

Feedback on experiences with various pathosystems at GEVES

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Workshop PathoLED – 14th May 2019



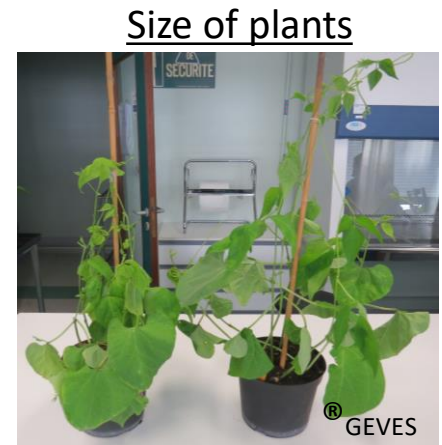
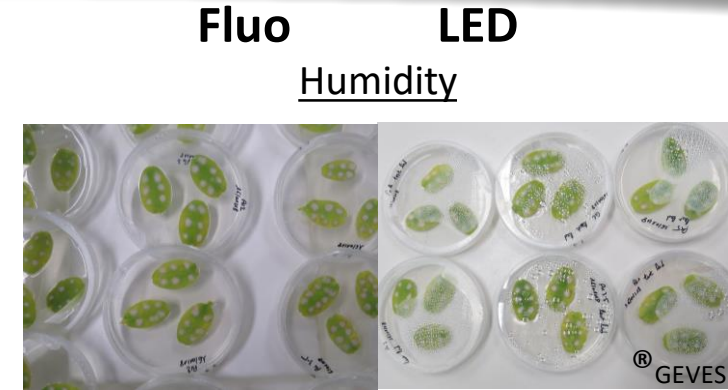
Comparison between LED and fluo condition



LED:
2
suppliers

Homogeneity of
development
Symptoms
observed
Validation on
controls

Bacteria
Fungus
Viruses



Vegetables
Cereals

Light conditions compared

Fluorescence light

- Warm white
- Reference: OSRAM 58w830
- Size: 150 cm
- 8 tubes of 70 cm



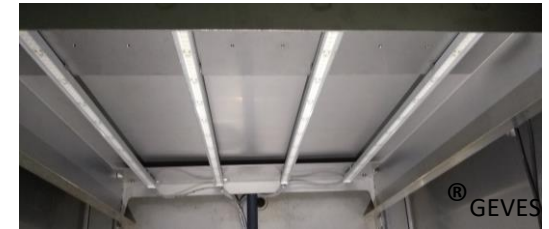
LED - Supplier 1

- Light: closer than reference 58w830
- Size: 60 cm
- 10 tubes on 70 cm
- Tube: same shape as neon, but 180 degree illumination
- Power supply: 230V



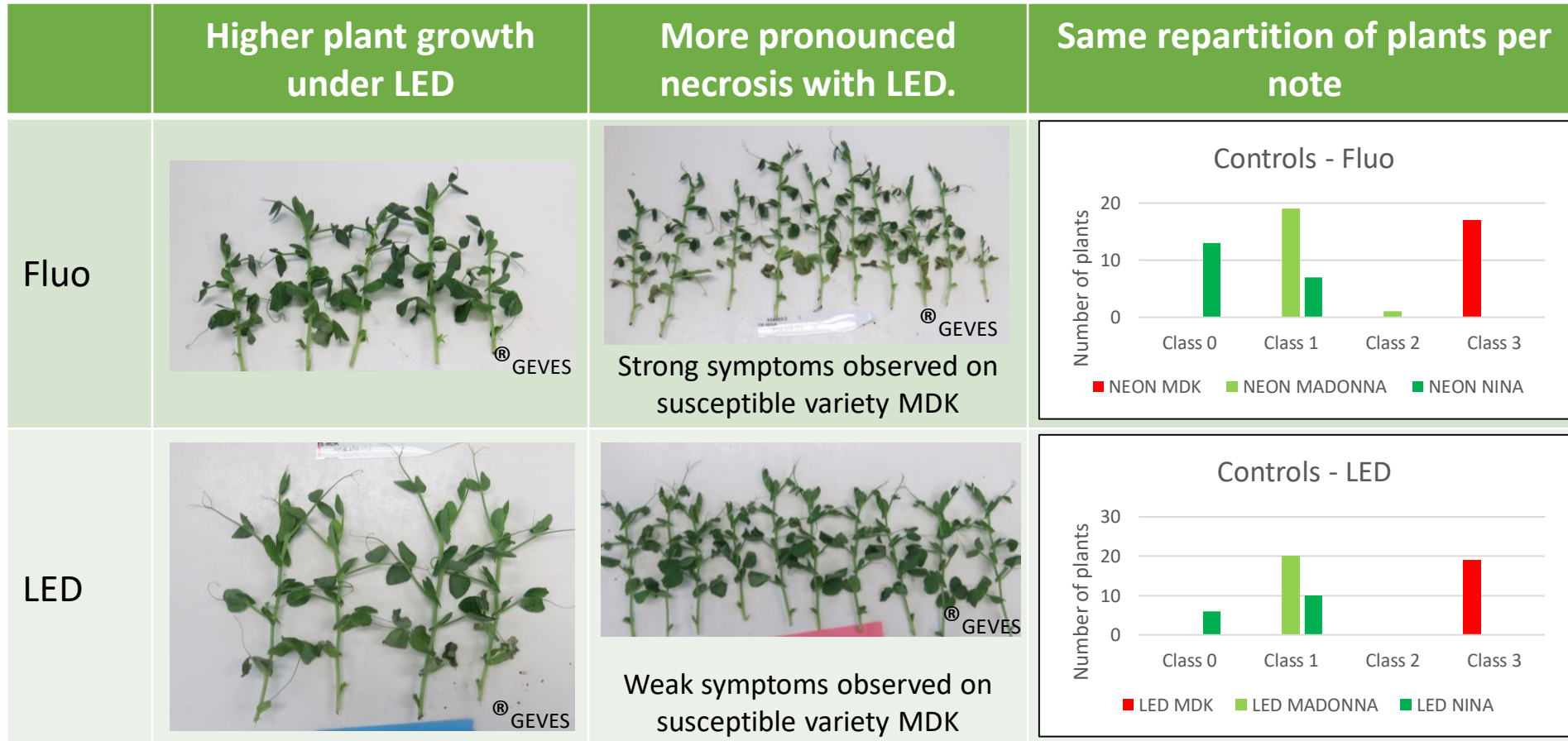
LED - Supplier 2

- Light: closer than reference 58w830
- Size: 60 cm
- 4 strips of LED on 70 cm
- Strip: 8 LED on 10 cm
- Power supply: 24V, necessity of an electrical transformer



No differences between fluo and LED conditions

➤ Evaluation of resistance of pea to *Ascochyta pisi* – supplier 1



➔ Some differences observed between fluo and LED but no impact on test evaluation

➔ Validation of LED in place of fluo

No differences between fluo and LED conditions

➤ Evaluation of resistance of tomato to *Verticillium dahliae*– supplier 1

	Non inoculated plants	Inoculated plants
Fluo	No specific observation	<ul style="list-style-type: none">•Yellowing and wilting of leaves for the susceptible control (expected symptom)•Strong brown vessels
LED	Heterogeneity of plant stage for the variety Santonio (susceptible control)	<ul style="list-style-type: none">•Growth reduction of susceptible varieties (expected symptom)•Strong brown vessels



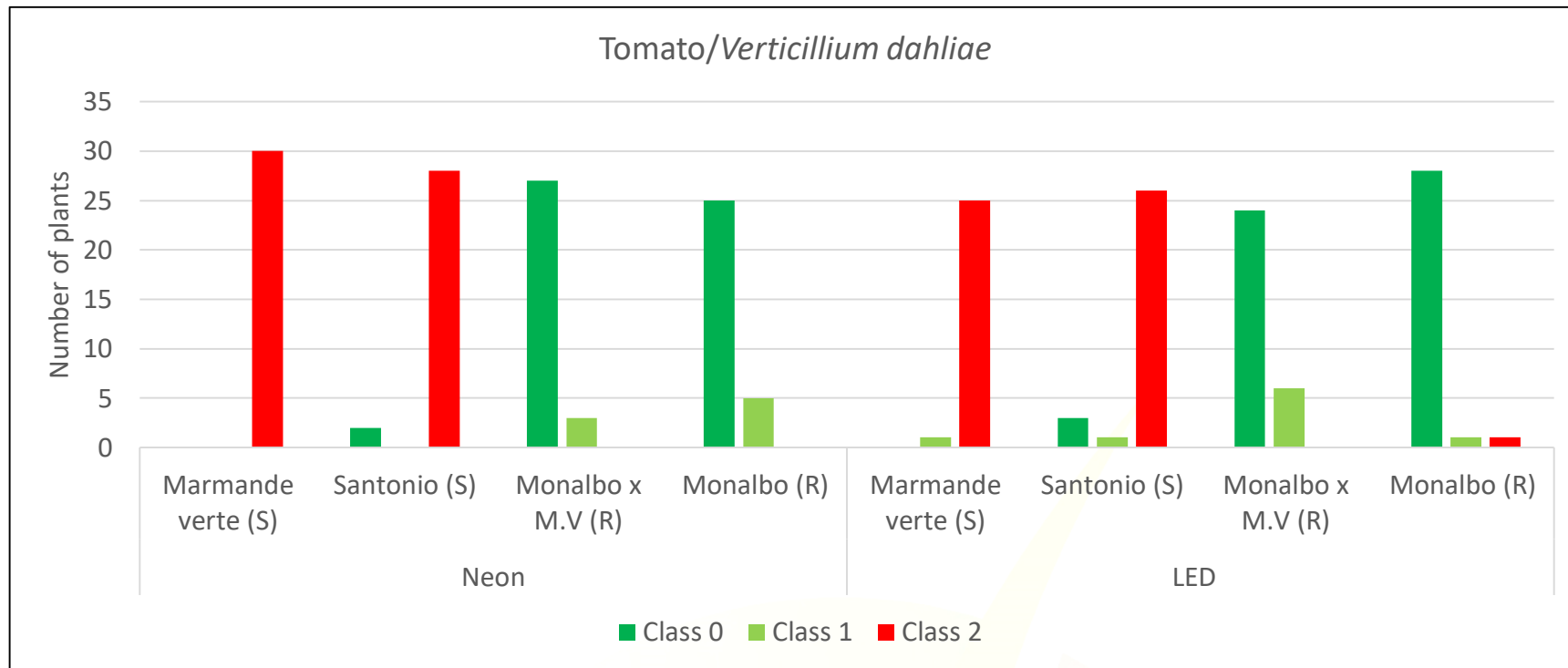
Fluo: Yellowing and wilting



LED: heterogeneity on mocks (Santonio)

No differences between fluo and LED conditions

➤ Evaluation of resistance of tomato to *Verticillium dahliae*– supplier 1



➔ Some differences observed between fluo and LED but no impact on test evaluation

➔ Validation of LED in place of fluo



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Better results with LED than fluo conditions

➤ Production of inoculum: rust (*Puccinia coronata*) on oat /– supplier 1

No difference at inoculation stage

More pustuls on the foliar surface with LED.

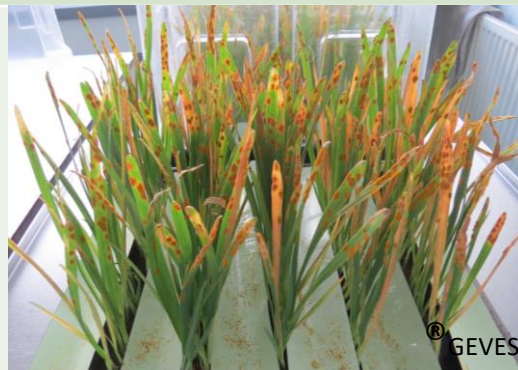
More spores produced with LED

Fluo



300mg

LED



660 mg

➔ Stronger symptoms and higher production of rust on LED

➔ Validation of LED in place of fluo.



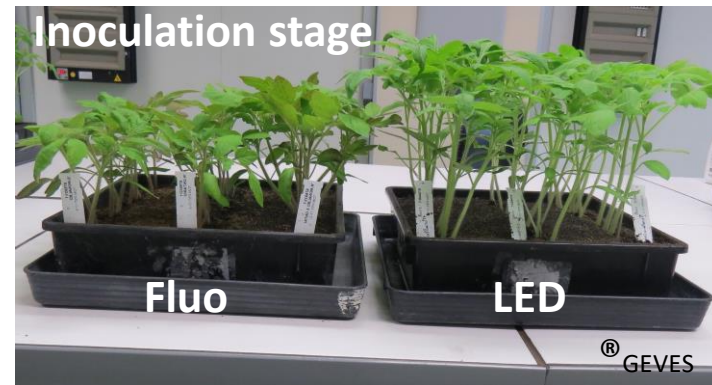
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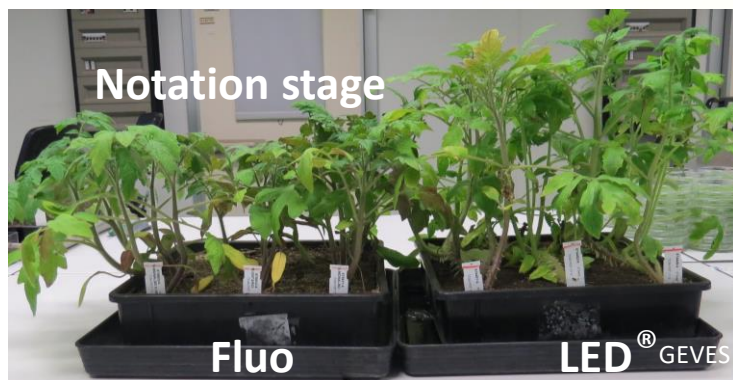
Less good results with LED conditions

➤ Evaluation of resistance of tomato to *Pseudomonas syringae* pv. *tomato* – supplier 1

	Inoculation stage
Fluo	<ul style="list-style-type: none"> • Expected size • Stem and leaves dark green
LED	<ul style="list-style-type: none"> • Plants etiolated (about 5 cm larger)

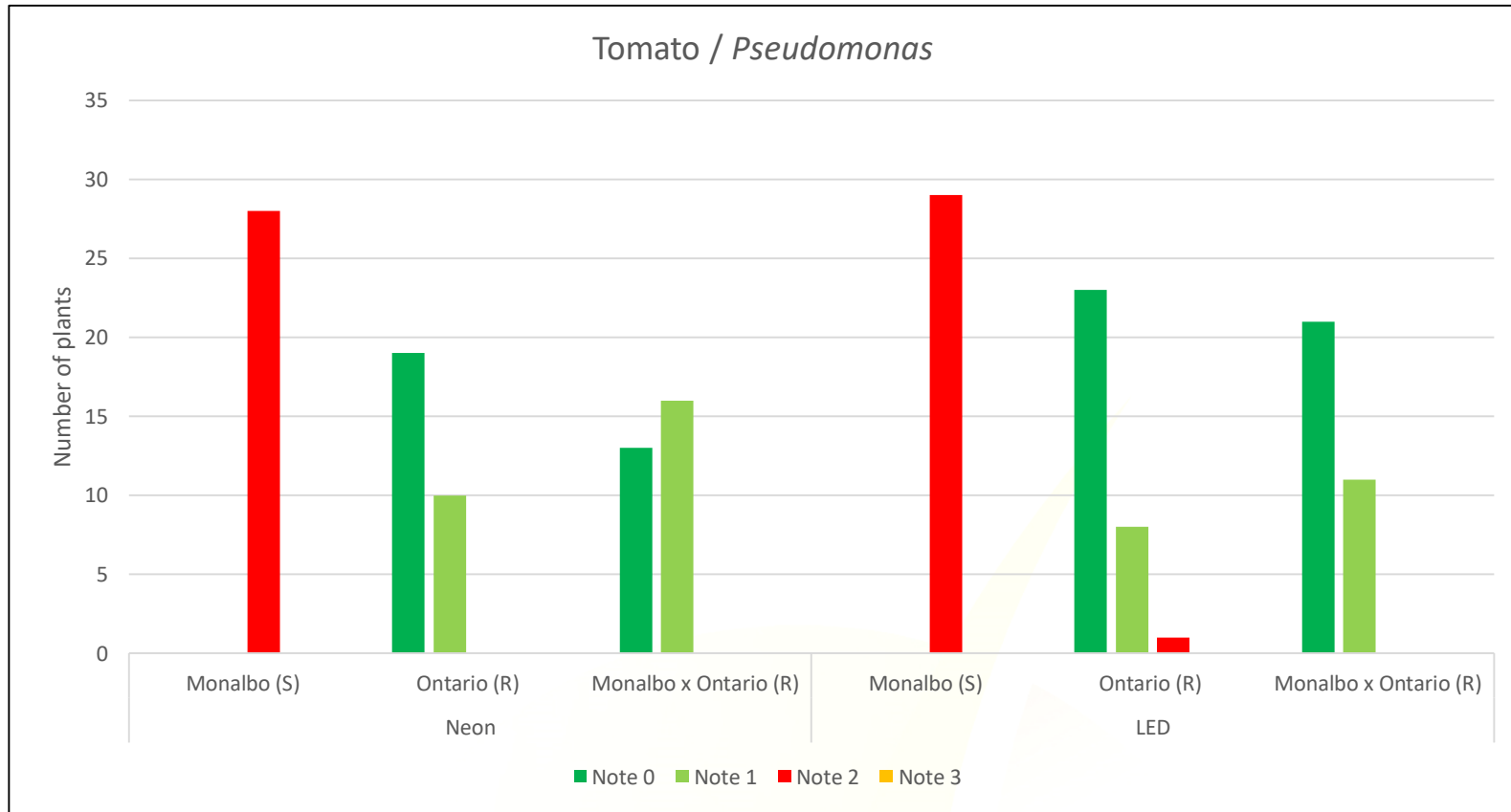


	Non inoculated plants	Inoculated plants
Fluo	<ul style="list-style-type: none"> • Expected size of plants 	<ul style="list-style-type: none"> • Expected size • Symptoms of bacterial speck
LED	<ul style="list-style-type: none"> • Etiolated plan 	<ul style="list-style-type: none"> • Etiolated plants and yellowing of leaves → difficulties at notation • Strong symptoms: several bacterial speck, loss of old leaves



Less good results with LED conditions

➤ Evaluation of resistance of tomato to *Pseudomonas syringae* pv. *tomato* – supplier 1



➔ Some differences observed between fluo and LED, no impact on validation on controls but notation more difficult with LED

➔ No validation of LED in place of fluo



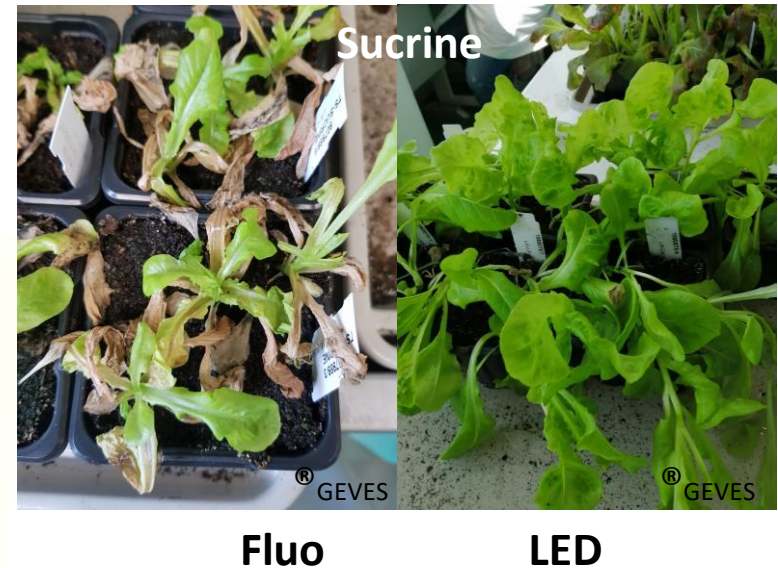
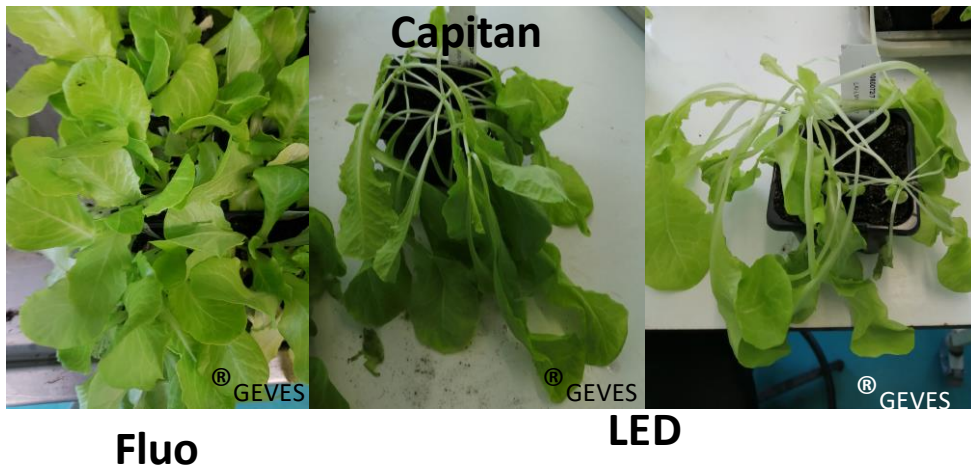
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Less good results with LED conditions

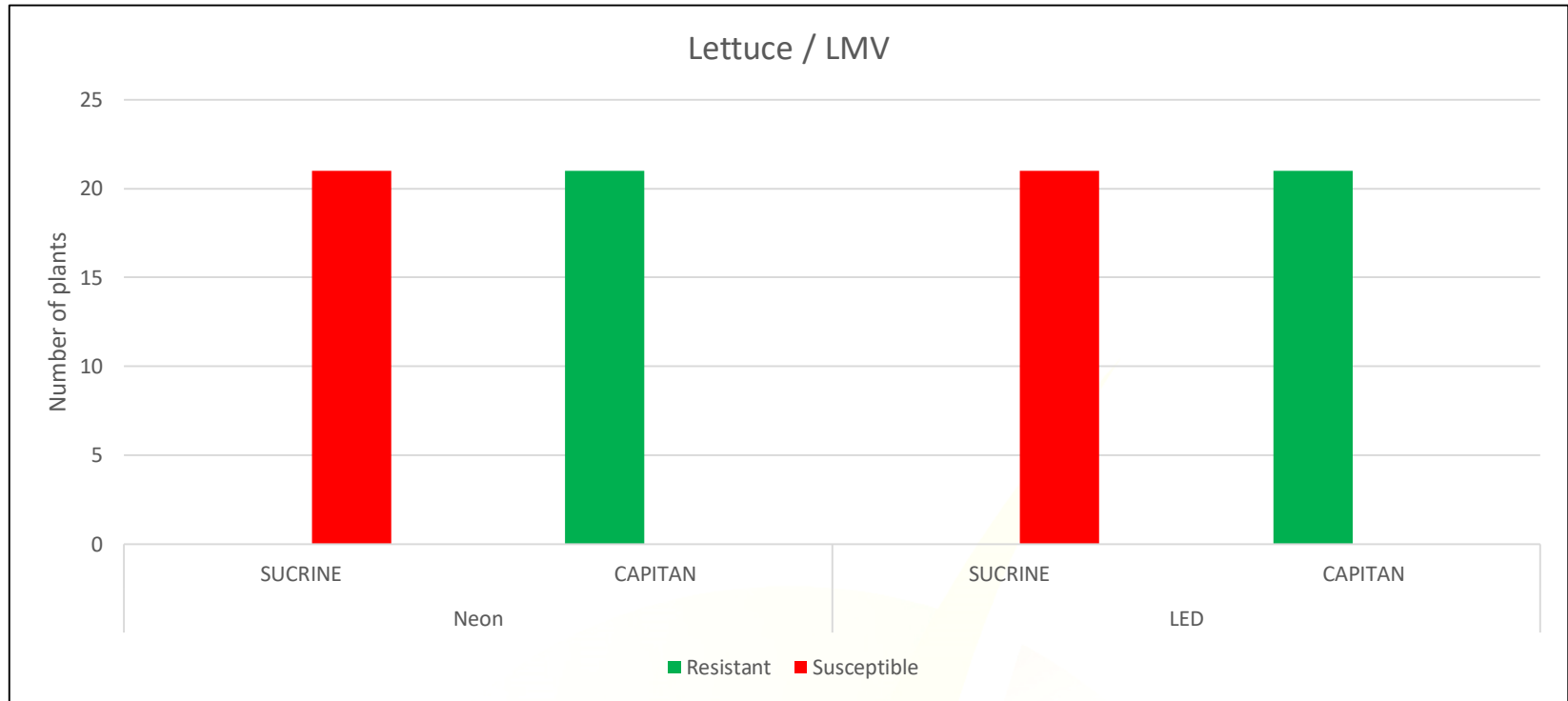
➤ Evaluation of resistance of lettuce to LMV– supplier 2

	Non inoculated plants	Inoculated plants
Fluo	<ul style="list-style-type: none"> Expected size of plants 	<ul style="list-style-type: none"> Expected size Specific symptoms of LMV
LED	<ul style="list-style-type: none"> Etiolated plan 	<ul style="list-style-type: none"> Etiolated plants and yellowing of leaves → difficulties at notation Weak symptoms of LMV: no leaf curving, few growth retardation



Less good results with LED conditions

➤ Evaluation of resistance of lettuce to LMV– supplier 2



- ➔ Some differences observed between neons and LED, no impact on validation on controls but notation fluo difficult with LED
- ➔ No validation of LED in place of fluo

Comparison of 2 suppliers

➤ Evaluation of resistance of cornsalad to downy mildew (*Peronospora valerianella*)

Fluo

Lower sporulation with LED
– supplier 1

Etiolated plants with LED –
supplier 2



- ➔ Differences observed between fluo and LED, and between suppliers
- ➔ Impact on symptoms expression or plant development
- ➔ No validation of LED in place of fluo

Comparison of 2 suppliers

➤ Evaluation of resistance of tomato to *Fusarium oxysporum* f. sp. *lycopersici*

LED - supplier 1

Strong symptoms, growth reduction on susceptible plants but very aggressive test, even on the resistant control

Etiolated plants with LED – supplier 2

Etiolated plants, fragile and brittle plants. Very difficult for notation

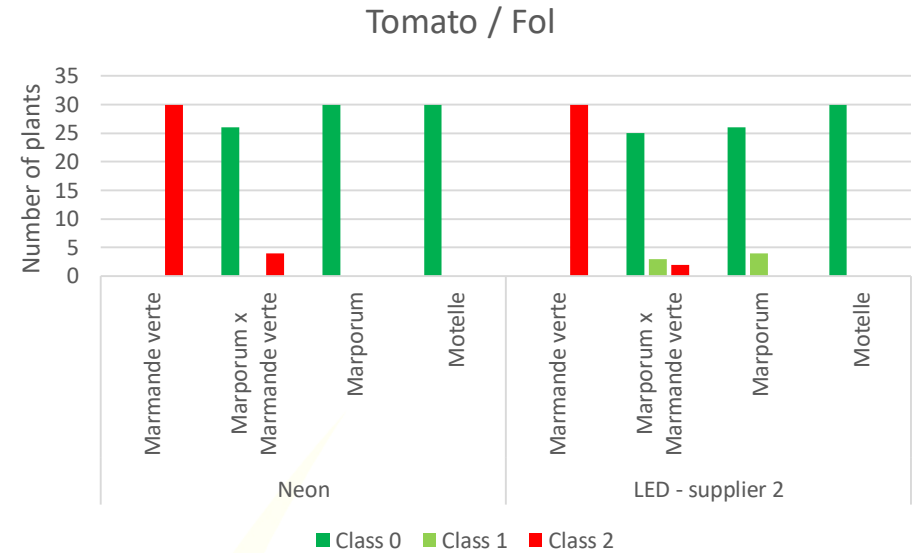
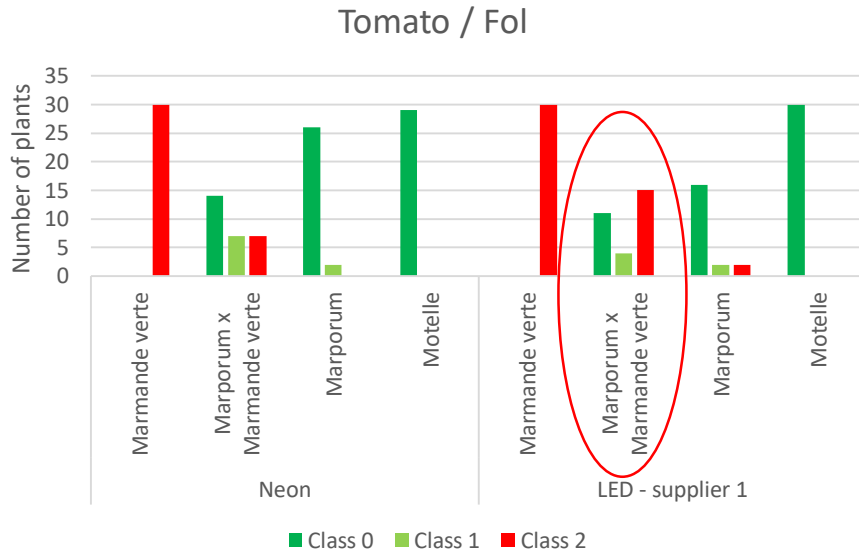


Resistant control



Comparison of 2 suppliers

➤ Evaluation of resistance of tomato to *Fusarium oxysporum* f. sp. *lycopersici*



- ➔ Differences observed between fluo and LED, and between suppliers
 - ➔ Impact on symptoms expression or plant development
 - ➔ No validation of LED in place of fluo

Comparison of 2 suppliers

➤ Evaluation of resistance of tomato to *Passalora fulva*

LED - supplier 1

Etiolated plants, fragile and brittle plants. Very difficult for notation

Etiolated plants with LED – supplier 2

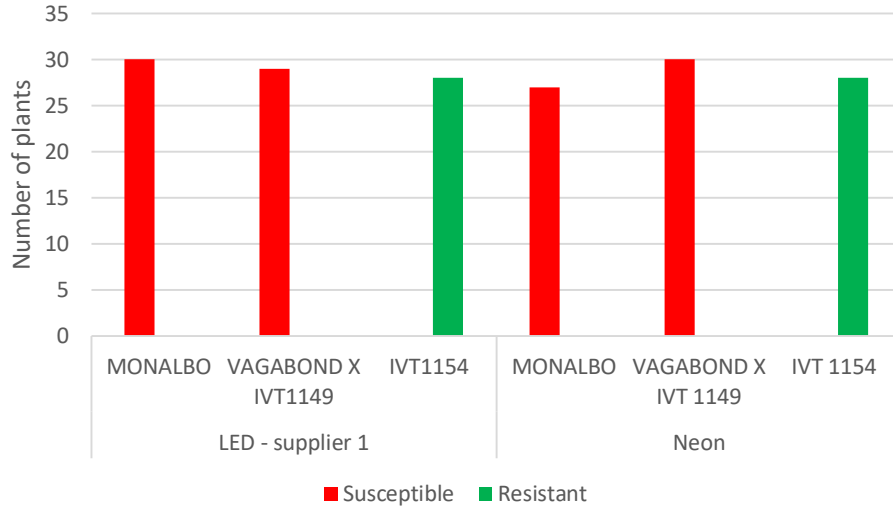
Etiolated plants, fragile and brittle plants. Very difficult for notation



Comparison of 2 suppliers

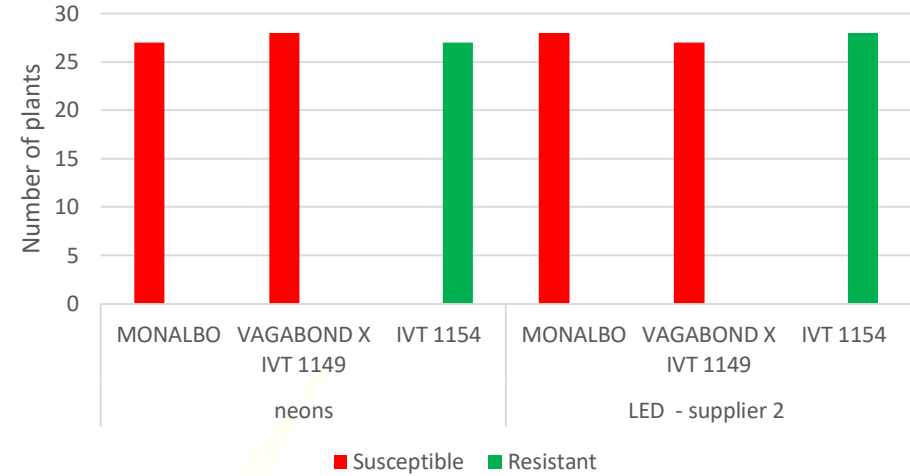
➤ Evaluation of resistance of tomato to *Passalora fulva*

Tomato / *Passalora fulva*



LED – supplier 1:
Validation on controls.

Tomato / *Passalora fulva*

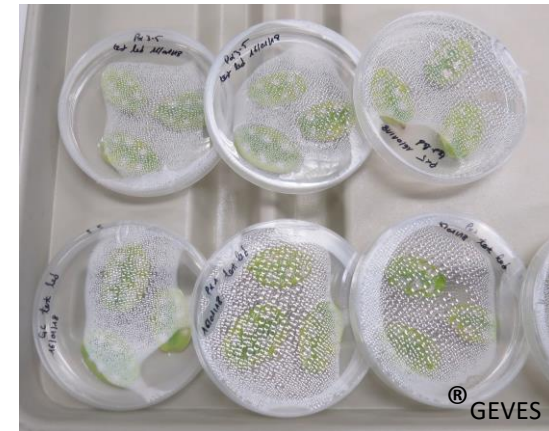


LED – supplier 2:
Validation on controls.

- ➔ Differences observed between fluo and LED
 - ➔ Impact on plant development
 - ➔ No validation of LED in place of fluo

Conclusion

- 4 biotests validated with LED out of the 13 tests performed at GEVES on vegetables and cereals
- Main problems encountered but depending on species and/or pathogens:
 - ❌ Plants etiolated (fragile and brittle) → tomato, corn salad and lettuce
 - ❌ Test more/too aggressive → tomato and pea
 - ❌ Test less aggressive → corn salad
- Other observations:
 - ❌ High humidity
 - ❌ Heat release



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Thank you for your attention