



# PathoLED: Light sources & plant pathology test outcomes

Workshop – 14<sup>th</sup> May 2019



**GEVES**  
Expertise & Performance

# Today we were

- 73 participants
- 11 speakers
- 4 exhibitors
- 3 organisers
- 6 GEVES

- 75 France / 50 companies (10 INRA)
- 8 Netherlands / 4 companies
- 6 Spain / 4 companies
- 3 UK / 2 companies
- 3 Italy / 2 companies
- 1 Norway / 1 company



# Presentations: a brief overview of what we learned



- Light has an impact on
  - The plant: photosynthesis, elongation, transpiration
    - Different plants, different needs of light intensity
  - The pest
  - The interaction
    - With a claim to induce resistance for some colors/intensity
- Many different LED lights and manufacturers
- T° setting is different from T° on plant, effect of light on T° parameters in growth chambers
- Light/growth/pest/other parameters
  - Light spectrum, influence on pest /symptom development but can have a negative effect on plant growth
  - Light fluence, influence on infection efficiency (dimmer), effect on constitutive defences
  - Combination of colors, effect on plant growth, symptoms?
  - LED: effect on growth but depends species
  - Temperature setting/on plants can differ with light and have an influence on plants growth/symptoms



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# Presentations: a brief overview of what we learned



## ● LEDs and symptoms

- Some cases test works well
  - Greenhouse (but natural light?)
  - *Melampsora*
  - Tobamovirus local lesion test
  - *A pisi* even if difference in growth and necrosis intensity
  - *Verticillium*/tomato: growth differences between plants
  - PepMV/pepper
  - *Fusarium*/tomato greenhouse
  - MNSV/melon
  - TSWV/tomato
  - Tobamoviruses/pepper
  - ZYMV, *Fusarium*/watermelon
- Some cases improvement of the test
  - Rust more symptoms, *Septoria* less yellowing
  - Rust, more production spores
- Some cases problems on plant growth, symptom intensity
  - *Pseudomonas*/tomato, difference plant development etiolated, yellowing leaves, strong symptoms, but same result on controls
  - LMV/lettuce, etiolated plants, weak symptoms
  - *Peronospora* corn salad, depends LED source, less sporulation effect on growth
  - *Fusarium*/tomato: depends LED source, one etiolated plants, the other too much symptoms in R control
  - *P fulva*/tomato: depends LED source, etiolated plants but OK on controls
  - TSWV/tomato: died



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# 4 round tables

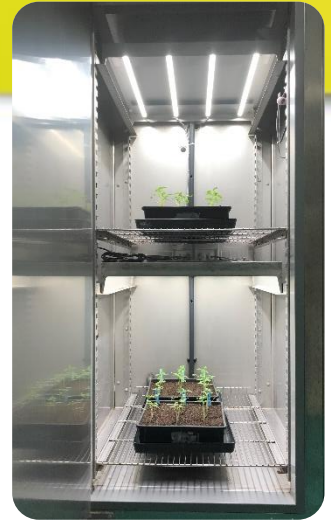
## ● Material/systems: Sophie and Remi, criteria to choose

### – Technical characteristics

- Spectrum, better if adjustable and easy to change, speak in PAR and MAR
- Optic (lens, shape) easier with Leds
- Intensity
- Water resistant norm IP65?67?
- If possible adaptable with current electric system
- Tube/strip
- Homogeneity of light on the plants
- Life time??? What criteria? Timer, spectrum and intensity change over time of use of LED
- What measurements to monitor LEDs over time PAR captor, spectrometer...
- Available over time?
- When will neons not be available? Unknown
- Price
- Adapt the number to the needs not 1/1 replacement
- Reference standards needed? Keep neon/HQI lamp control

### – Plant/pest interaction

- Etiolated, development
- Homogeneous between genotypes
- Crossing/pollinization
- Physiology
- Color: CRI
- Pests: intensity and type symptoms, sporulation, sexual reproduction, test duration, genotype
- Management of changing system



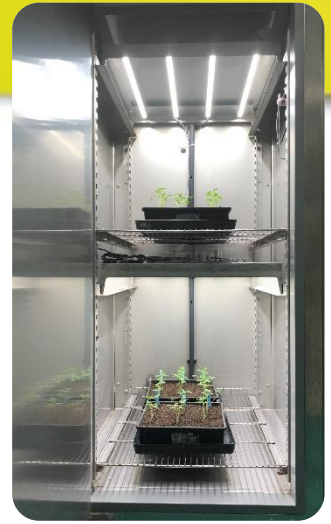
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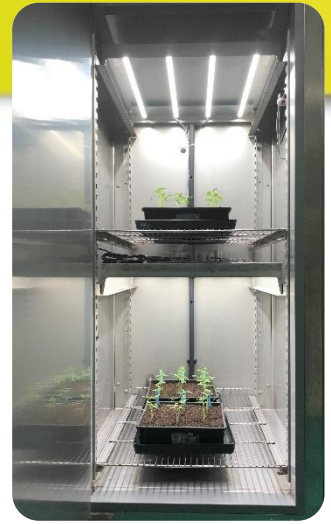
# 4 round tables

## ● Light spectrum: Didier and Olivier

- Different needs
  - Greenhouse easier, not always work on pest, more compact plants
  - Growth chamber: only light
  - Breeding : correlated to field
  - Difficult: validate on each pest
- Reproducible tests, plants not stressed
- Natural light not a reference because vary over time and region
- Spectrum: want some “recepty” close to usual lights for result
- Adaptable, different spectrum for different tests or phases?
- Plasmalight?
- Opens new question



# 4 round tables



## ● Impact on other parameters: Ela and Pierre and Gaetane

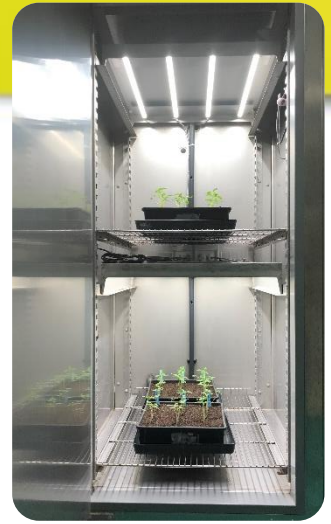
- Many questions,
- Thought no impact
- On T° and humidity: yes
- On CO2: ? certainly
- Light is energy, needs to be dissipated
- Many plants and tubes, if low distance risk of increasing T°
- Less heat in greenhouse so increase heat
- Less cold needed
- Less electricity but not so much 17%
- Intensity pic when Leds are switched on: adaptation to plan
- Modification design installation, distance transformer/light
- **Control T° at plant level, cartography**
- Effect on transpiration/ Condensation but plants are dry
- More test levels in trays of the growth chamber: possible to test more plants
- Knowledge is spread no compilation on global effect of light on plants



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# 4 round tables



## ● Impact on health/environment: Valerie and Clotilde

### – Environment:

- Less energy except in greenhouse
- Greenhouse: outside lighting pollution, regulation in some countries
- Recycling: not known, electronic???
- Harmful components: less than tubes but still some rare metals
- Impact on other organisms micro/macro and biological control in greenhouses
- Life Time: 5 years? Longer than neons? Less waste
  - Decrease intensity and spectrum changes, coating material

### – Health:

- Eyes
- Skin
- Some publications on eye damages but monochromatic
- Adaptation when entering and exit
- Glasses (anti blue), shields
- Dimmer/switch off light
- Not enough information





# Follow up

- Presentations available on GEVES web site
- Summary of round table will be circulated
- No information given on insects
- Work together?
- Ring test
- Other meetings?

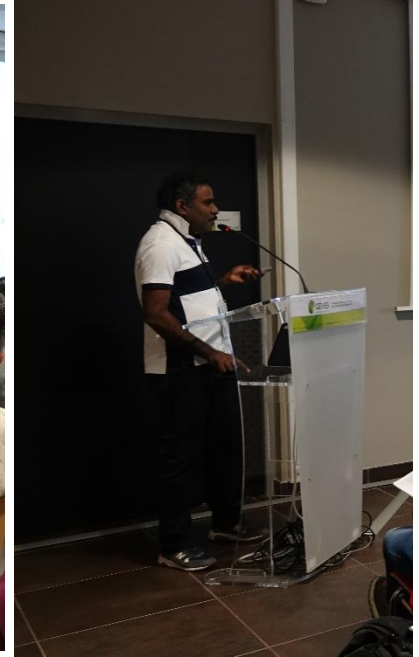


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# Thank you to

- Lecturers who shared their knowledge and experience with us



# Thank you to

## ● Organising committee

- Nicolas Denancé
- Valérie Grimault
- Olivier Herbert
- Sophie Perrot
- Clotilde Polderman-Roussille
- Nathalie Augé

## ● Local helpers

- Laura Cordier
- Stéphanie Erdeven
- Rosie Gilonis
- Laurent Le Corre
- Pierre Lerebours
- René Pann
- Nathalie Phelipon



## ● Exhibitors



GRUPE EDF



## ● Our sponsors



Société Française de Phytopathologie

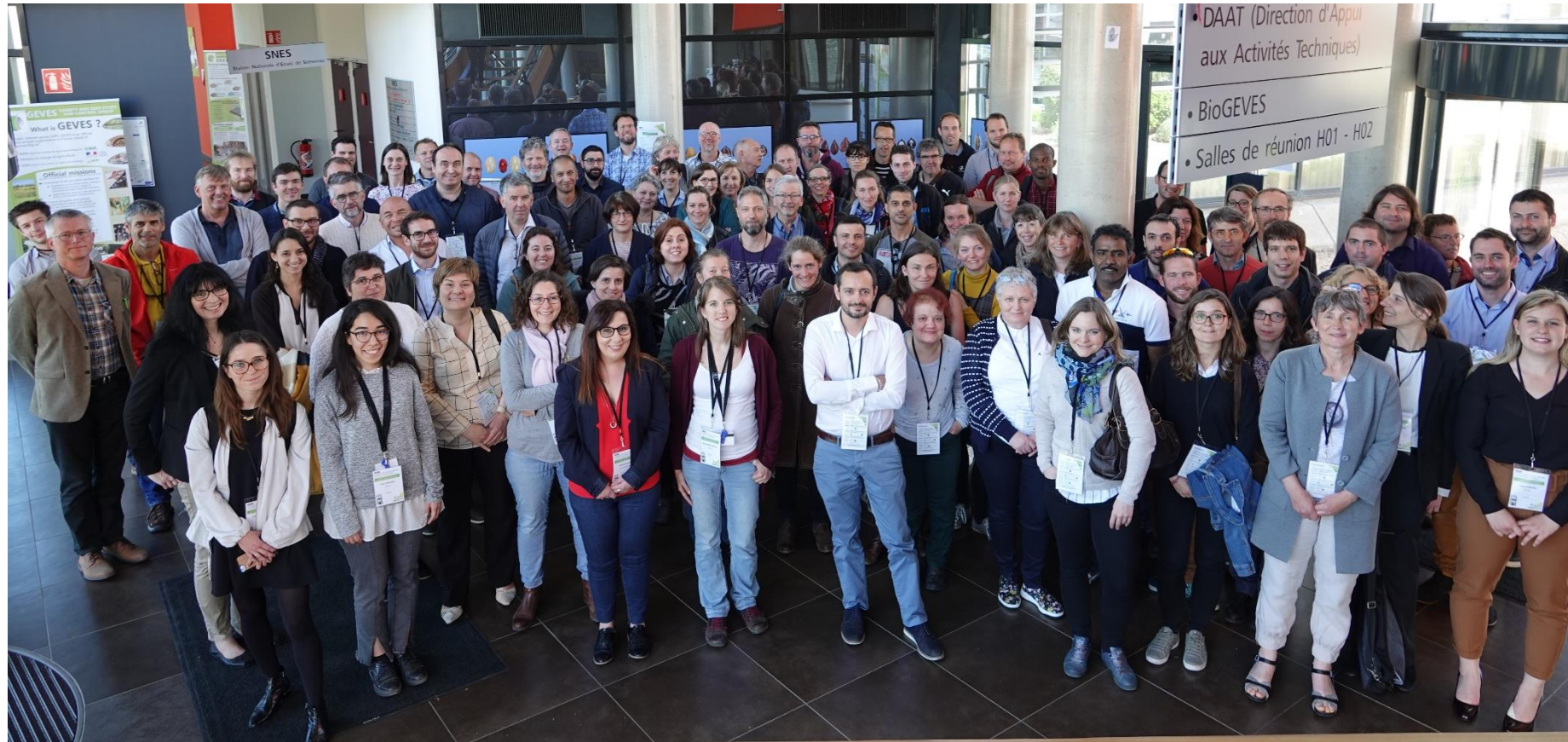


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And...

**Thank you for your participation**



**and for those having dinner with us, let's meet at  
La réserve (theater Le Quai)**