

Fungal Pathogen Quantification Using Image Analysis in Controlled Conditions Trials

Léopold Van den Berghe^{1,2}, Clément Burgeon^{1,2}, Simon Dal Maso², M. Haissam Jijakli^{1,2}

¹ Laboratory of Integrated and Urban Plant Pathology, University of Liège, Gembloux Agro-Bio Tech, 2 Passage des Déportés, 5030, Gembloux

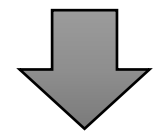
² Agronomical Plant Extract an Essential Oil (APEO), 2 Passage des Déportés, 5030 Gembloux, Belgique

Contact : l.vandenbergh@uliege.com

Introduction

Chemical pesticides problematic

- Toxic for human health
- Toxic for environment
- Could contain eternal pollutants such as PFAs
- Create resistances among pest populations



More and more active matters forbidden

Context

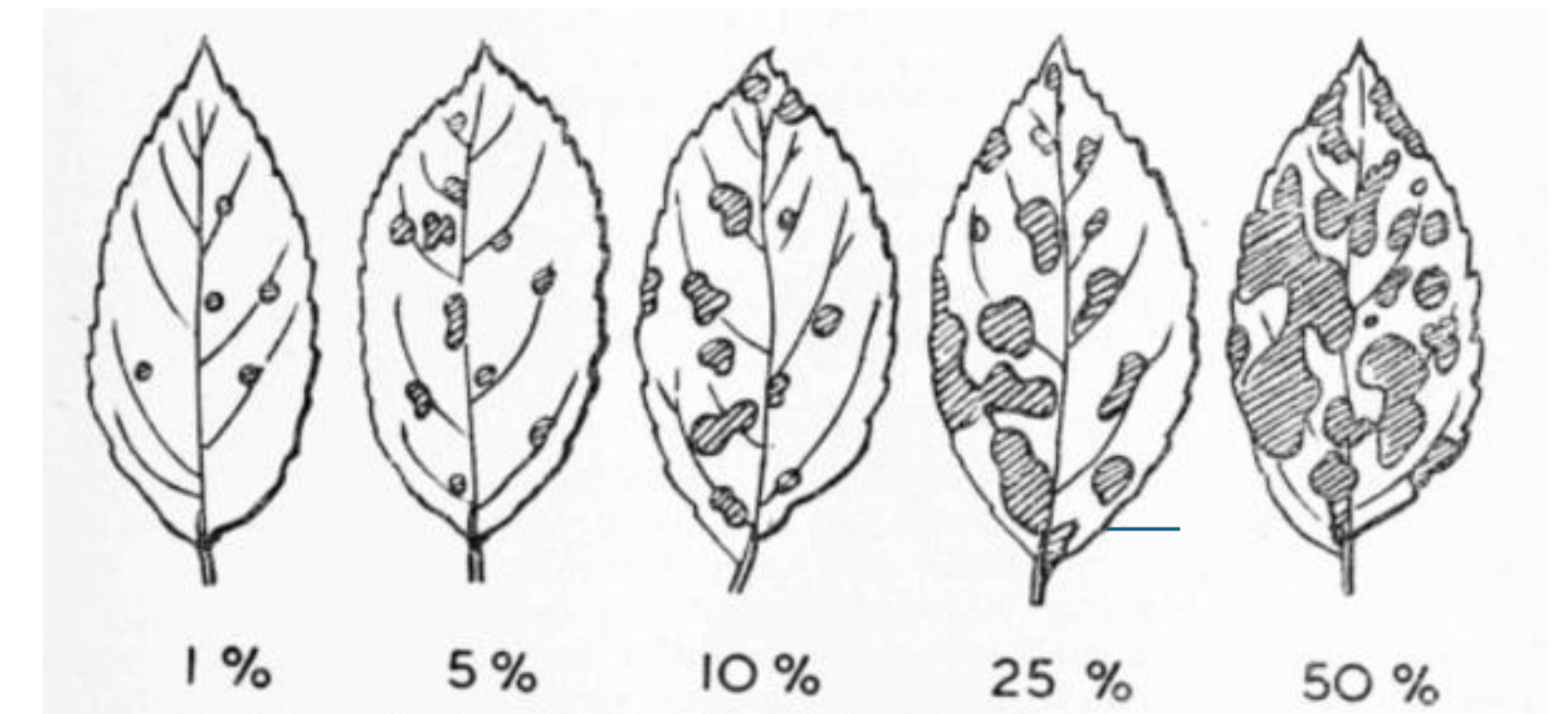
Necessity of developing alternatives to synthetic pesticides

The research focuses on developing **biofungicide** based and **essential oils** against **apple scab disease** (*Venturia inaequalis*)



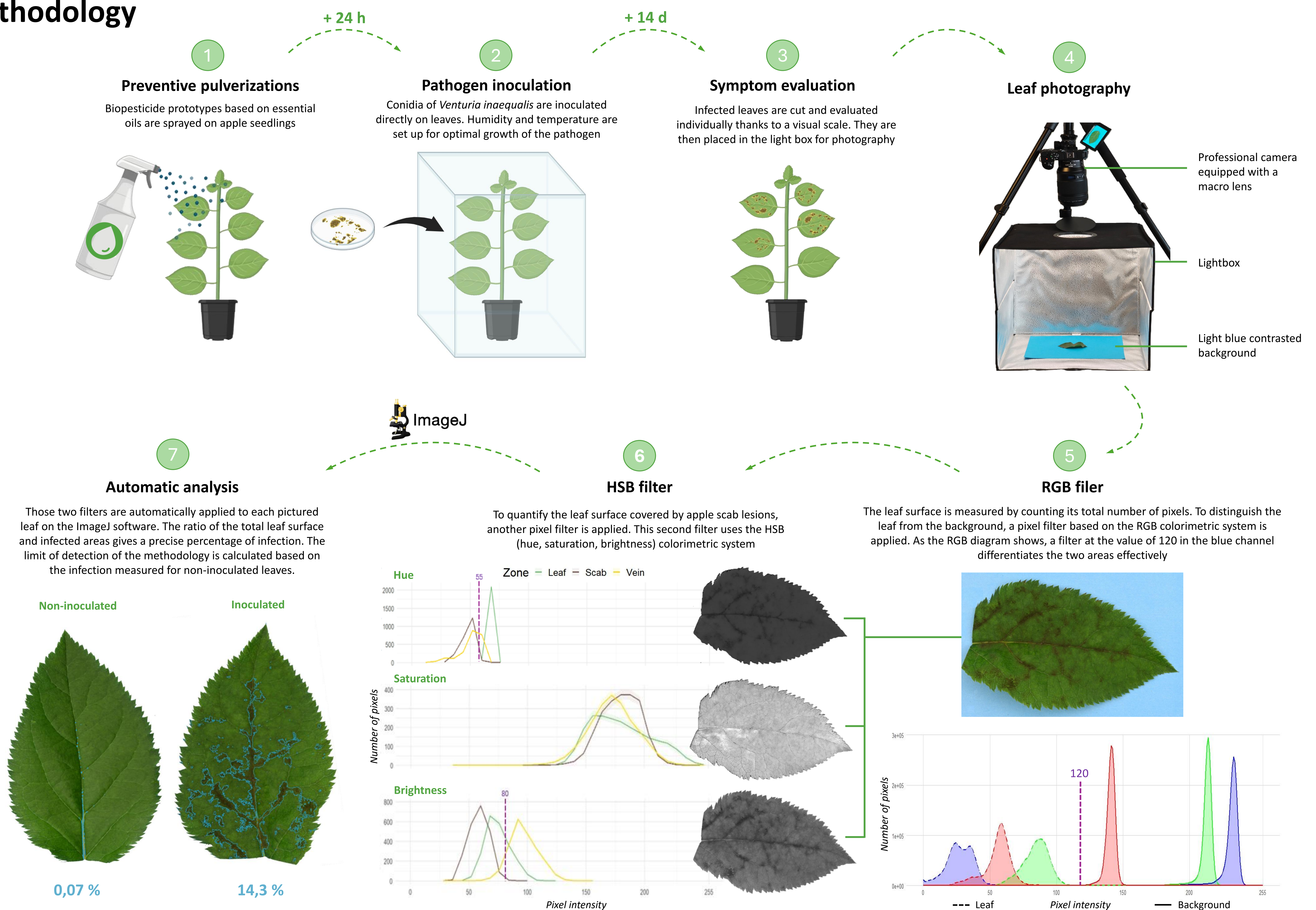
Trials in controlled conditions accelerate the process of development

Problem : Precision is needed for symptom evaluating, yet traditional visual scales are not precise enough



(Croxall et al., 1952)

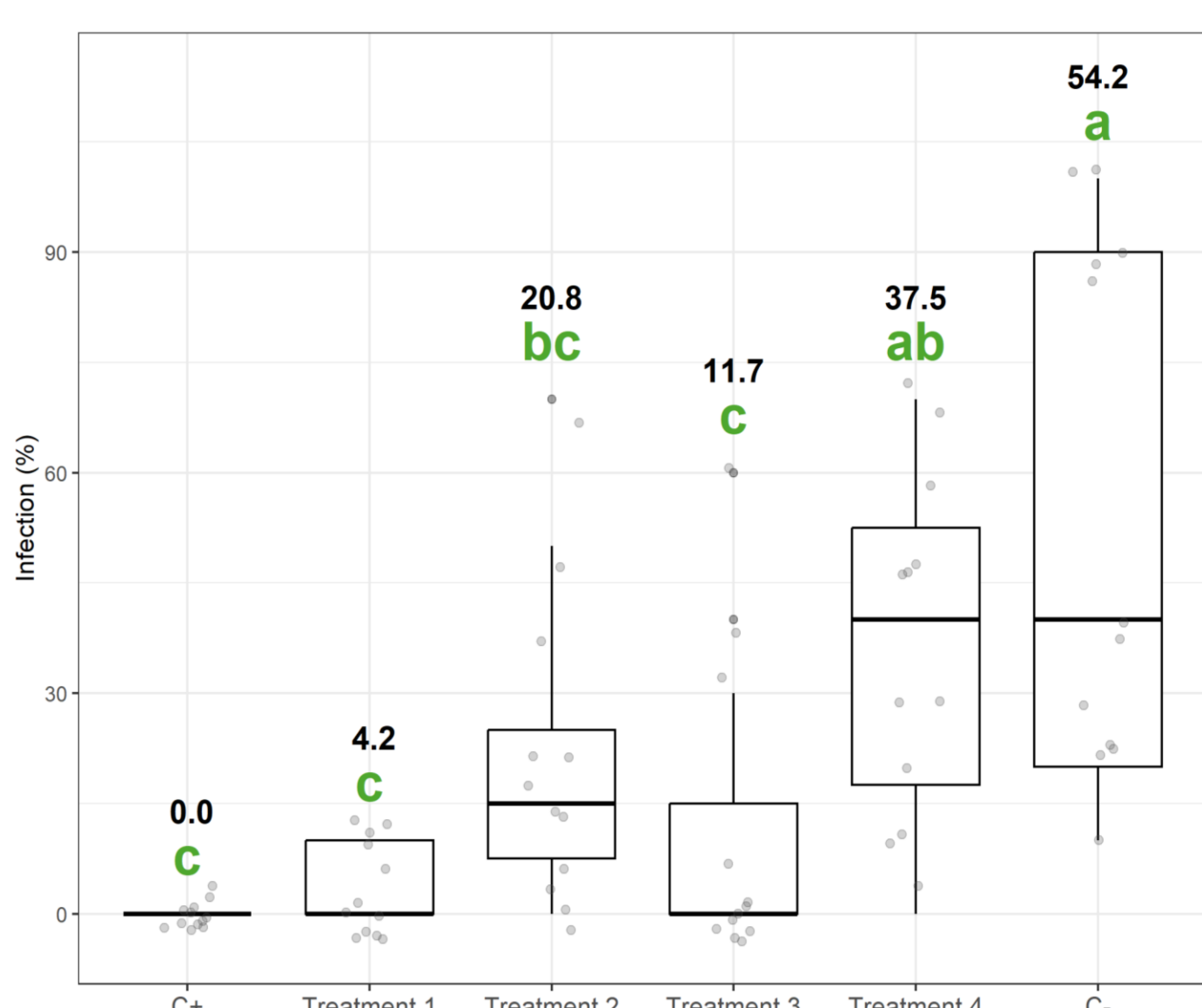
Methodology



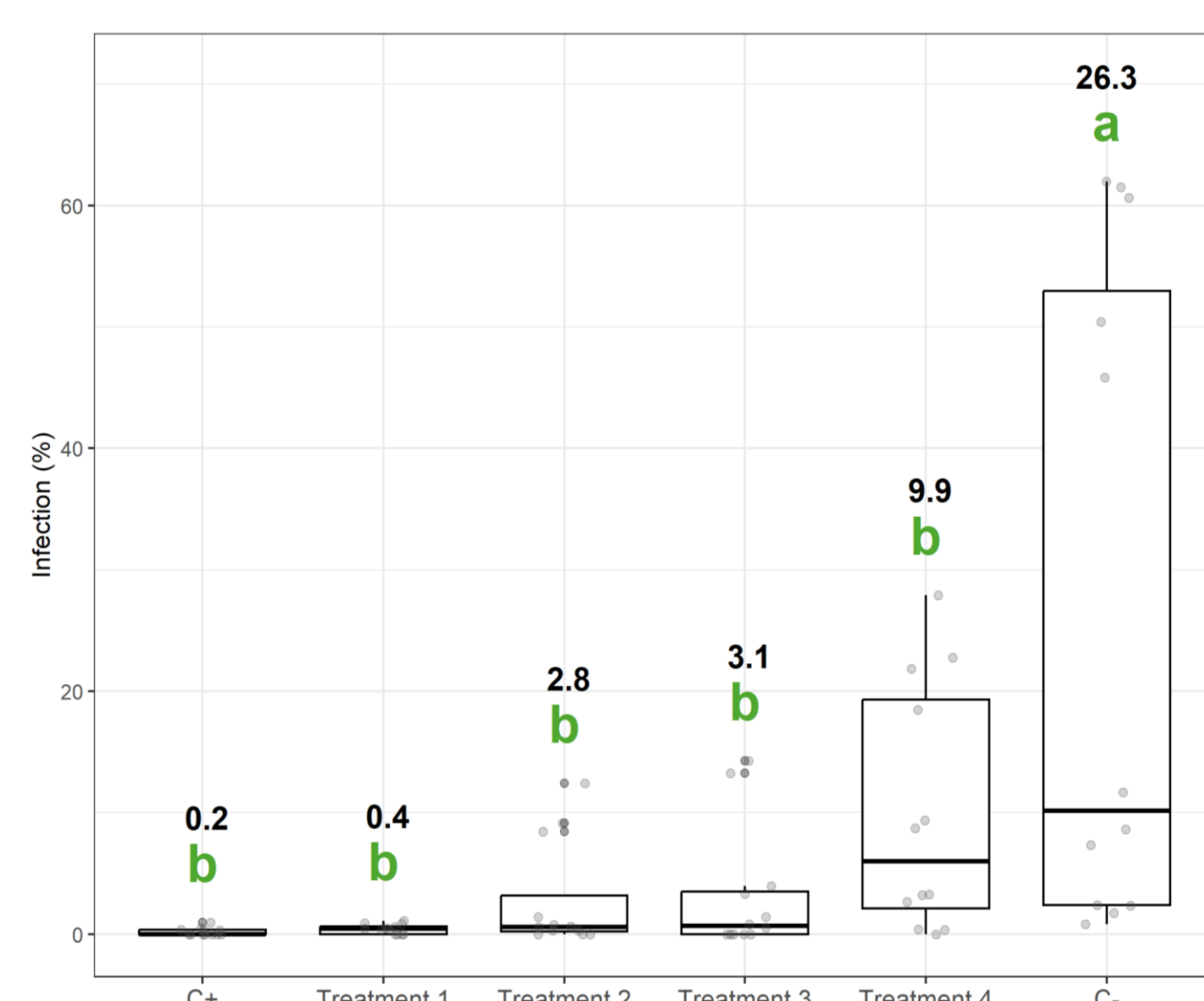
Result

Traditional visual quantification compared with the digital one in an applied example :

Visual quantification



Digital quantification



✓ Finest limit of detection

< 0,3%

✓ Lowest minimum detectable difference

13,98 vs 22,73
(digital) (visual)

✓ Great ordinal correlation

Spearman $\rho = 0,801$

Conclusion



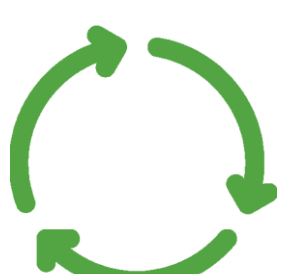
Precise and repeatable



Useful for biopesticide development



Low-cost and open source



Easily transposable