AAFC-USDA Collaboration on Genotyping and Monitoring of High Risk Plant Pathogens
Huntington Convention Center of Cleveland, Saturday August 3, 2019

Virus epidemiomics toward epidemiology

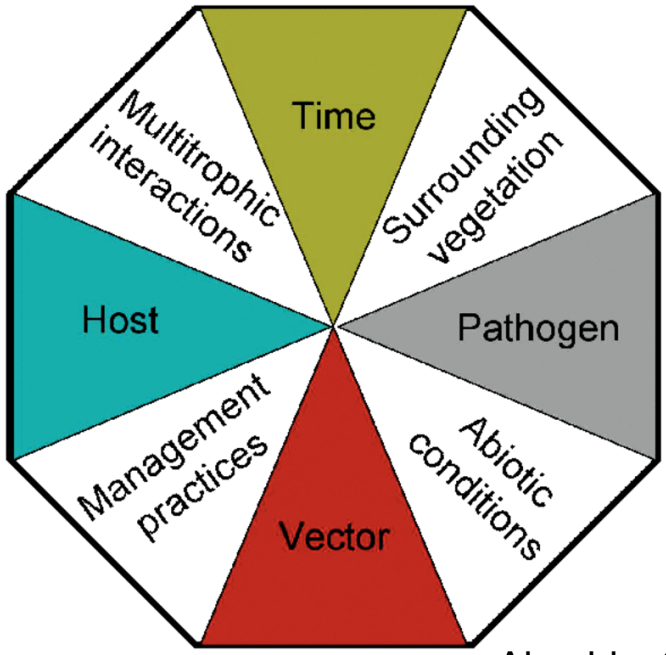
Mamadou L. Fall,

Vector-borne plant diseases lab.

Agriculture and Agri-Food Canada (AAFC)

Research interest and expertise

- Epidemiology
- Modeling and dynamic simulation
- Ecogenomic
- Epidemiomics
  - *Viruses*
    - *Grapevine*
    - *Vegetables*
    - *Blueberry (strawberry)*
    - *Potato*



Almeida, 2007

Research interest and expertise

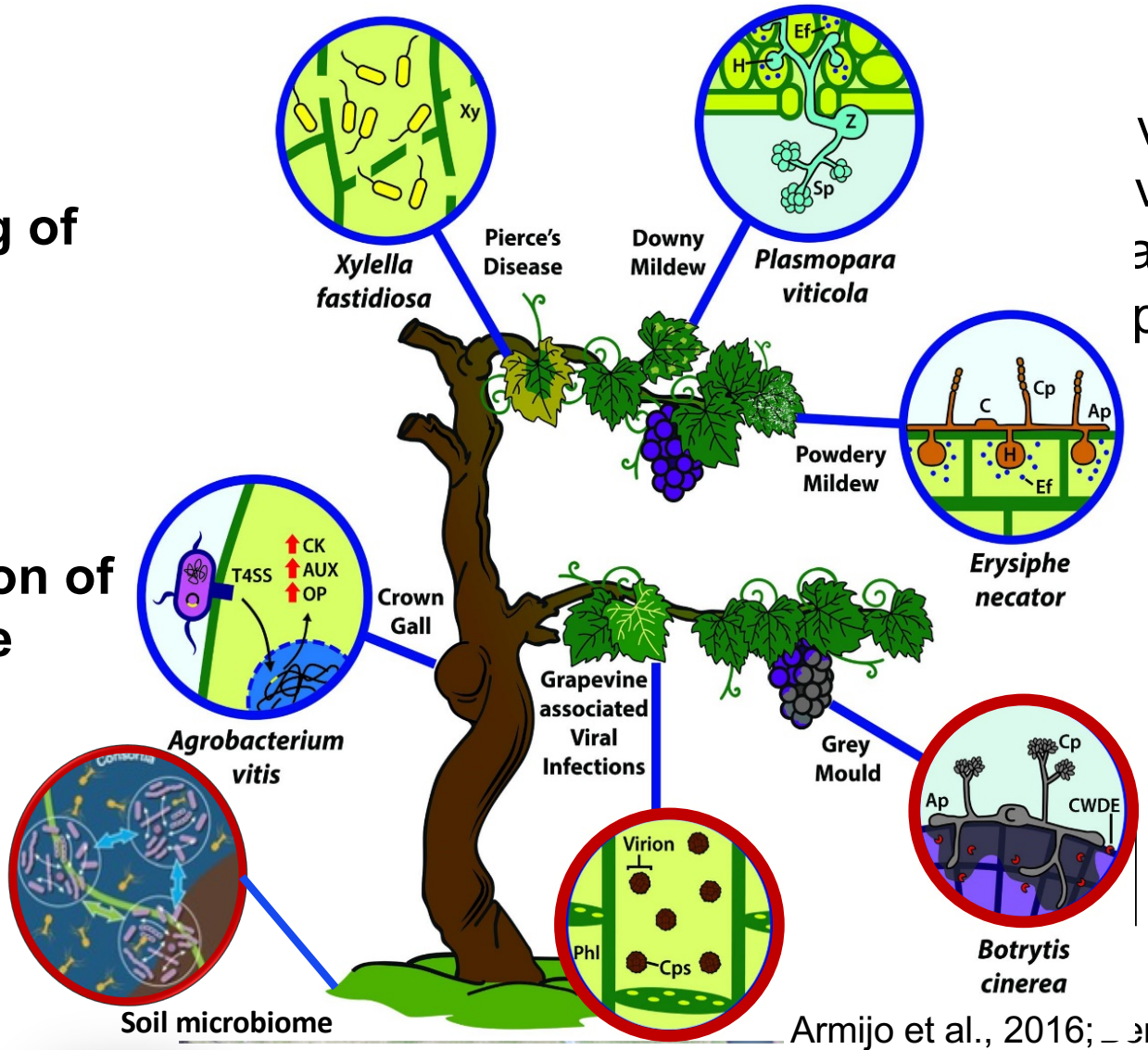
- Spatiotemporal dynamic and demographic of plant viruses and virus outbreak risk associated with an ecosystem
- Comparison in plant viruses in cultivated and uncultivated crops
  - Identify spill over processes, prevalence and spatial distribution of viruses
- Correlation between plant phenological stages and viral prevalence
- Determine the host range of viruses with high agronomic impact to predict the emergence of viral diseases
- Temporal and spatial variation of the virome
- Viruses in soil microbiomes

Grapevine virosystem

Geo-referencing of hosts

Spatial distribution of viruses in the virosystem

viruses
vines
ative hosts
pods



Carisse, O., Fall, M.L et Vincent C., 2017,CJP, 39 (4)

Armijo et al., 2016; ernadino, 2018

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Virome in a crop rotation system

- Identify reliable bio-indicators to measure crop resilience and to characterize the impact of management practices on soil biodiversity and eco-services (2018-2021).

#1: Development of a **methodology** for consistent assessment of soil biodiversity.

#2: Impact of agronomic practices on **soil biodiversity** and microorganisms recruitment by the plants.

#3: Evaluation of crop **resilience to viruses** and abiotic stresses under different production systems.

#4: Combination of plant health status data obtained by **remote sensing** and soil biodiversity.

#5: **Network analysis** for the identification of reliable bio-indicators for soil health.

Viral component of the soil microbiome

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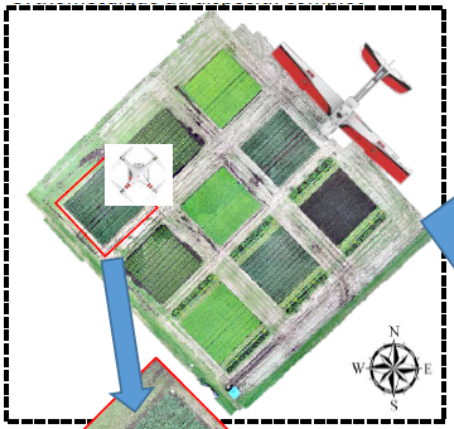
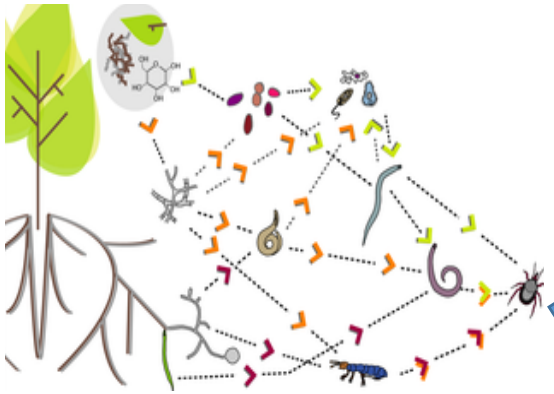
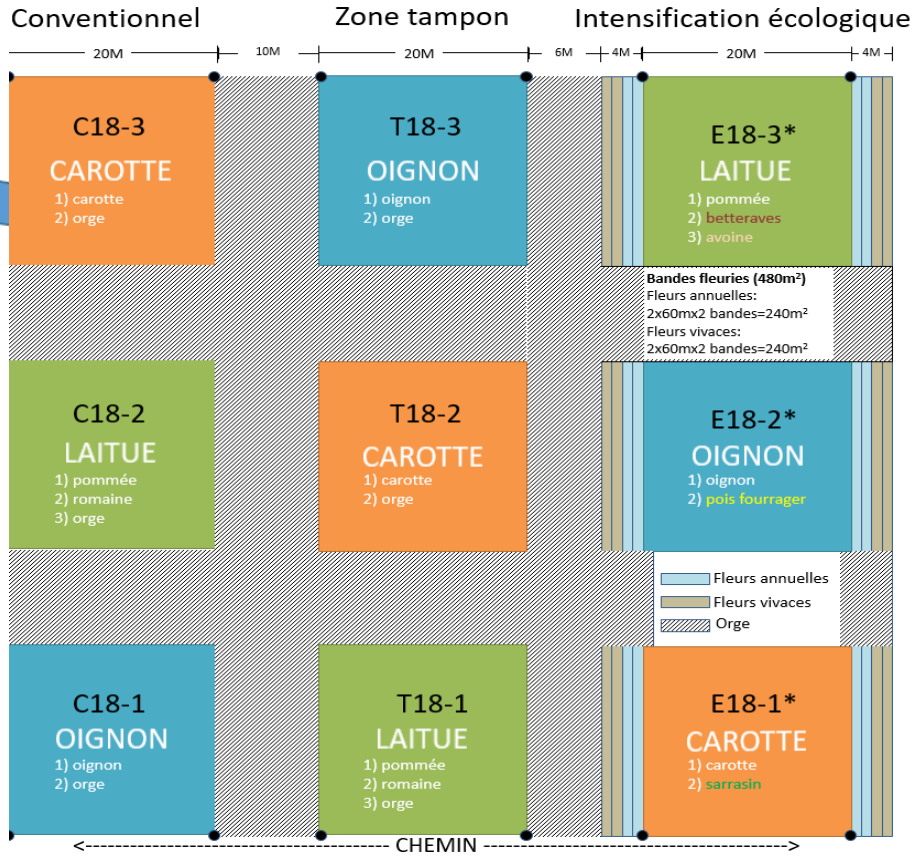




Photos ponctuelles acquises à basse Altitude, directement au-dessus de la parcelle.

Soil microbiome interaction network



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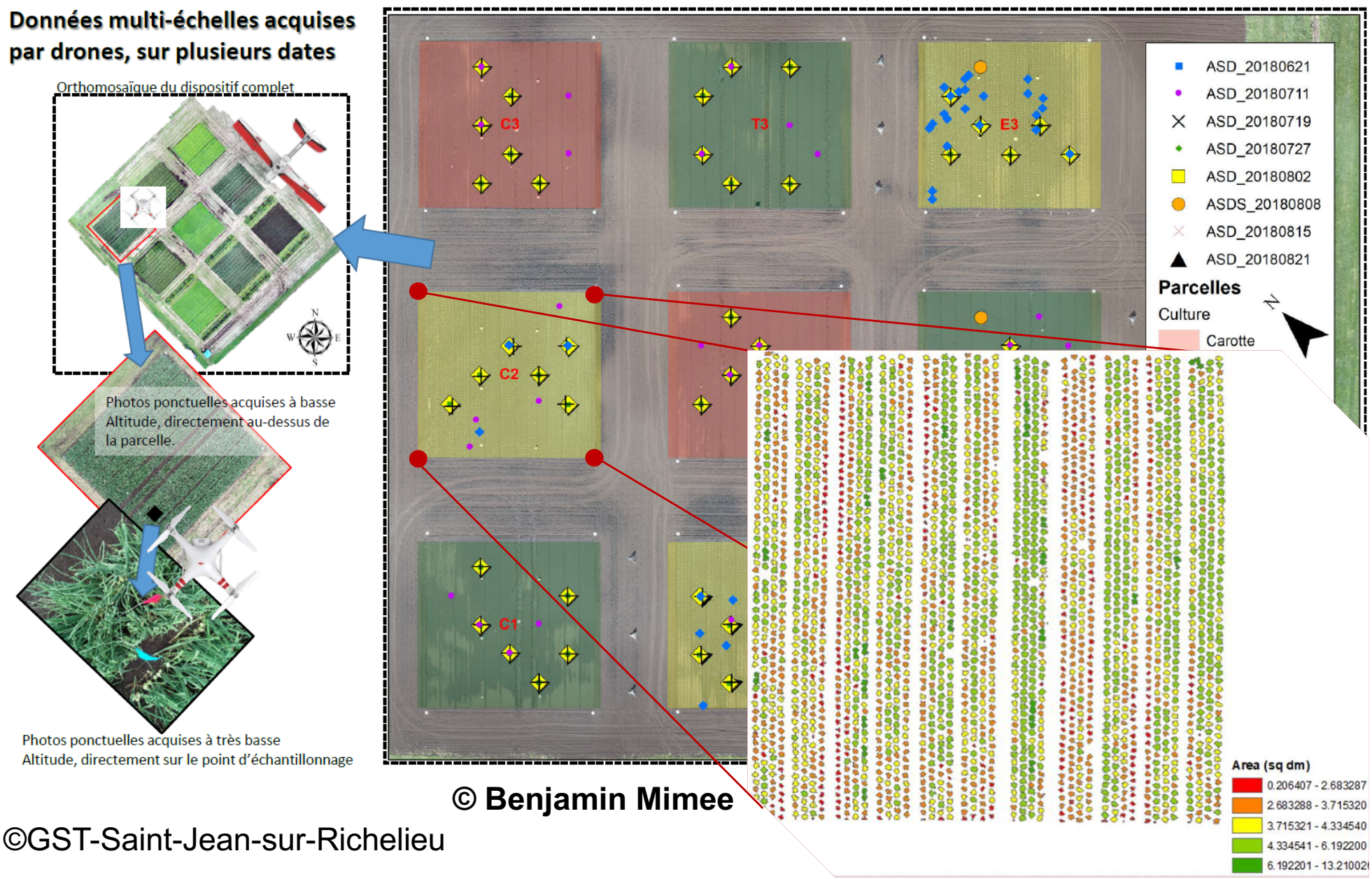
Virome and phenomic

Données multi-échelles acquises par drones, sur plusieurs dates



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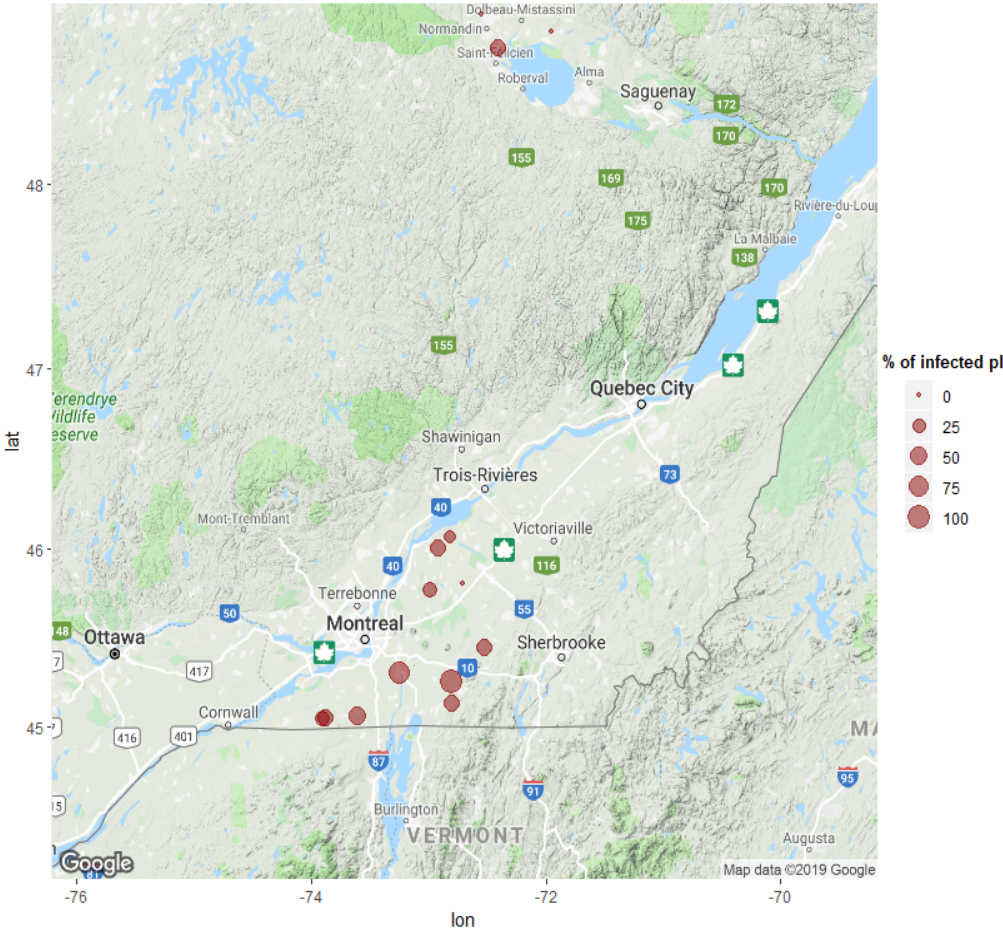
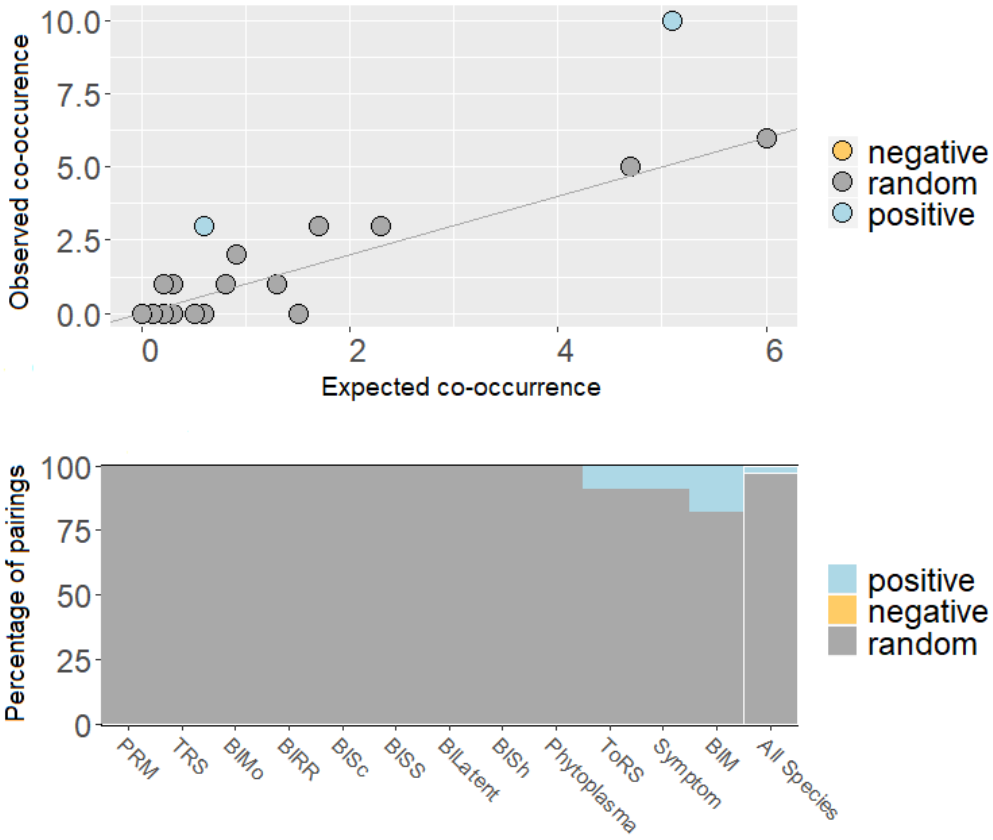
Prevalence of mixed infection and interactions between blueberry viruses





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