

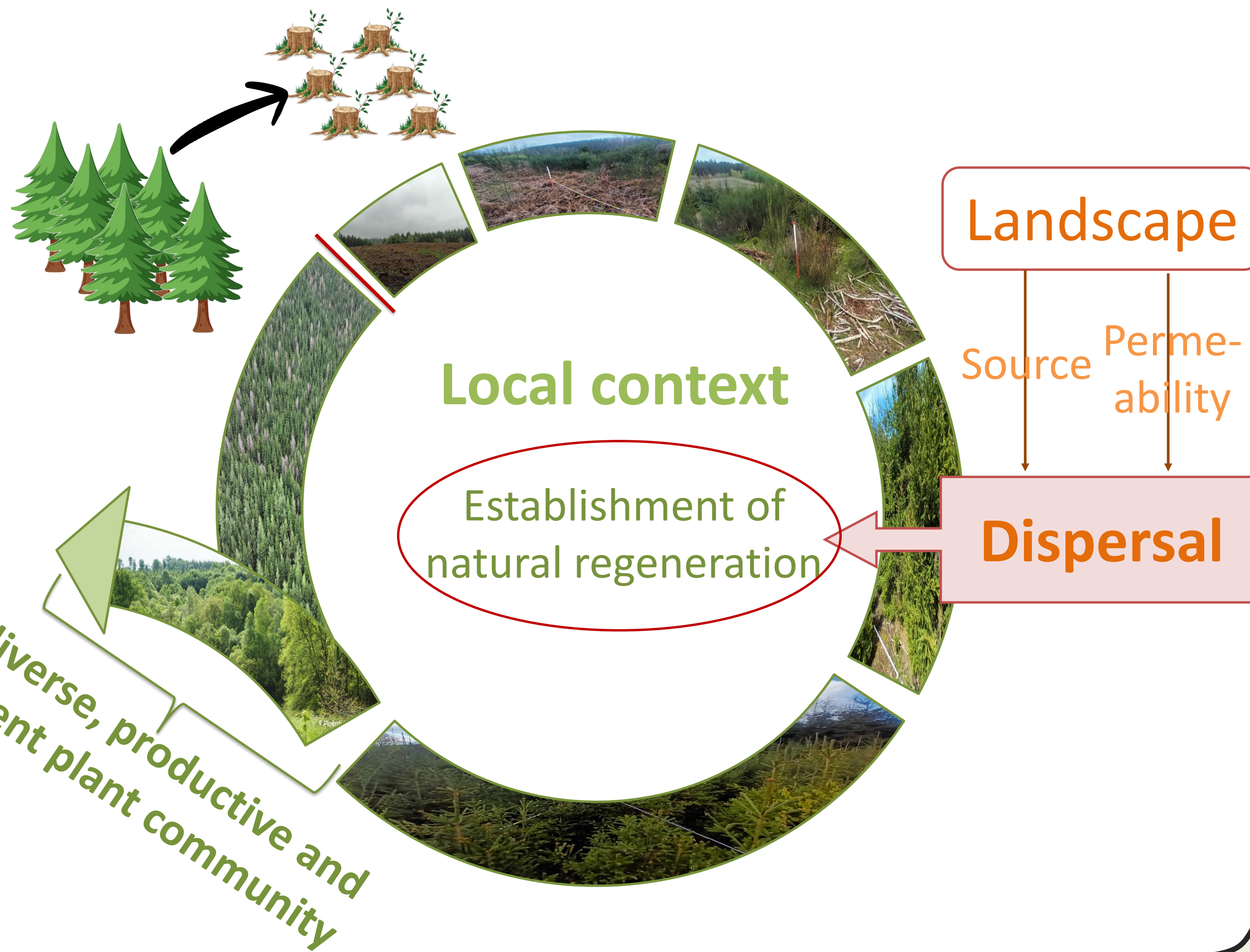
# Estimating Seed Production Using Drone Imagery

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**Context: Clear-cutting and spruce plantation cycle**



Promoting **natural regeneration** through a better understanding of seed production

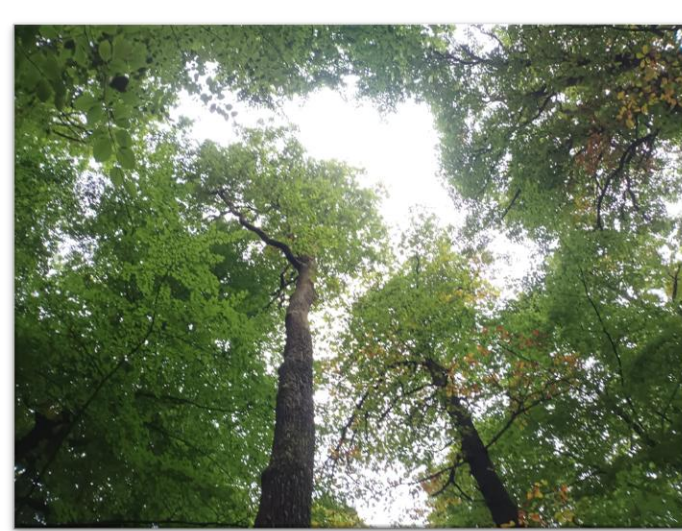
Focus on the **silver birch**

- Large ecological range
- A **fast** and **easily** regenerating species
- An increasingly sophisticated **forestry management plan**



## Ground-based measurements

- Time-consuming
- Measurement error



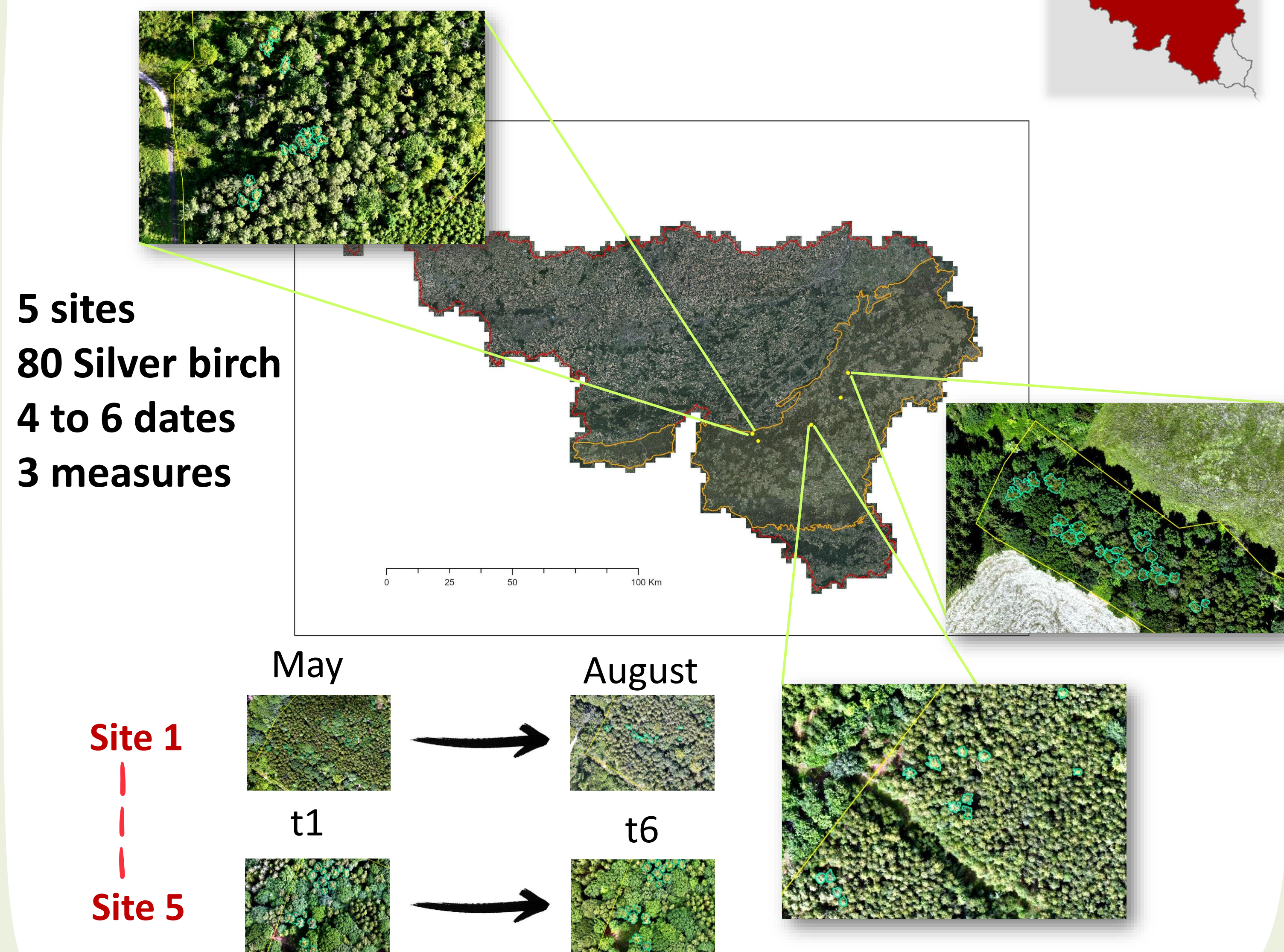
## Drone-based remote sensing

- Time/cost efficiency
- « More accurate measurements»



**The relationship between drone imagery and seed production remains to be demonstrated**

## Sampling design

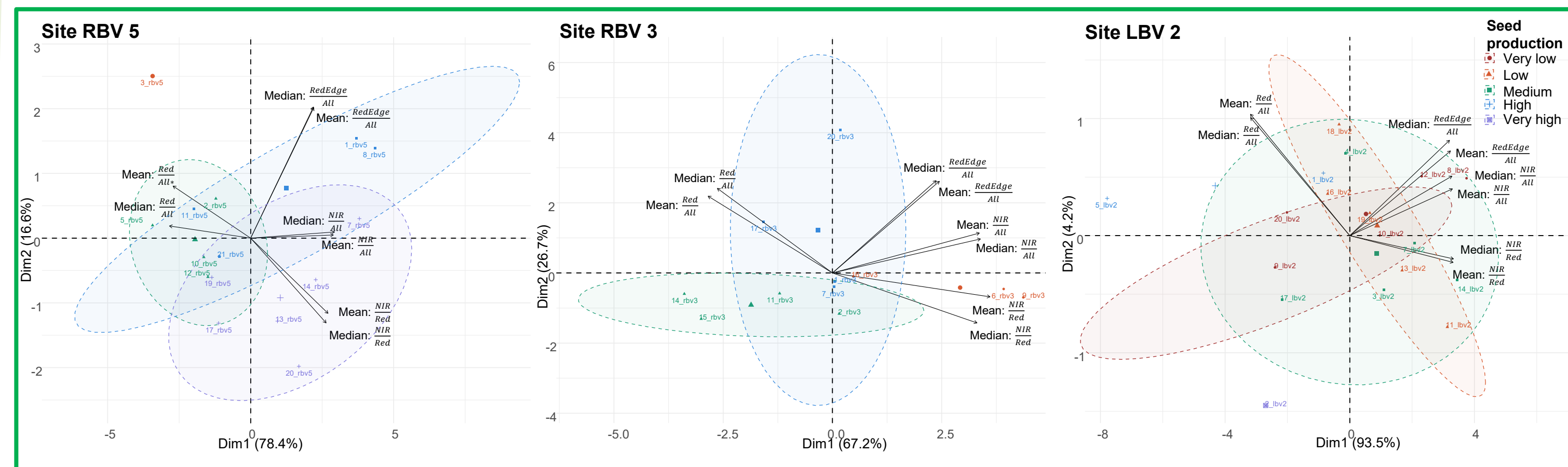


## Preliminary analyses

**Hypothesis 1:** Change in **physiological status**

PCA suggests a **relationship** between **seed production** and spectral indices based on **NIR** and **RedEdge**.

\*All includes the **RGB**, **NIR** and **RedEdge** bands.

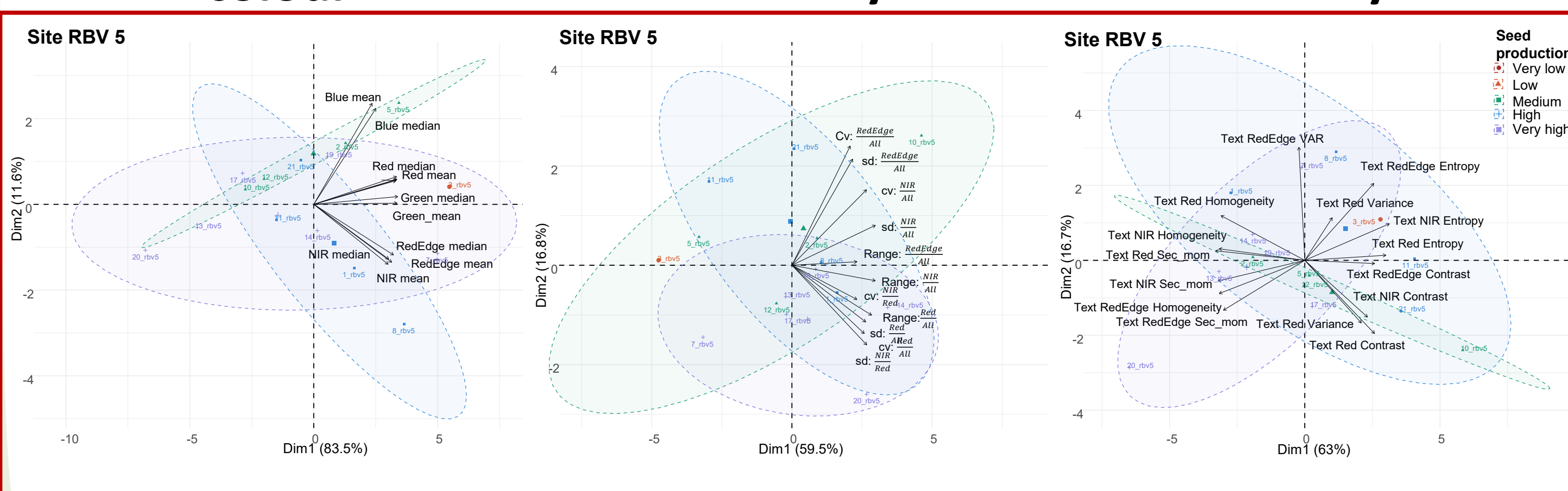


The **other hypotheses** are not supported by the data. The **PCAs do not** show **clear distinction** between **seed production** levels.

**H2: Changes in colour**

**H3: Spectral variability**

**H4: Texture variability**



## Improvements to the 2026 protocol

- Systematic use of a calibration panel
- Same flight times across sites
- Improve resolution
- Automate and improve crown segmentation
- More stringent wind conditions
- Take measurements in September

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