Finding solutions against viral yellows in Europe without phytosanitary product

PNRI
PLAN NATIONAL DE RECHERCHE ET D'INNOVATION

AMERICAN SOCIETY OF SUGAR BEET TECHNOLOGISTS

ITB Institut Technique de la Betterave

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Legal environment: a challenge for our agricultural sector

- Extremely strong social expectations:
  - Nature restauration
  - Chemical free agriculture
  - No GMO, endless discussion on NBT

- Expectations transformed into laws faster than developing alternative solutions including economical sustainability.
- Launch of national research programs to develop alternative solution.
- In sugar beet, fight against yellows is a priority.

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Legal environment : a challenge to our research

- 2018 : Most NNIs banned in Europe / Only France forbid the whole range including sulfoxaflor and flupyradifurone.
- 2020 : Huge viral infections / sugar production dropped but 30% nationally / NNI allowed back for 2 years in France (2021, 2022)
- February 2023 European Court of Justice stated emergency authorisations for forbidden NNI are not legal !
- Most European countries maintain acetamiprid until 2033.

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An efficient team: myzus persicae & viruses

4 viruses

- BYV- very common
- BMYV / BChV
- BtMV

- An infected plant will contaminate after 3 days
- Myzus persicae multiplies exponentially: 37 billions offsprings in 70 days

2020: 64 t/hectare

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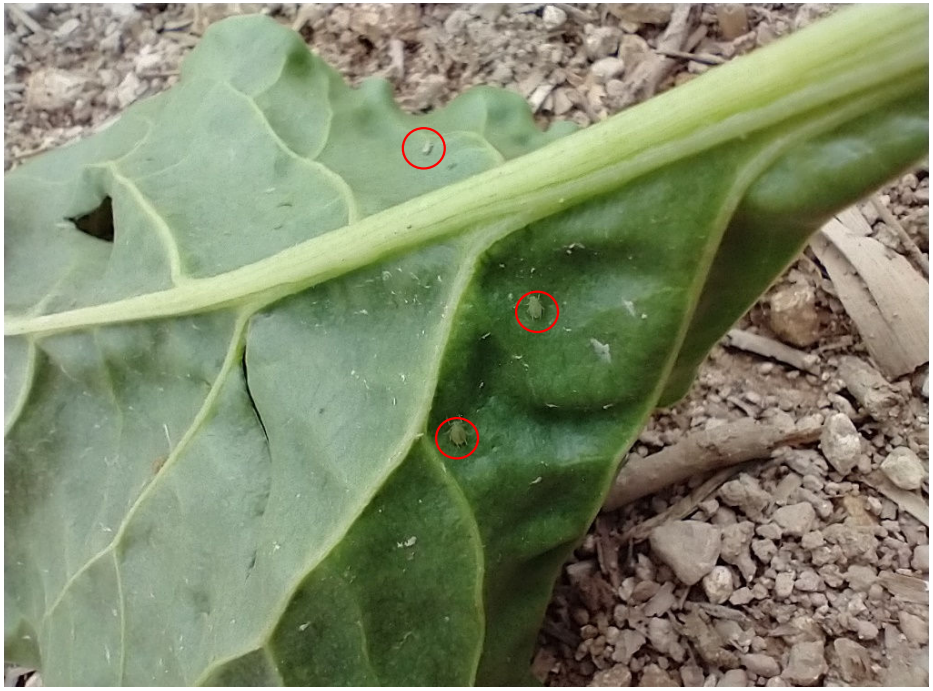
Aphicides currently available in France

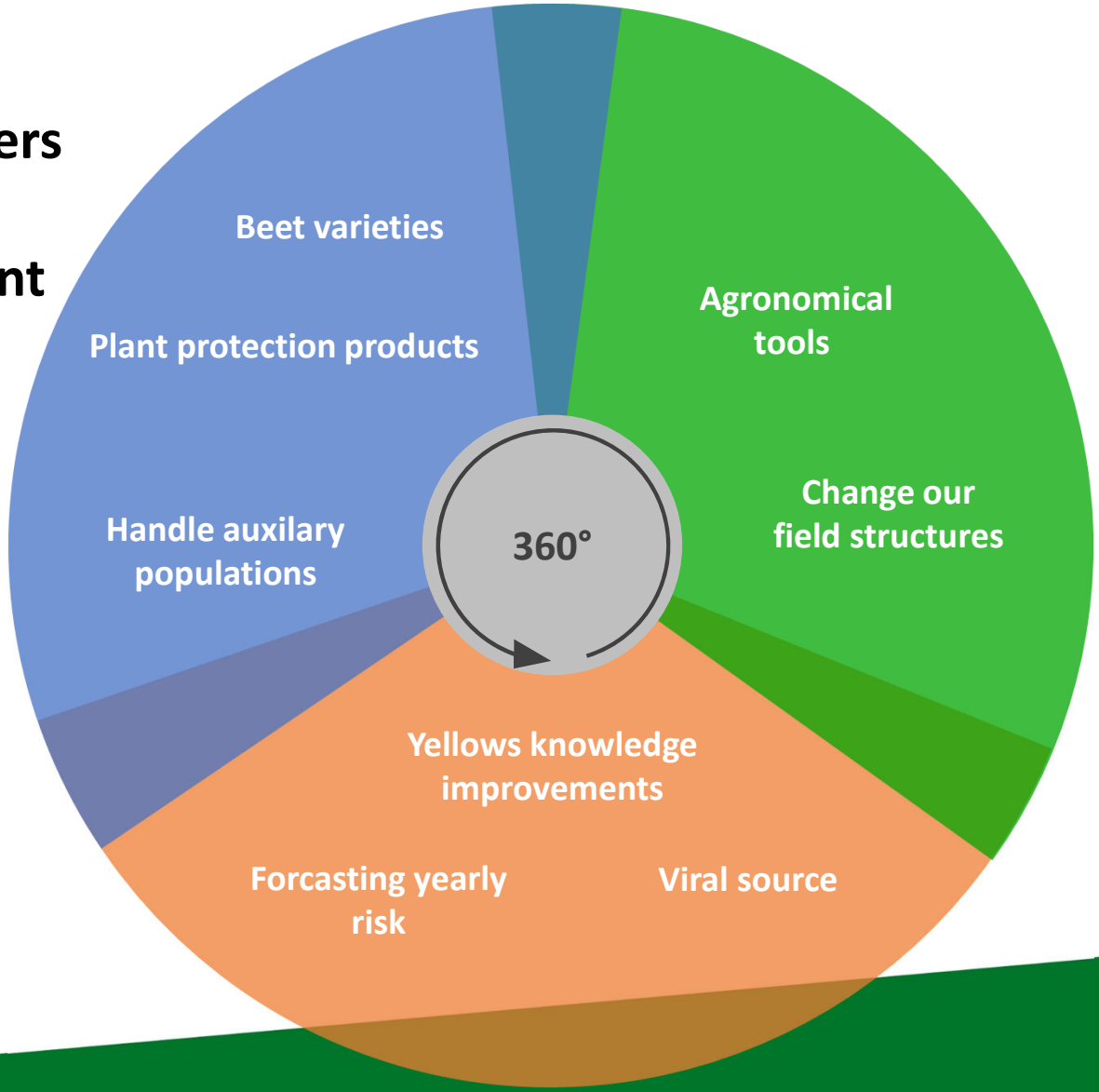
- Registered products:
  - Flonicamide (Teppeki) : 0,14 kg/ha, limited to a single application
  - Spirotétramate (Movento) : 0,45 L/ha, limited to 3 applications in 2024*

- Stage of action:
  - 1 greenfly for 10 sugar beets



* Subject to a 120 day emergency derogation every year

2021/2026:
More than 40 partners to find solutions economically efficient
24 M€ budget



Pesticides and biological control solutions

Active ingredient	Number of trials	Years of trials	Expected efficacity 14 days after treatment	Price/ha
flonicamide spirotetramat	124	2018-2024	62 – 72 %	27€ 45€
Entomopathogenic fungus	14	2019-2020 2022-2024	0 – 41 %	Not approved
Paraffin oil	13	2019-2020 2022-2024	0 – 21 %	30-50€

Standard treatment prices for farmers : 0 to 4 applications

1€ = 1 USD

Pesticides and biological control solutions

Active ingredient	Number of trials	Years of trials	Expected efficacity 14 days after treatment	Price/ha
flonicamide spirotetramat	124	2018-2024	62 – 72 %	27€ 45€
Aphid repellents	12	2023-2024	23 – 62 %	70€

Use of smells to repel greenflies : Agriodor repellent products (efficacy of 28 days) can be used before an insecticide.

Companion plants

Active ingredient	Number of trials	Years of trials	Expected efficacity 14 days after treatment	Price/ha
Oat	47	2021-2024	35 – 60 %	86 €
Barley	23	2021-2024	46 – 73 %	< 86 €

- Efficacy confirmed by the symptom reductions
- But : Yield reduction due to competition with beets if the destruction of companion plants occurs after the 6-leaf stage of the beets

Pesticides and biological control solutions

Active ingredient	Number of trials	Years of trials	Expected efficacity 14 days after treatment	Price/ha
flonicamide spirotetramat	124	2018-2024	62 – 72 %	27€ 45€
Beneficial releases *Chrysoperla*	10	2022-2024	1 – 68 %	150 €

Genetic: What can we expect from the varieties?

- Differences in varietal sensitivity to virus infection exist among commercial varieties, but no variety can be classified as tolerant and we face 4 viruses belonging to 3 families.

- Some varieties alter the aphid feeding behaviours, but the reason for their lower attractiveness is not yet known.

Prophylaxis: preventing the development of viruses





Aphid and virus reservoirs

Aphid reservoirs

Identify viral sources to limit contagiousness from one agricultural campaign to another

Yearly national information campaign relayed by our entire sector

More than 23,000 contacts -All beet farmers have been informed

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To conclude

- Best pesticide-free solutions help reducing aphid populations by about 50%
- We are focusing on combining identified solutions to improve aphid population control
- Economical efficiency and feasibility of the technics by farmers are major issues
- Efficient medium-term solution have still to be developed not to jeopardize our sector sustainability

France has launched similar research programs to assess feasibility of farming without phytosanitary products
The PARSADA

“ Strategic action plan to anticipate the potential European withdrawal of active substances and develop alternative crop protection techniques ”

If no solution, no interdiction !

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Thank you for your attention.