

HM CLAUSE

Patho LED Workshop

14/05/2019







Agenda



LED Specifications by Location

Pathosystems Tested by Location

General Conclusions



LED Specifications Almeria (Spain)

- Company: Threeline Technology
- Ref.: T8GP150 Cold light
- Wave length range: 450nm 730nm





Pathosystems Tested in Almeria (Spain)

Pathosystems	GH/GC	Plant stage at inoculation	Genotypes
Melon/MNSV	GC	Cotyledon	S and R checks
Tomato/TSWV	GC	Cotyledon	S and R checks
Pepper/TSWV	GC	Cotyledon	S and R checks
Squash/ToLCNDV	GC	1st leaf	S and R checks
Pepper/ Tobamovirus	GC	Cotyledon	S and R checks



Pathosystems Tested in Almeria (Spain)

MNSV / Melon



Typical necrotic spots at 7dpi on S check

ToLCNDV / Squash



Susceptible check at 18 dpi



Resistant check at 18dpi

TSWV / Tomato



TSWV symptoms at 14dpi on S check No symptoms at 14dpi on R check

Pathosystems Tested in Almeria (Spain)

Tobamovirus / Pepper



Fallen cotyledons at 8dpi on R check



Non-inoculated Pepper at 15 dps



No symptoms on cotyledons at 8dpi on S check

Non-inoculated Pepper and tomato at 21 dps





LED Specifications Florida (USA)

- Company: Phillips
- Ref.: Greenpower LED DR/W 15W lamps



 LED only used as supplemental light during short days under GH conditions.



Florida (USA)

Pathosystem	GH/GC	Plant stage at inoculation	Genotypes
Tomato/Vd	GH	Cotyledon	S and R checks
Tomato/FOL	GH	Cotyledon	S and R checks
Tomato/TSWV	GH	Cotyledon/1 st true leaf	S and R checks
Pepper/P. capsici	GH	3 rd true leaf	S and R checks
Pepper/ PepMoV	GH	Cotyledon	S and R checks
Pepper/TSWV	GH	Cotyledon	S and R checks



Pathosystems Tested in Immokalee (FL)

Pictures: GH Supplemental Lighting Design





Comparison of impact on pepper growth using LED supplemental lighting in FL greenhouse during short day period (winter months).



Comparison of impact on tomato growth using LED supplemental lighting in FL greenhouse during short day period (winter months).

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Pathosystems Tested in Immokalee (FL)

PepMoV / Pepper





PepMoV inoculated pepper under supplemental LED in GH conditions. S check in back, R check in front.



Figure 6: a) Growth of FOL3 test under DR/W LED supplemental lighting. b) Results of FOL1 when tested under DR/W LED supplemental lighting (Susceptible variety, EP7, is on the left, resistant variety, Pik Red, is on the right.)

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LED Specifications Thailand

- Company: Growlab Agritech Company Limited http://www.growlaboratory.com/
- Ref.: GFB25 Spectro17



Wave length range: 450nm – 700nm





Pathosystems Tested in Thailand

Pathosystem	GH / GC	Plant stage at inoculation	Genotypes
Cucurbits/Potyvirus (PRSV, ZYMV)	GC	Seedling	S and R checks, breeding lines
Cucurbits/Fungi (Fusarium, Db)	GC	Seedling	S and R checks, breeding lines
Solanaceous/Rs	GC	Seedling	S and R checks, breeding lines
Hot Pepper/Fungi (Colletotricum, Pc)	GC	Seedling	S and R checks, breeding lines
Hot Pepper/ Potyvirus (ChiVMV)	GC	Seedling	S and R checks, breeding lines
Hot Pepper/ Cucumovirus (CMV)	GC	Seedling	S and R checks, breeding lines

Pathosystems Tested in Thailand

GC Overview





Ralstonia



Pathosystems Tested in Thailand

ZYMV / Watermelon



No symptoms at 21dpi on R check



Severe symptoms at 21dpi on S check





Obvious wilting and dead on S check

LED Specifications Davis (USA)

- Company: California LightWorks
- Ref.: Solar System 550
- Wave length range: Programmable Spectrum Control



Programmable Spectrum Control Means Infinite Possibilities







Pathosystems Tested in Davis (USA)

Pathosystem	GH/GC	Plant stage at inoculation	Genotypes
Tomato/TSWV	GC	2 nd - 3 rd true leaf	S and R checks
Watermelon/Fusarium	GC	Cotyledon	S and R checks
Watermelon/Db	GC	Cotyledon	S and R checks

Pathosystems Tested in Davis (USA)

- RWB combinations produced severe stressed symptoms on tomato: Stretched, yellowing and purpling.
- Good growth at seedling stage when changed to complete white light only (R0<u>W90</u>B0).
- These plants inoculated with TSWV (~2 weeks stage), all of a sudden plants started dying at 3 wpi
 - Possible explanations:
 - Type of LED used
 - Plant stage effect







General Conclusions

- Good plant growth during the period tested under GC conditions.
- Better plant growth when LED is used as supplemental light during short days in GH.
- Symptoms expression are as expected and NO effect on the interaction between hosts and pathogens tested. EXCEPT on tomato under different combinations from LED used in Davis and also when TSWV is inoculated at 2-3 leaves.



Thanks to my colleagues from Florida, Thailand and Davis

Thank you for your attention

