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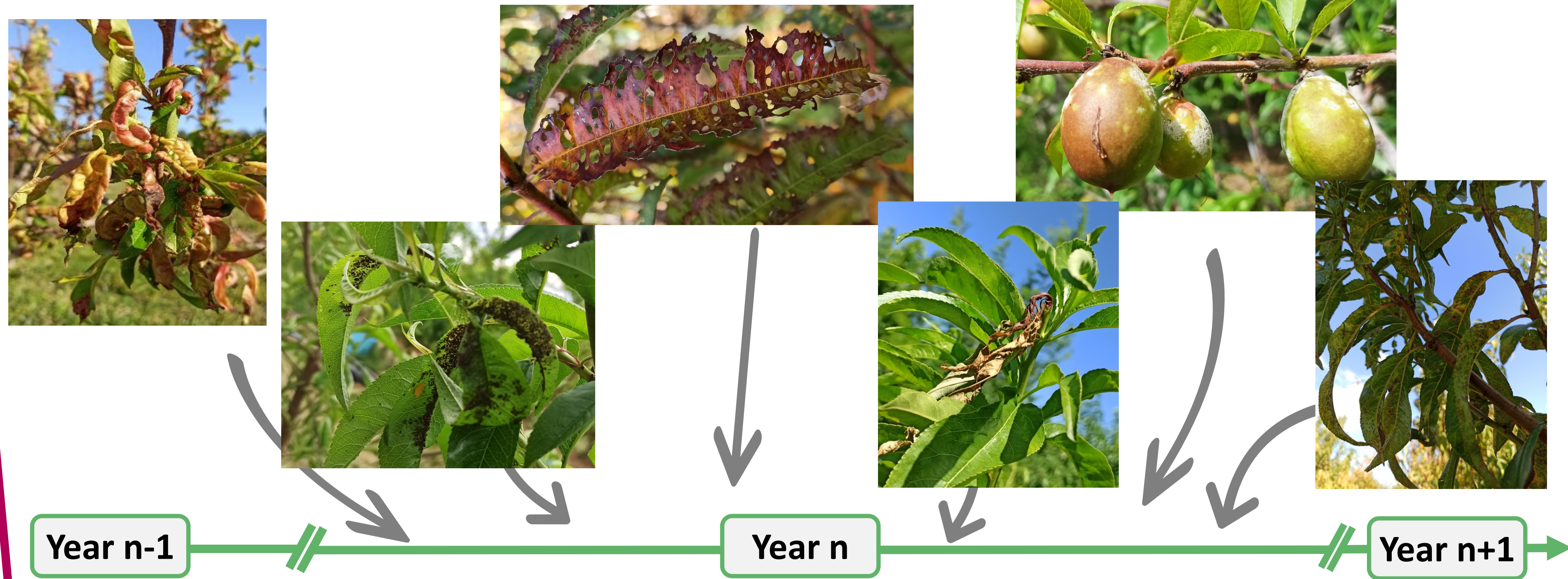
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Deciphering plant resilience mechanisms to face the multiple disease challenge in fruit trees

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In current cultivated orchards:

- Fluctuating pressures of multiple pests and diseases
- Cumulative effects over the years
- Lack of multi-resistant varieties

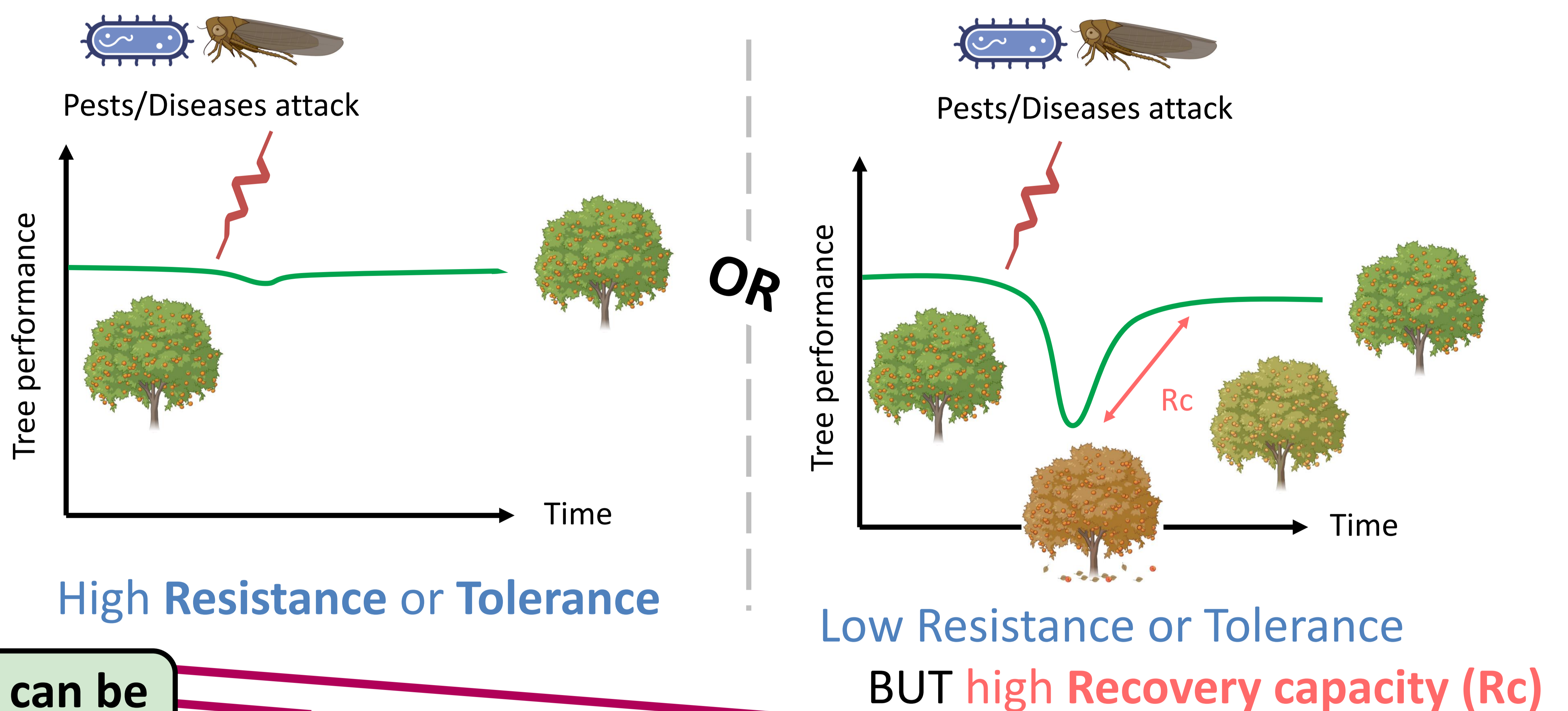
High dependence on phytosanitary products

Could disease resilience, as a key component of plant immunity, be relevant to study tree survival and fitness in this context?

Disease resilient tree

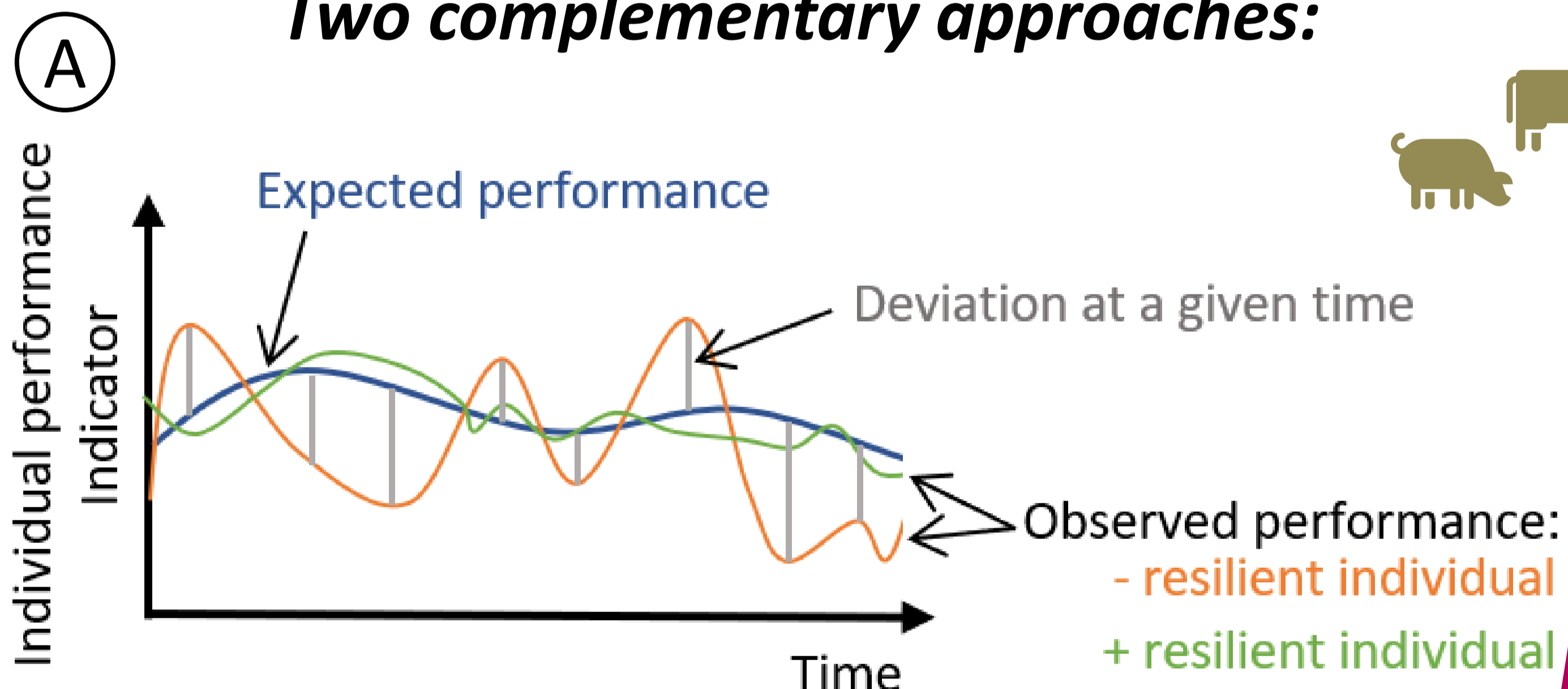
Resistance, Tolerance and Recovery interaction

Multiple trajectories over the time involving several biological functions

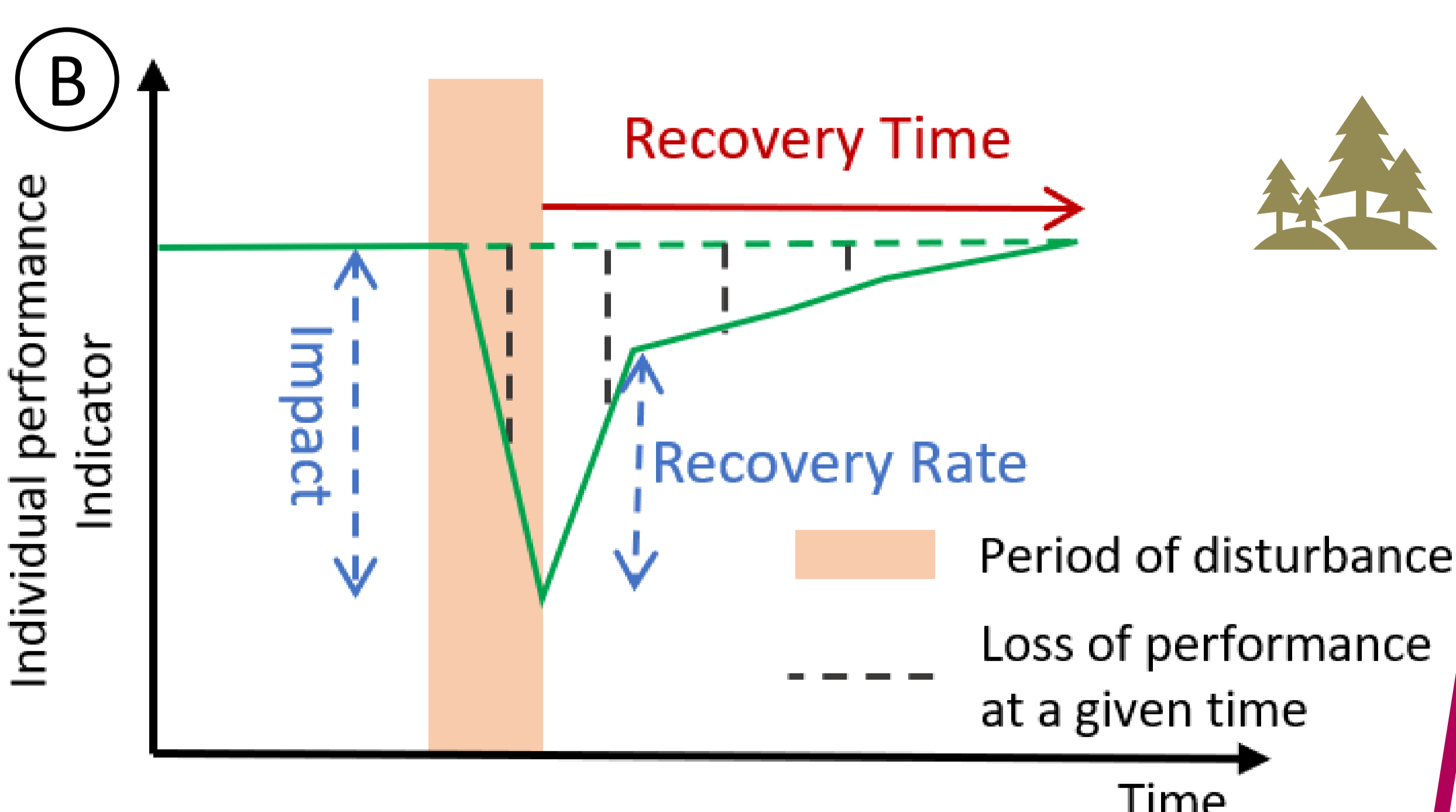


What metrics of resilience can be found in literature?

Two complementary approaches:



Resilience in livestock^[1]:
 Measurement of deviations between expected and observed performance over a period of time



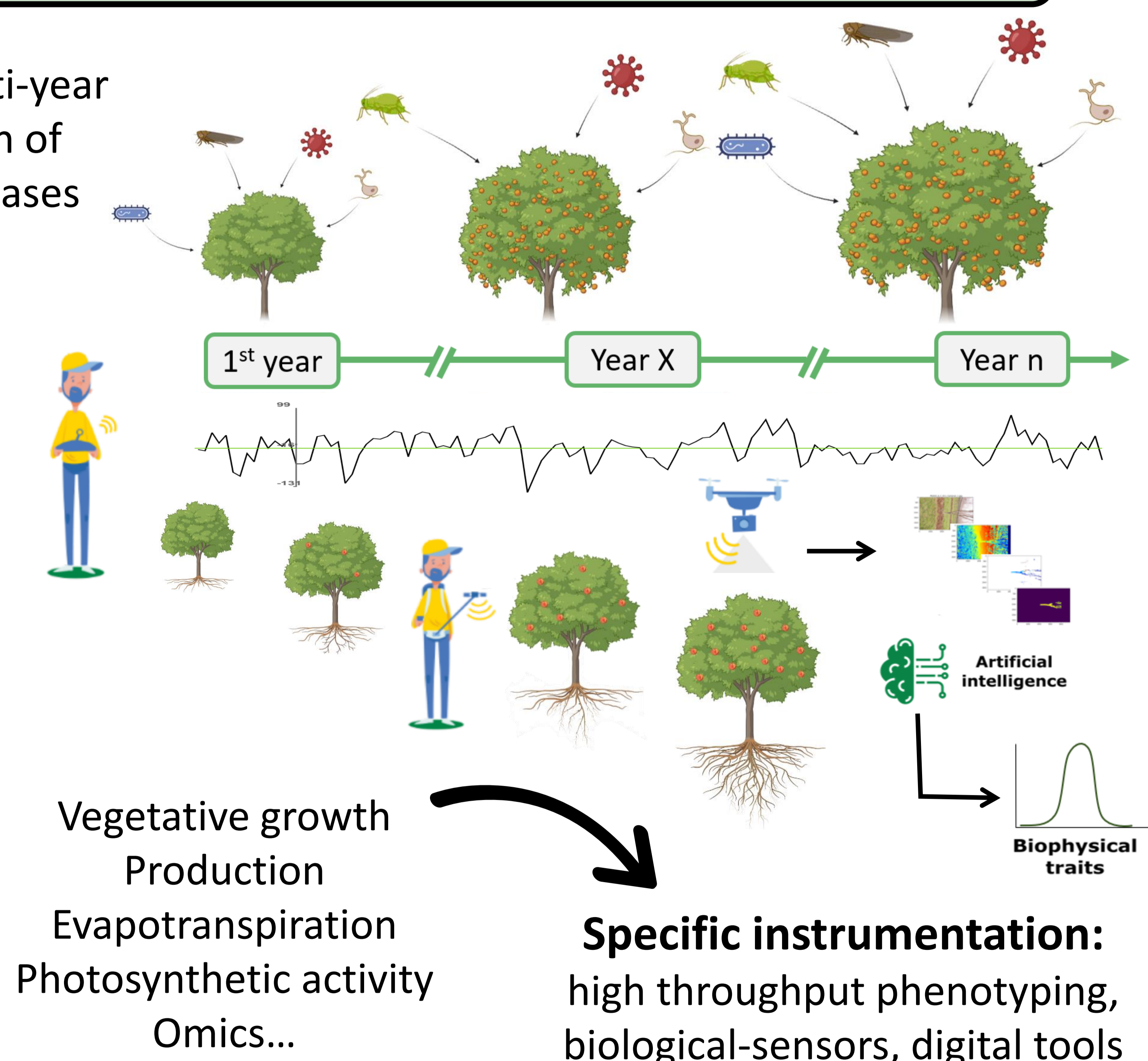
Decomposition of forest resilience into several indicators^[2]

How to characterise disease resilience in orchards?

Integrative multi-year quantification of pests and diseases damages

Which are the impacts on tree health?

Temporal measurement of Resilience Biomarkers



Specific instrumentation: high throughput phenotyping, biological-sensors, digital tools

What is the genetic architecture of disease resilience?

Acquisition of genetic data from large and genetically diverse collections

Genetic analyses: GWAS, genomic or phenomic prediction

Identification of genetic markers linked to disease resilience components

How to go further?

Let's make disease resilience into a concrete and achievable breeding goal towards resilient ideotypes



[1] Berghof et al. 2019. *Frontiers in genetics* 9, 692.

[2] Lloret et al. 2011. *Oikos* 120(12), 1909-1920; Thurm et al. 2016. *Forest Ecology and Management* 376:205-220.