BORAVI WG 1 kg/ha + Silwett L77</td>
<td>2,0 cd</td>
<td>17,0 a</td>
</tr>
</tbody>
</table>

Répétition 4/4
Based on trial’s results, there is a strong temptation to apply Boravi WG against both adults and larvae in some area.

<table>
<thead>
<tr>
<th>CSFB resistance status</th>
<th>CSFB adults</th>
<th>Ceutorynchus picipitarsis</th>
<th>CSFB larvae</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timing</strong></td>
<td>End of Sept / Beginning of Oct</td>
<td>Mid-Oct</td>
<td>Nov</td>
</tr>
<tr>
<td>Sensitive or partial resistance (Kdr +/- metabolic)</td>
<td>Phosmet</td>
<td><strong>Pyr.</strong></td>
<td>CHLP + Pyr.</td>
</tr>
<tr>
<td>High resistance (Super Kdr + metabolic)</td>
<td>Phosmet</td>
<td>CHLP + Pyr</td>
<td>Phosmet</td>
</tr>
</tbody>
</table>

How to avoid a rapid development of resistance to Phosmet and globally to organophosphates?

- By reducing unnecessary applications
  - By demonstrating interest in agronomic practices (better crop’s implementation)
  - By supporting farmers for insecticide applications (right timing / larvae).
Agronomical trial of Forêt Bréault (2016/17) Pictures of 30/03/2017

3 applications:
- CSFB adult 03/10
- Ceutorhynchus picitarsis 23/10
- CSFB larvae 14/11

18/46 fertilizer + seedling spring field beans

Classical implementation

18/46 fertilizer at seedling

Classical implementation
AGRONOMICAL TRIAL OF FORÊT BRÉAULT (2016/17)
WHEN SPRAY INSECTICIDES?
Picture 30/03/2017  1 application against CSFB larvae 14/11/16

normal seedling

3 applications
3/10, 23/10, 14/11

OSR with spring field beans’ seedling and 18/46 fertilizer

Number of larvae / plant (21/01)
1 application against CSFB larvae 14/11/16

Normal seedling

UTC
Lambda-cyathrine
CHLP-ethyl + CYP
Boravi WG 1 kg/ha
Boravi WG 1,5 kg/ha

OSR with spring field beans’ seedling and 18/46 fertilizer

Number of larvae / plant (21/01)

Picture 18/04/2017

3 applications
3/10, 23/10, 14/11
Support for farmers to use effectively Boravi WG (Autumn 2017)

From October to Mid-November, monitoring of 67 plots with an untreated area:

1. Regular counting of larvae per plant by using Berlès technique to improve positioning of the larvae’s sprays.

2. Sending information to concerned distributors as risk maps (every Monday) with a reminder of the treatment thresholds.
THANK YOU FOR YOUR ATTENTION