

# Variability of Leaf Surface Temperatures on a Sunny Day in August 2008 in the Model Ecosystem Experiment “Querco”

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# Outline



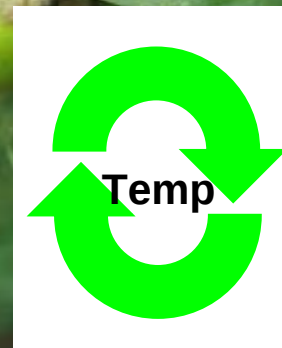
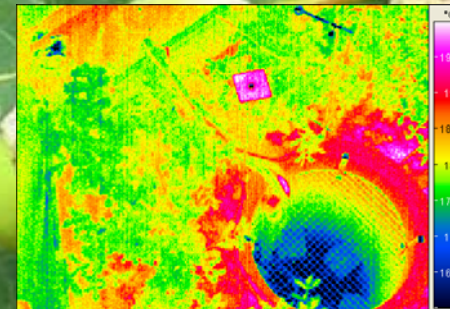
Method



Results



Conclusions



# Method: Measurement System



## Infrared Thermography



VarioCAM



### Lenses

| Lens            | Focal distance (mm) | min. focus (m) | FOV (°)   |
|-----------------|---------------------|----------------|-----------|
| Wide angle lens | 12.5                | 0.2            | (64 x 50) |
| Standard lens   | 25                  | 0.5            | (32 x 25) |
| Telephoto lens  | 50                  | 2.0            | (16 x 12) |

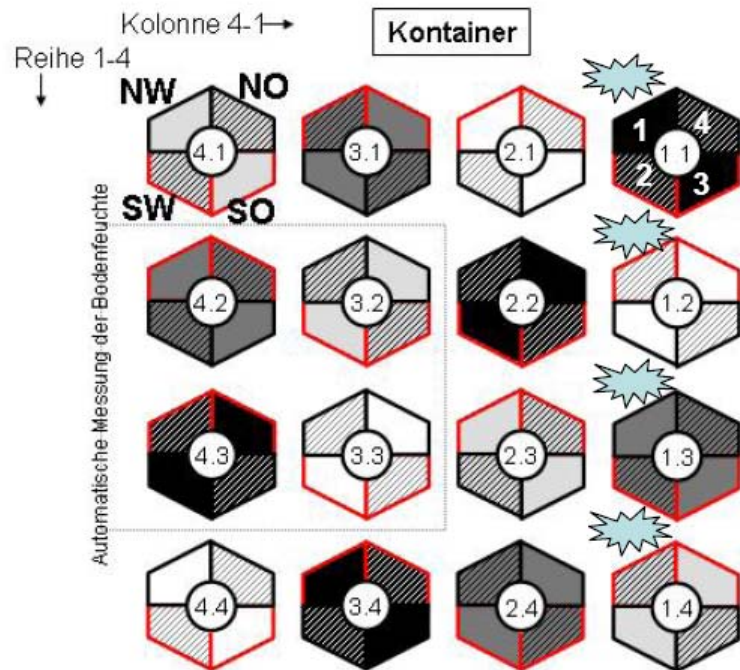
Spectral range 4.....14  $\mu\text{m}$   
 Temp. resolution 0.08 K  
 Accuracy 2 K

# Method: Parameter



## Surface Temperature

### Querco: Design Modellökosysteme



Aufnahmestandort

- Kontrolle
- ◐ Trockenheit
- ◑ Lufterwärmung
- Kombination

opportunistischer Pathogen



kalkhaltiger (pH 7.5)  
Waldboden, Fluvisol,  
Brugg

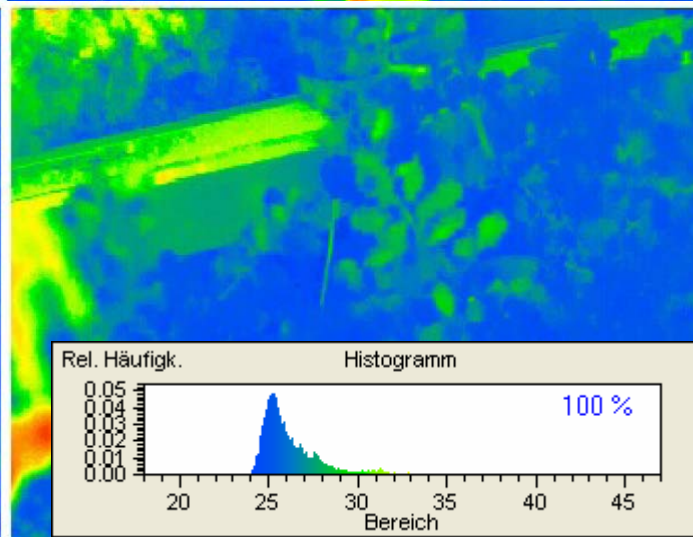
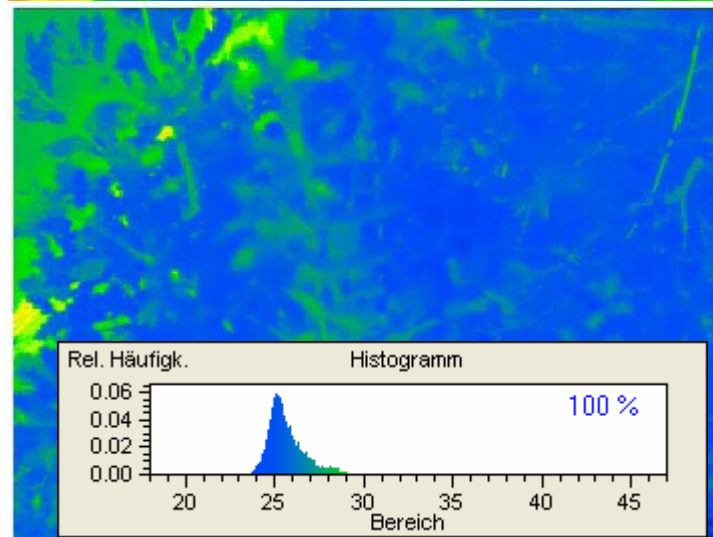
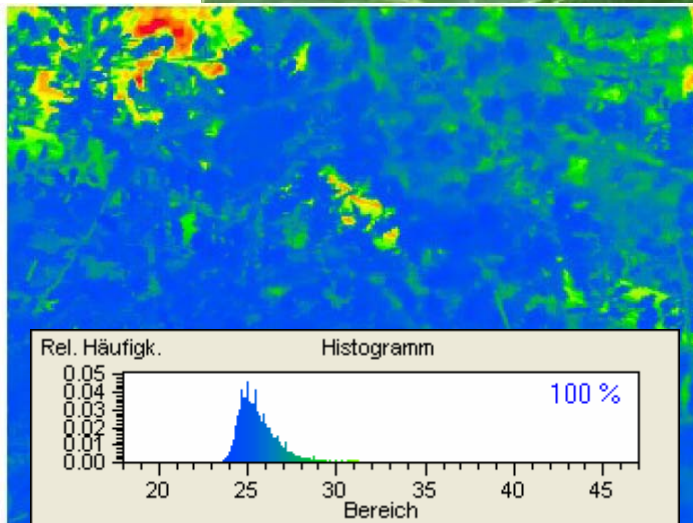
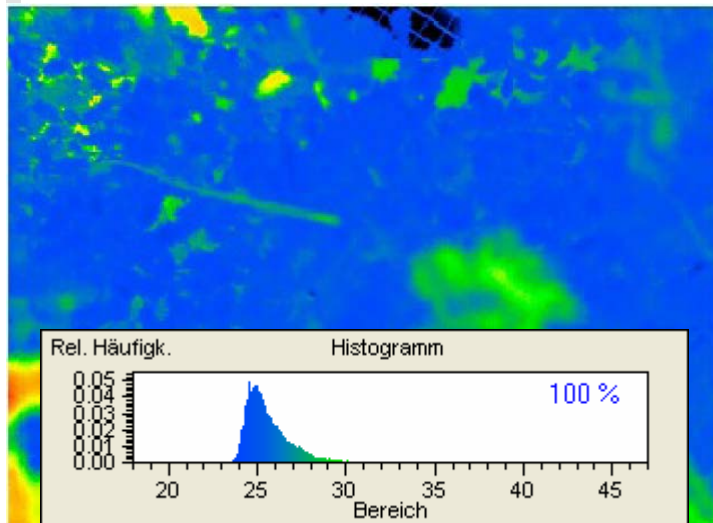
saurer (pH 4.5)  
Waldboden, Alisol,  
Eiken



# Leaf Surface Temperatures August 06, 2008; 15:00 CEST



## Chamber 1.2: Control

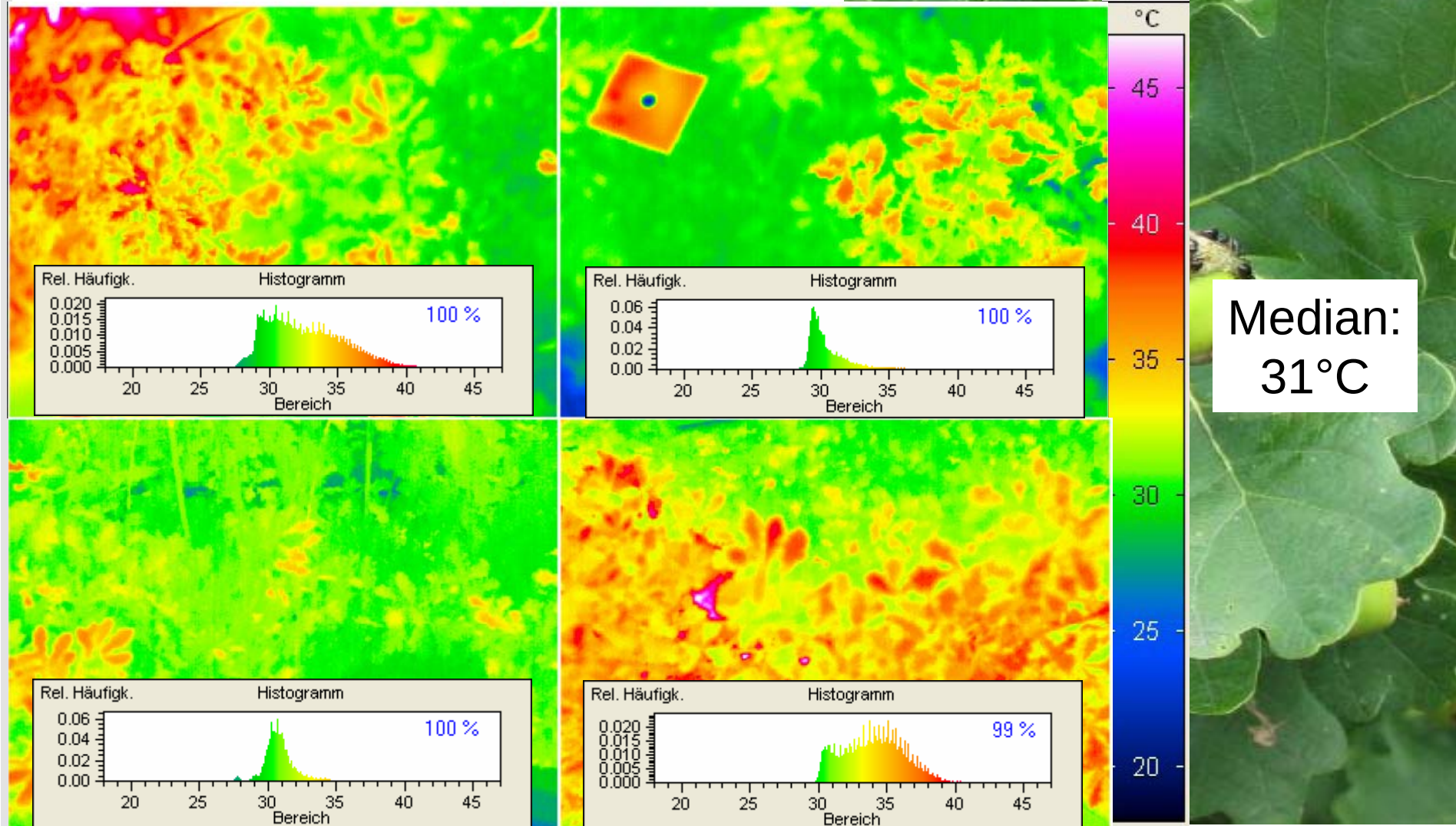


Median:  
25°C

# Leaf Surface Temperatures August 06, 2008; 15:35 CEST



## Chamber 4.1: Combination

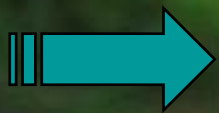


# Results: Summary

Leaf surface temperatures and its variability in the control and treatment plots (n=4) of the *Querco* experiment on August 6, 2008, 15:00 to 15:35 CEST. The analysis was performed using 20 sun leaves and shadow leaves, respectively, in each chamber.

| Treatment      | ,Combination'     | ,Control'         | ,Warming'         | ,Drought'         |
|----------------|-------------------|-------------------|-------------------|-------------------|
| Temperature/°C | 34,0<br>+<br>2,68 | 27,3<br>+<br>1,90 | 28,0<br>+<br>1,99 | 32,3<br>+<br>2,54 |

- Highly resolution thermography elucidates high variability of leaf surface temperature even within one chamber with a maximum span of 12 °C.
- On sunny days in summer leaf temperature may amount to a mean value in the comb. Temp./soil drought plot to 34 °C.
- At the same time leaf temperatures in the control chamber are near the outside air temperature of 27 °C.
- At that day soil drought is the most important factor leading to high leaf surface temperatures accounting for a about 5 °C increase in leaf temperature as compared to the control.



further detailed data evaluation will likely elucidate also impacts of soil type and pathogene treatment on leaf temperatures

# Thank You!!

for your kind support  
and for giving us the  
opportunity being part of  
this great integrated and  
interdisciplinary project

