



Soybean Virus Disease: The Long Course of a Rehabilitation

C.A. Betrix, A. Schori, O. Schumpp

31.01.2018



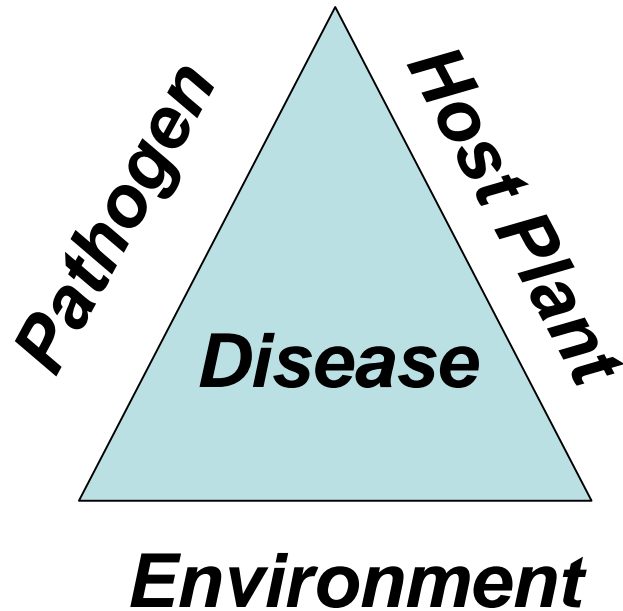
- Diagnosis concept
- *Introduction* "Journaline Crisis" in 2014

Analysis of the cycle of the disease

- Study of the transmission of the plant to the seed
- *Epidemiology and agronomic impact*
- Environmental context

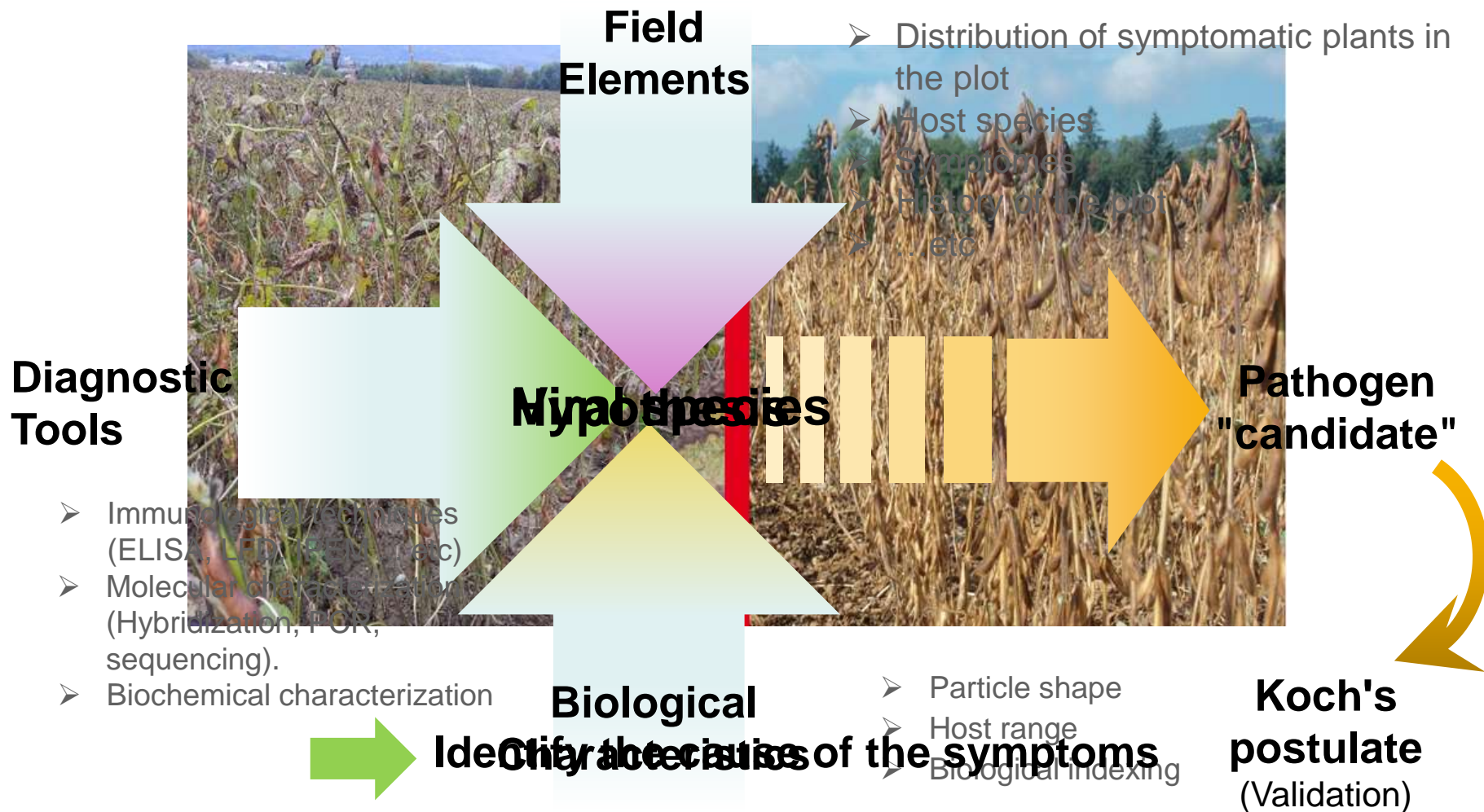


Diagnosis: finding the cause of a disease





Diagnosis: finding the cause of a disease

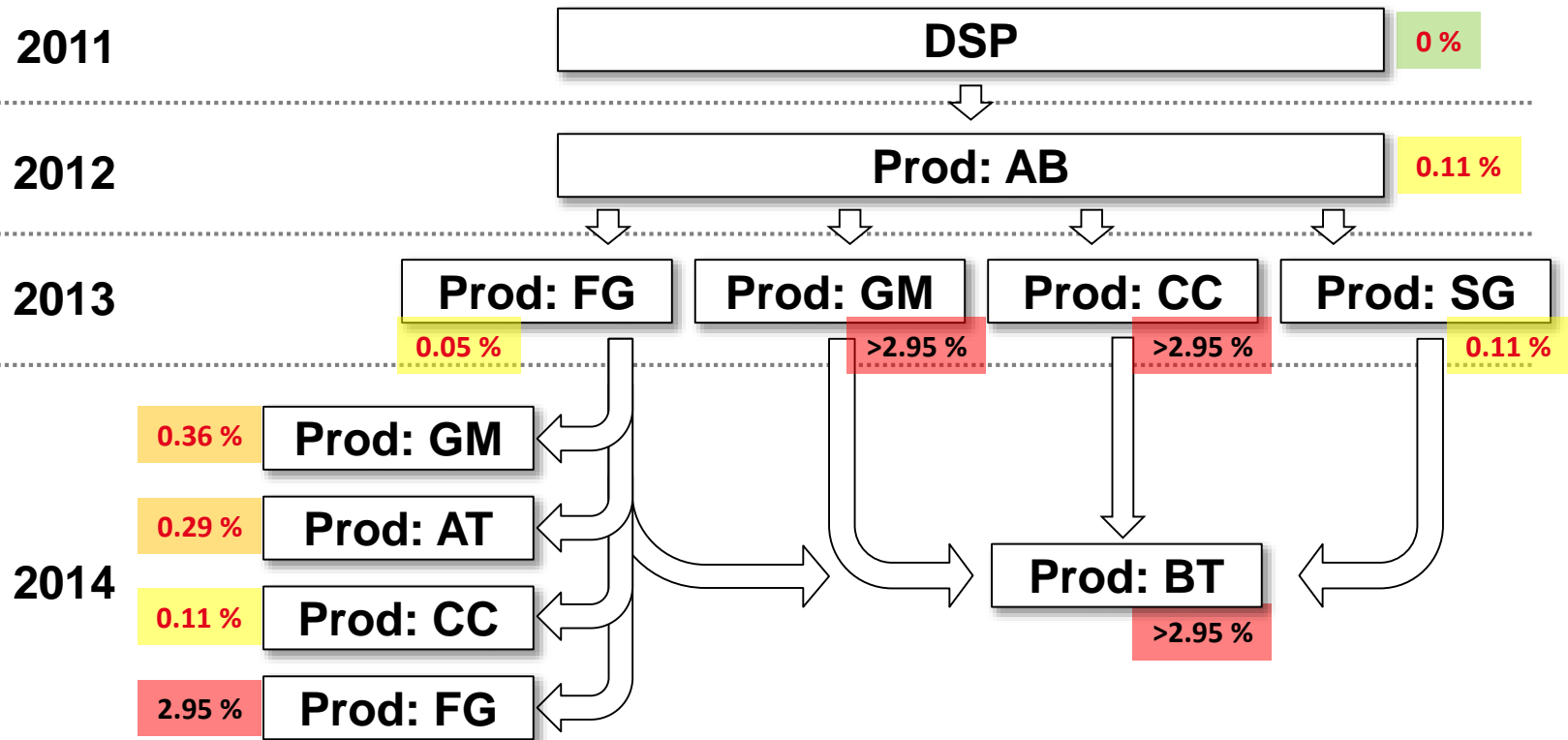


The "Tourmaline" variety susceptible to SMV ?



25 hectares affected in 2014

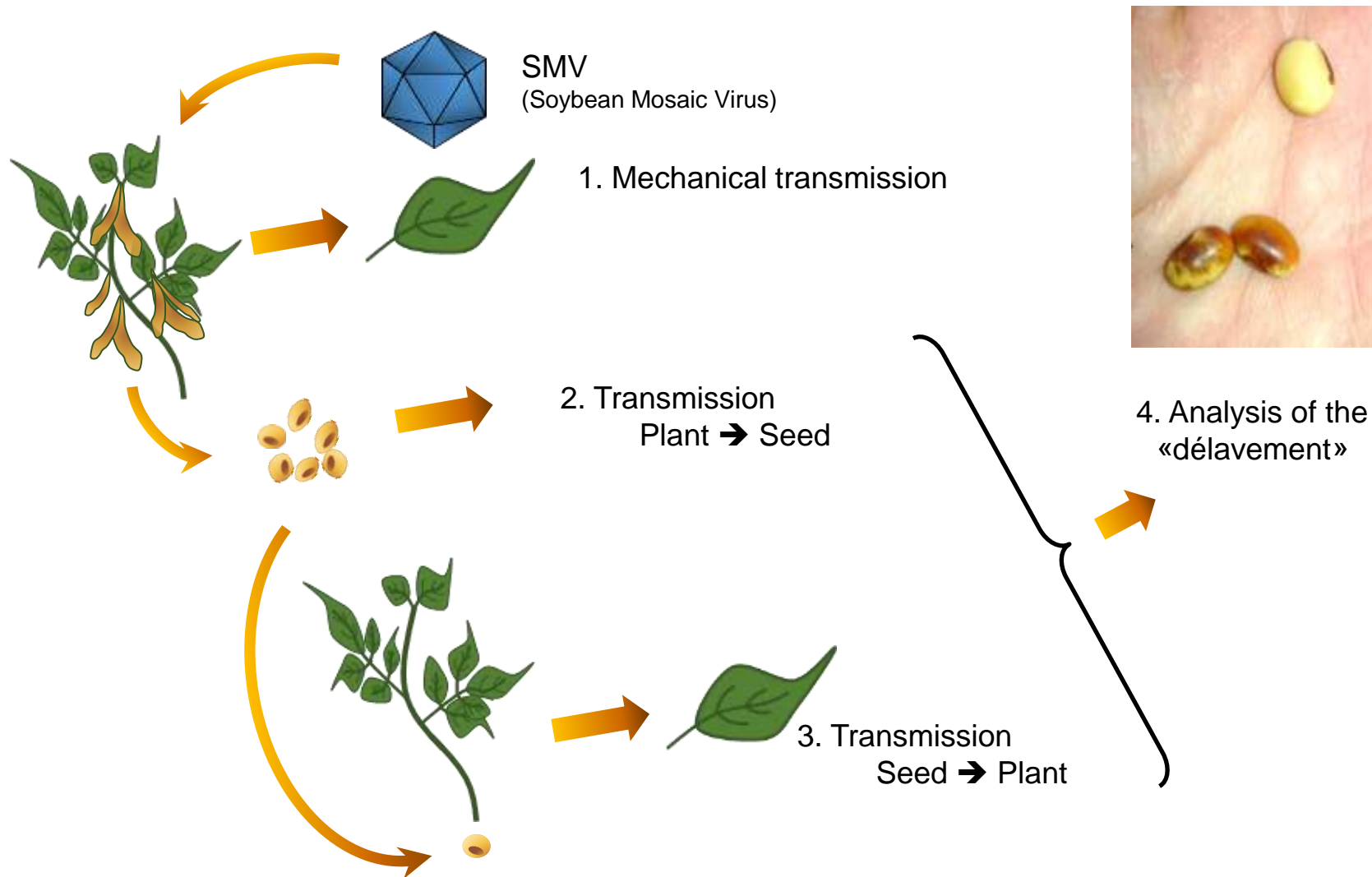
Analysis of seed lots available in 2015



Presence of SMV detected at low level in all available seed lots



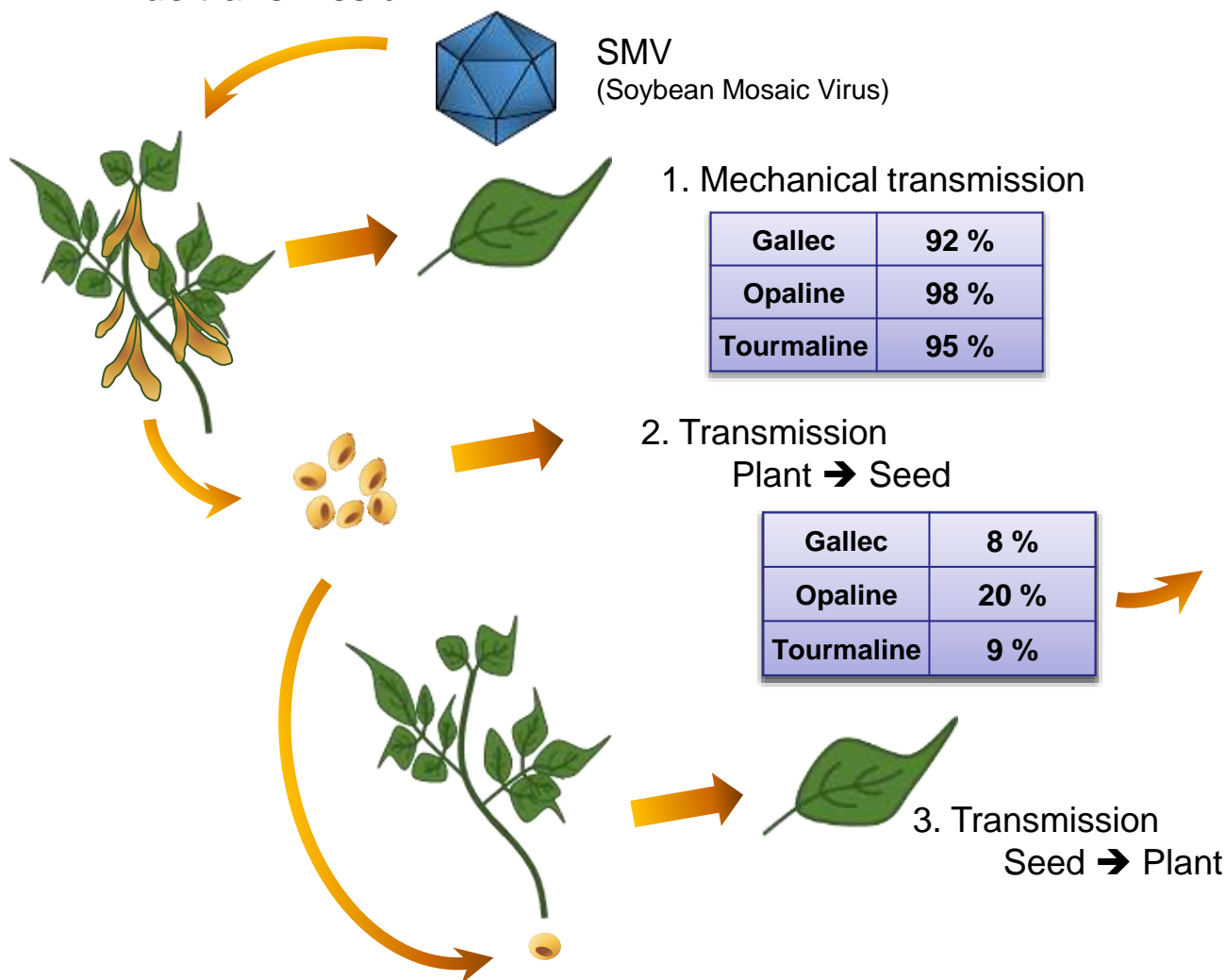
Analysis of the cycle of the disease





Analysis of the cycle of the disease

Virus transmission

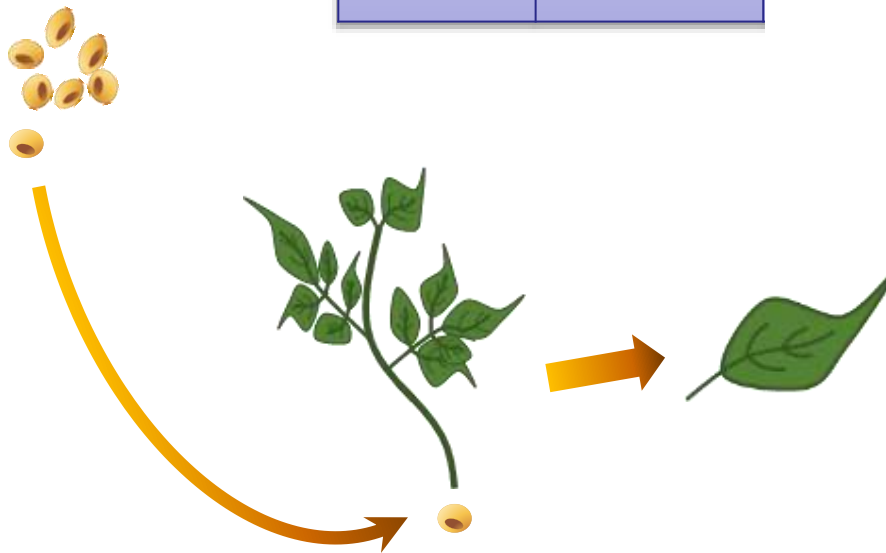
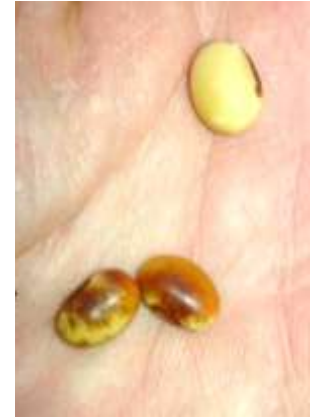




Analysis of the cycle of the disease

Virus disease and «Délavement»

| | % "délavement" |
|-------------------|-------------------|
| Gallec | 61% |
| Opaline | 68% |
| Tourmaline | 35% |

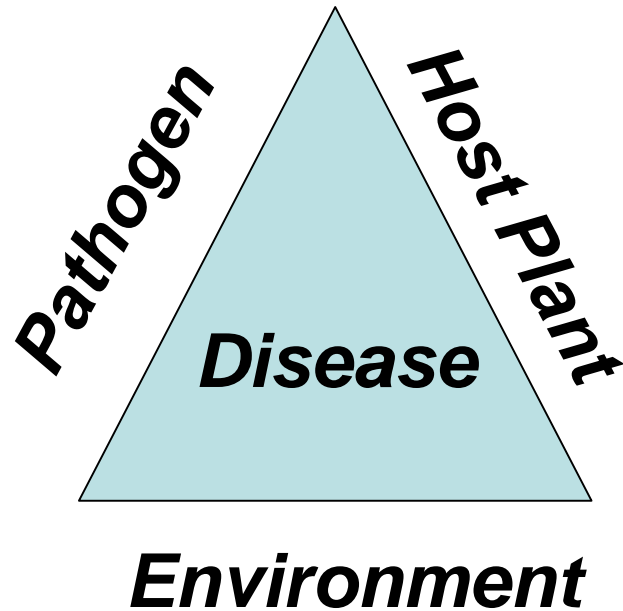


Transmission Seed → Plant

| | | % SMV "+" |
|-------------------|-------------|--------------|
| Gallec | Non-Délavée | 0 % |
| | Delavée | 10 % |
| Opaline | Non-Délavée | 2 % |
| | Delavée | 23 % |
| Tourmaline | Non-Délavée | 10 % |
| | Delavée | 15 % |



Diagnosis: finding the cause of a disease





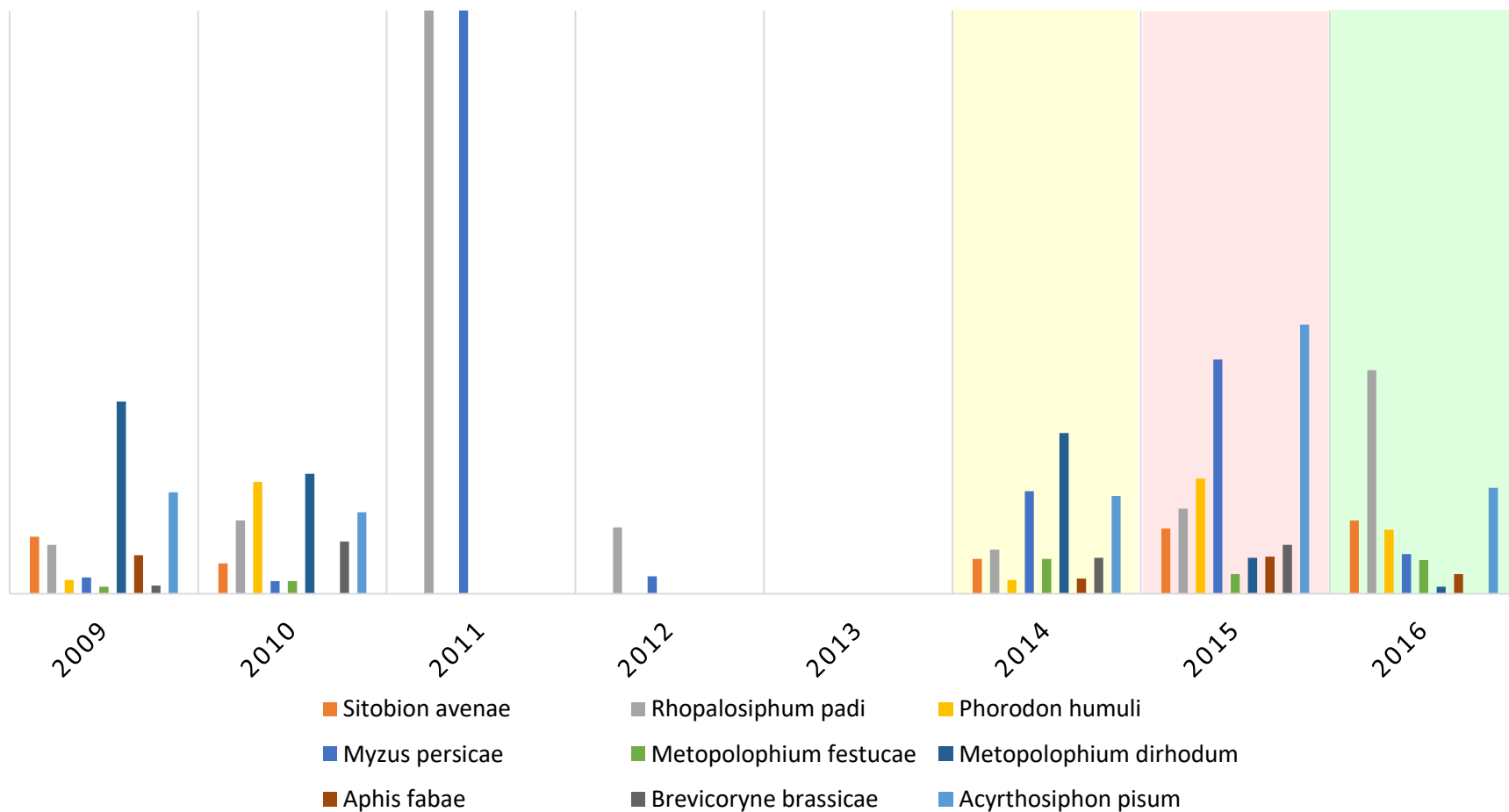
Search for reservoir plants



Chenopodium sp. are a reservoir for SMV and a host for aphids



Evaluation of Vector Pressure





Conclusions of the mechanistic analysis

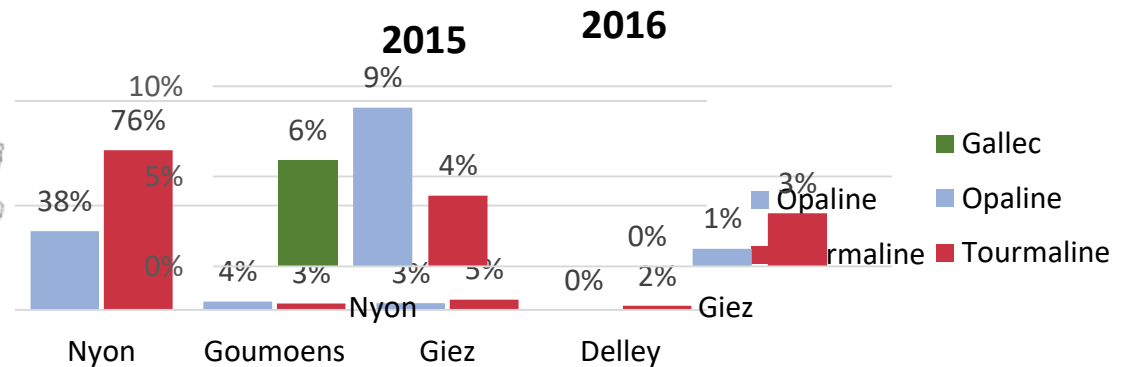
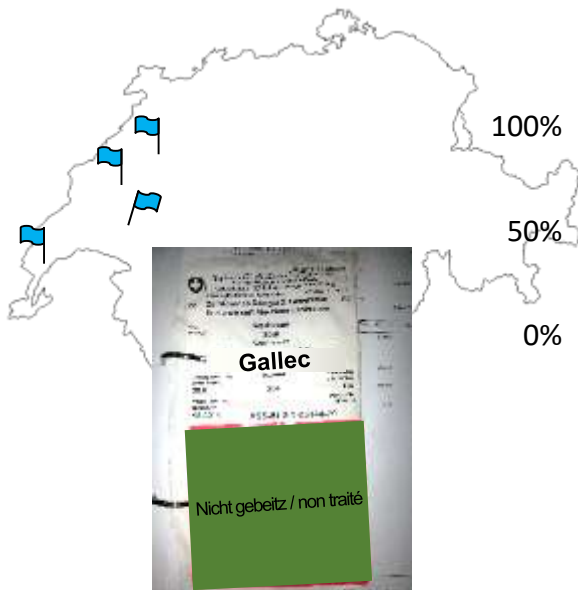
- The virus is transmitted from the plant to the seeds and vice versa
- Several potential vectors are present at Changins
- The virus is established on adventitious plants reservoirs



All conditions are present for the development of the disease



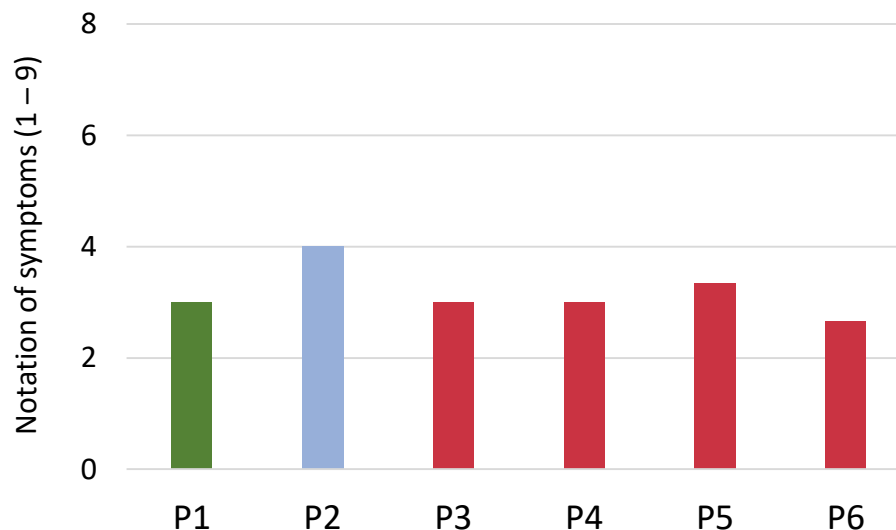
Prevalence of SMV in Soybean fields at 4 sites



Symptoms of Virus Disease vs Presence of the Virus

| Lots | Var. | % SMV |
|------|------------|-------|
| P1 | Gallec | 38% |
| P2 | Opaline | 38% |
| P3 | Tourmaline | 76% |
| P4 | Tourmaline | 67% |
| P5 | Tourmaline | 63% |
| P6 | Tourmaline | 64% |

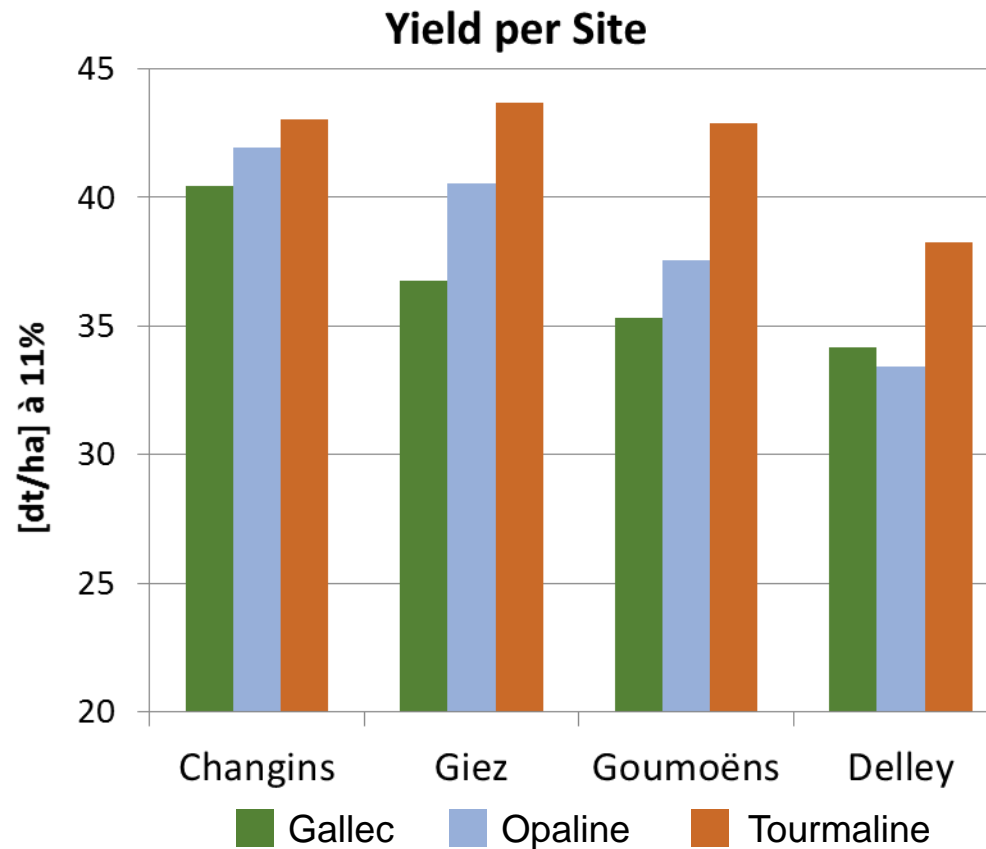
Evaluation of leaf symptoms



No correlation between symptoms
and infection rate
(Fields and Growth chamber results)



Yields 2015



No correlation between yields and virus rates



Agronomic Parameters Studied

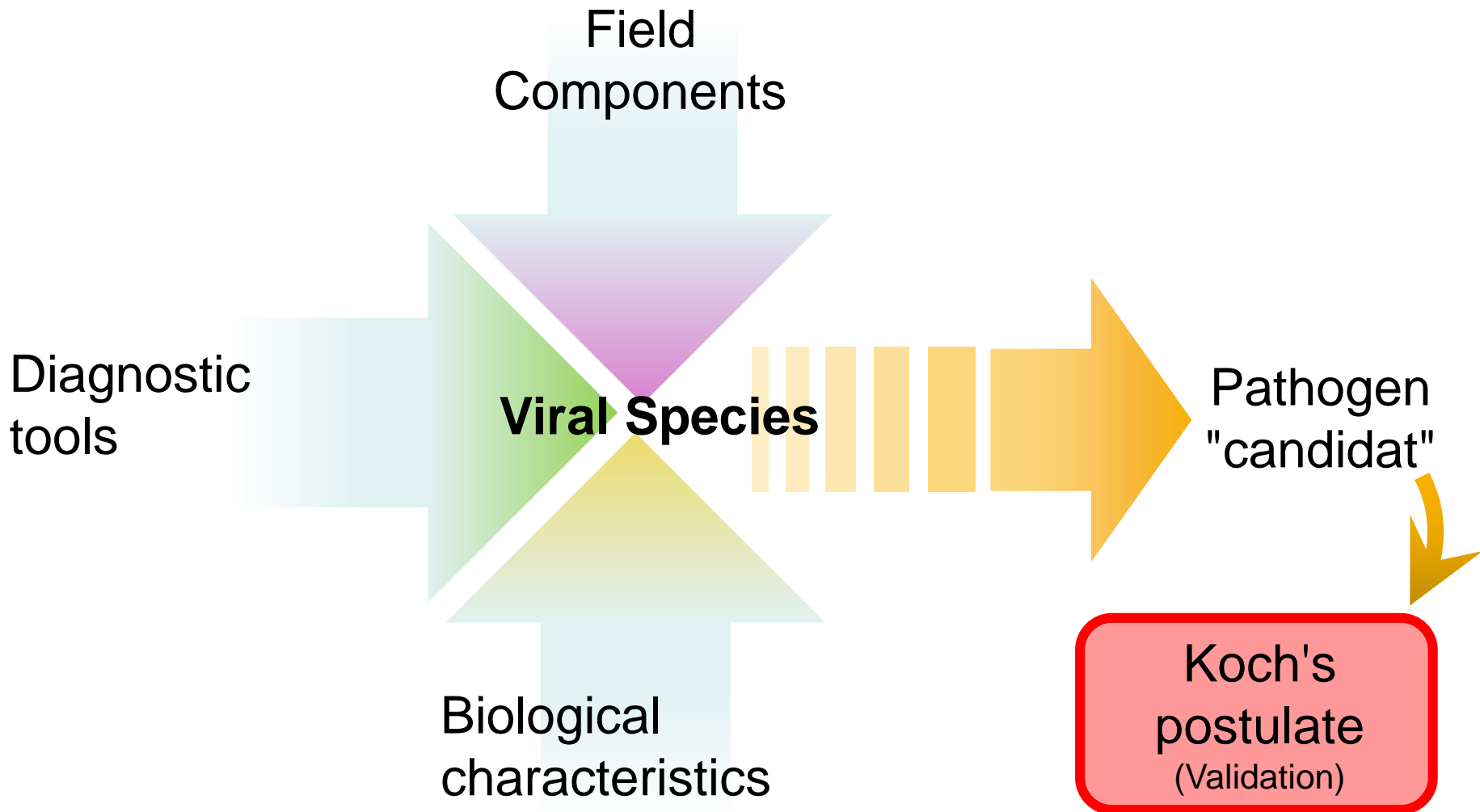
- Seedling emergence
- Density
- vigour
- Green plants at harvest
- Protein rate and oil content
- Origin of seeds



No correlation between agronomic measures and virus rate



Diagnosis: finding the cause of a disease





Conclusions

Virology

- Transmission by the seed
- Presence of vectors
- Presence of weeds reservoirs



All conditions are present for the development of the disease

Agronomy / Selection

- Yields of the varieties studied are not affected by SMV
- Strong presence of SMV in Changins = strong selection pressure on the genetic material created



The initial problem is not of viral origin

Acknowledgments

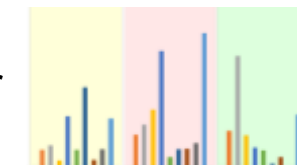


➤ Jean-Charles De Groote



➤ Floriane Bussereau

➤ Thomas Steinger



➤ Nathalie Dubuis

➤ Justine Brodard



Thank you for your attention

Olivier Schumpp

olivier.schumpp@agroscope.admin.ch

Agroscope good food, healthy environment

www.agroscope.admin.ch

