



Supplemental LED Growth Light in Remontant Strawberry at High Latitudes

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and Environmental Research, 1430 Ås, Norway. Financed by the 7th Frame Work Pgm of EU. Theory: Supplemental lighting is necessary to secure good fruit quality and yield.

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- PAR lighting below 400 μmol m⁻²s⁻¹ will reduce photosynthesis and fruit quality.
- Light saturation point at 800-1000 $\mu mol~m^{-2}s^{-1}$ at 20° C and 400 ppm CO $_2$. Oda graphs-1997.pptx
- Could LED (Light Emitting Diodes) lamps be a more efficient tool than conventional greenhouse lamps.
- LED make it possible to choose efficient light for photosynthesis and produce much less heat than conventional lamps.



Experimental Design

- Block with 4 replications in Polytunnel.
- Two Cvs: Rondo and Everest. 5 plants m⁻².
- Light treatments: LED 300W (B:R=1:8), LED 100W (B:R=1:4), Control (Natural light).
- Lamps 40 cm above top of canopy.
- Light periode: 12 hrs.
- LED initiated only when natural light was below 400 μmol m⁻²s⁻¹, beyound 6 September.
- Two fruiting years (June October).



Light levels in μ mol m⁻² s⁻¹ at top of canopy under LED lamps and in ambient light in periods when ambient light level was below 400 μ mol m⁻² s⁻¹

Light source	LED 100W	LED 300W	Ambient
Light level	258	900	100-400

Total salable fruit yield per harvest date in **Bioforsk** two seasons



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Effect of LED on total yield in kg m⁻², % salable, %Mildew and fruit size in g/fruit in average of two years and two remontant strawberry cvs





LED	Yield	% S	% MD	Fs
Control	1.90	64.8	11.9	13.3
100W	2.03	70.0	6.5	13.0
300W	2.11	67.9	11.3	13.9
Mean	2.01	67.6	9.9	13.4
Se	0.07*	3.6 ^{ns}	4.1 ^{ns}	0.5 ^{ns}

Fruit tension. 3 light levels (c, L1, L2), 3 strawb. cvs; average of 2 and 4 sampling dates in resp 2011 and 2012.



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Effects of LED on Brix[°] level at two dates in mid-Norway for two years, in average of two cultivars. Bars are Se at actual dates.

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Common arthropods in 'Rondo'





Conclusion





- LED> 400 µmol m⁻²s⁻¹ for 12 hrs beyond 8 SEP increased:
- fruit yield
- fruit tension
- Brix[°]
- Reactions on fruit tension were strongly cultivar dependent.
- LED did not increase spider mite numbers, but may promote aphids, and LED300W was benefical for predatory mites.