

Parental egg-turning and temperature gradient in nests of waterfowl

Breeding success in cavity-nesting ducks



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2018
waterfowl
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Overschot wegen



Floating

g



Spiering

g



Gemengd graan

g



Pellet

g



Motivation

Certain species have a low success rate when incubated in incubators

Probable causes

- Different movements of the egg compared to natural incubation
- Different temperature variation compared to natural incubation
- Other (unknown) causes

This study: What is the temperature during incubation during...

- One day?
- The entire breeding season?
- How strong does the temperature vary?

Research questions

This study:

What is the temperature of the eggs during one day? And the entire breeding season?

How strong does the temperature vary during a certain amount of time?

Is there a difference between different species?

Materials and methods

Materials

Research done on four different nests:

- Wood Duck
- Ringed Teal
- Mandarin Duck A
- Mandarin Duck B

Nest types: Nest boxes and hollow tree stumps

Measuring instruments: EggLogger (4 pieces)
(Measuring temperature and movement)

Microsoft Excel with EggLogger applications

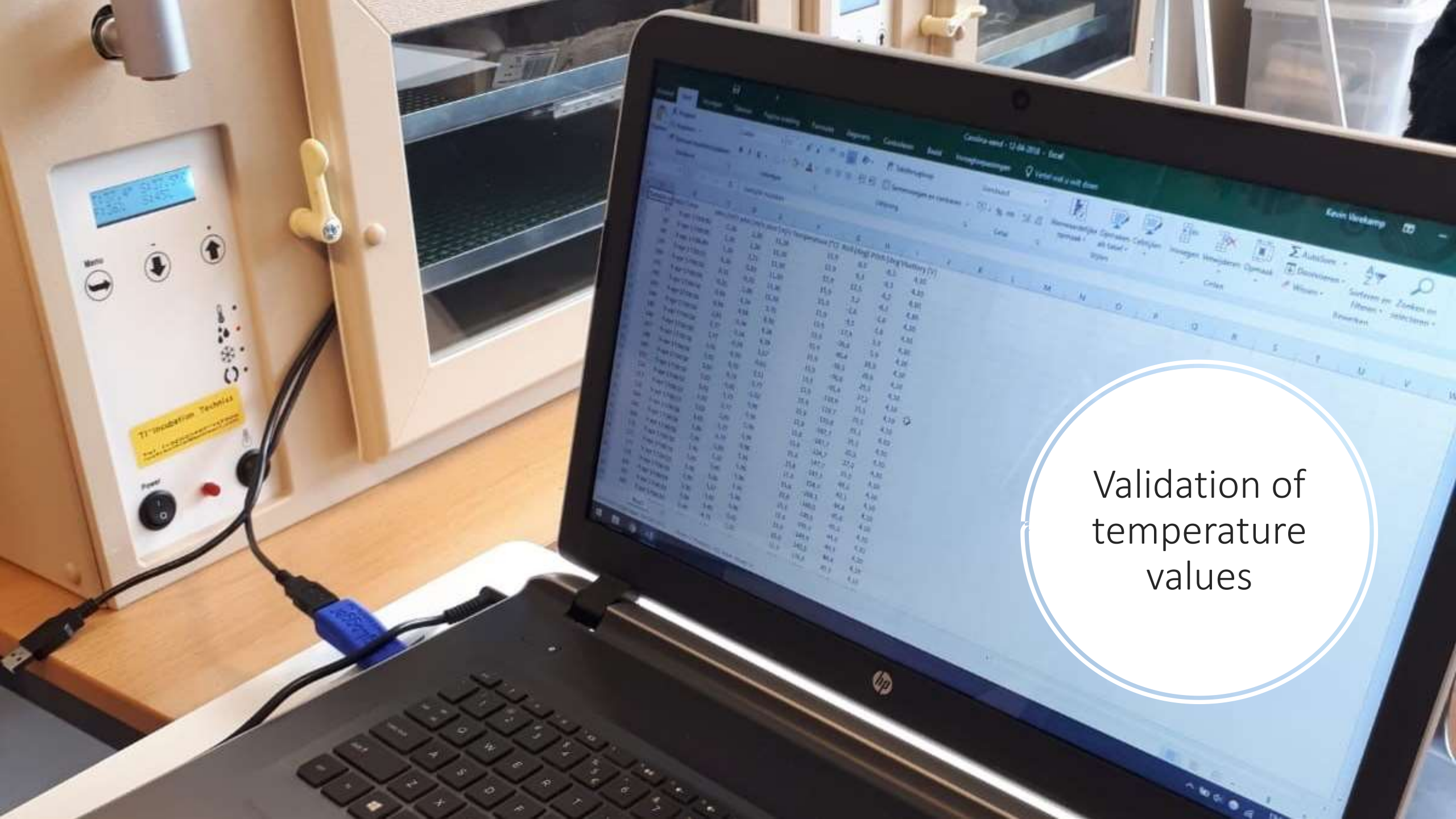
Materials and methods

Observations

- EggLogger are placed in the nests before the start of the breeding process.
- Checking and reading: at least once every 7 days
- Weather conditions

Validation

- Calibration EggLogger
- Validation of measured values in the incubator
 - Heating curve
 - Cooling curve



Validation of
temperature
values

Checking
the nests



A photograph showing two men on a brick wall. One man in a grey shirt and blue jeans is leaning over a dark wooden bird nest, while the other man in a dark hoodie and black pants stands on a ladder to the right, holding the ladder. The wall is made of light brown bricks and has several dark wooden bird nests attached to it. A large, white, circular graphic with a thin black border is overlaid on the left side of the image, containing the text 'Checking the nests'. The background shows a tiled roof and some tall grasses in the foreground.

Checking
the nests

Bothered?



Will they notice?

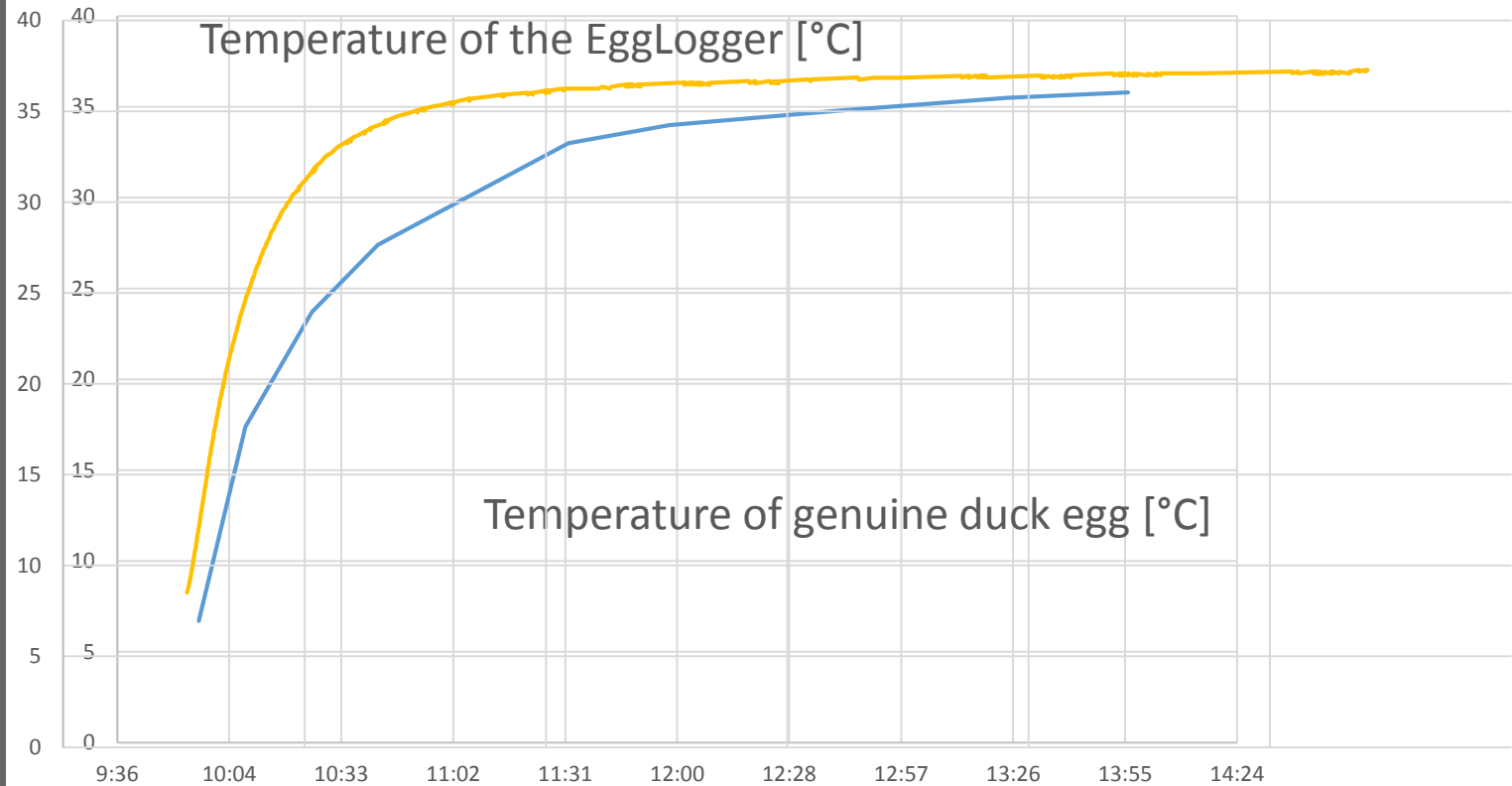




Reading and
interpretation
of the
EggLogger
data

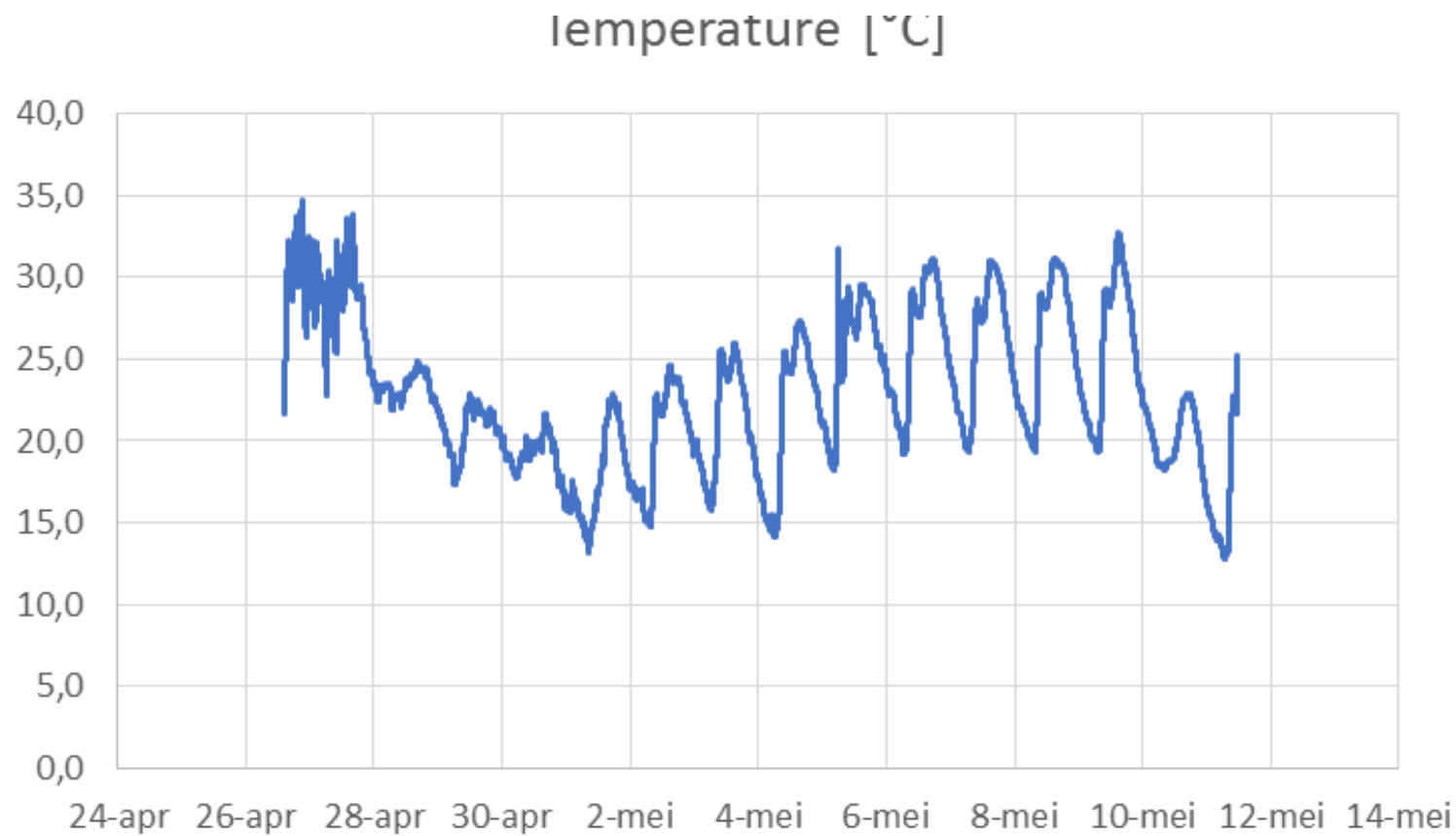
Results: Validation of measured data

Temperature gradient of the
EggLogger and a genuine duck
egg in one graph



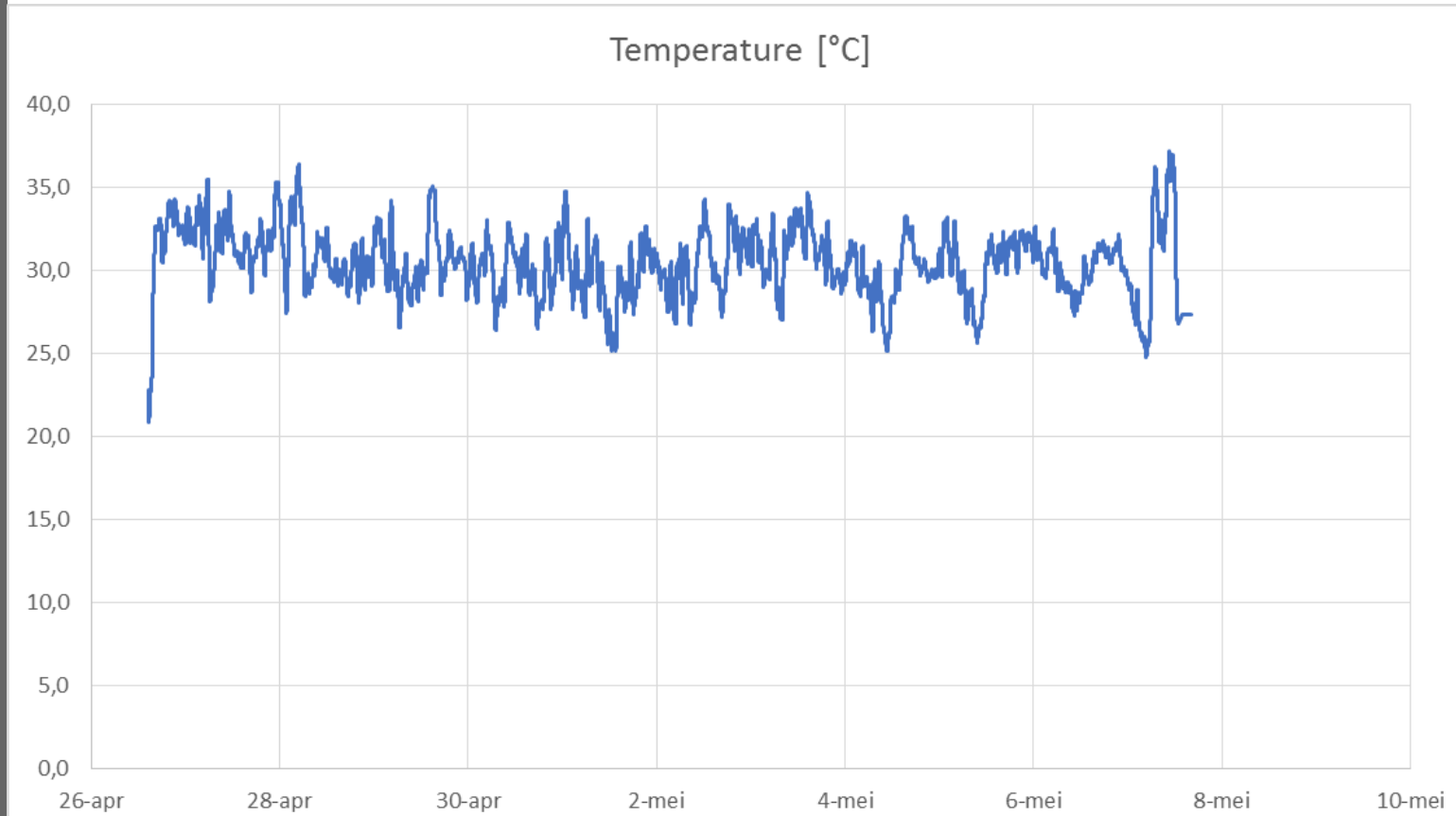
Results: EggLogger data

Mandarin Duck

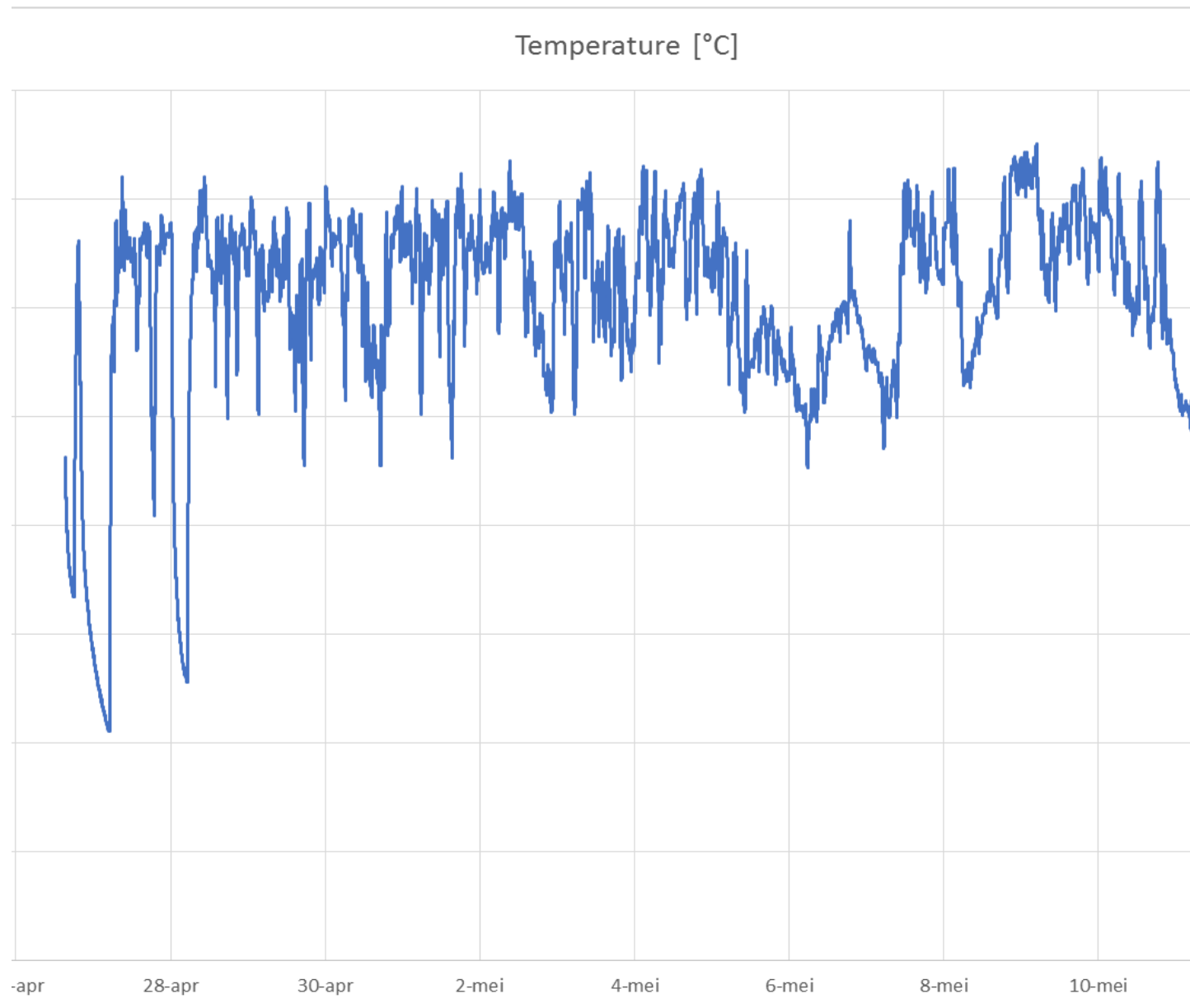


Results: EggLogger data

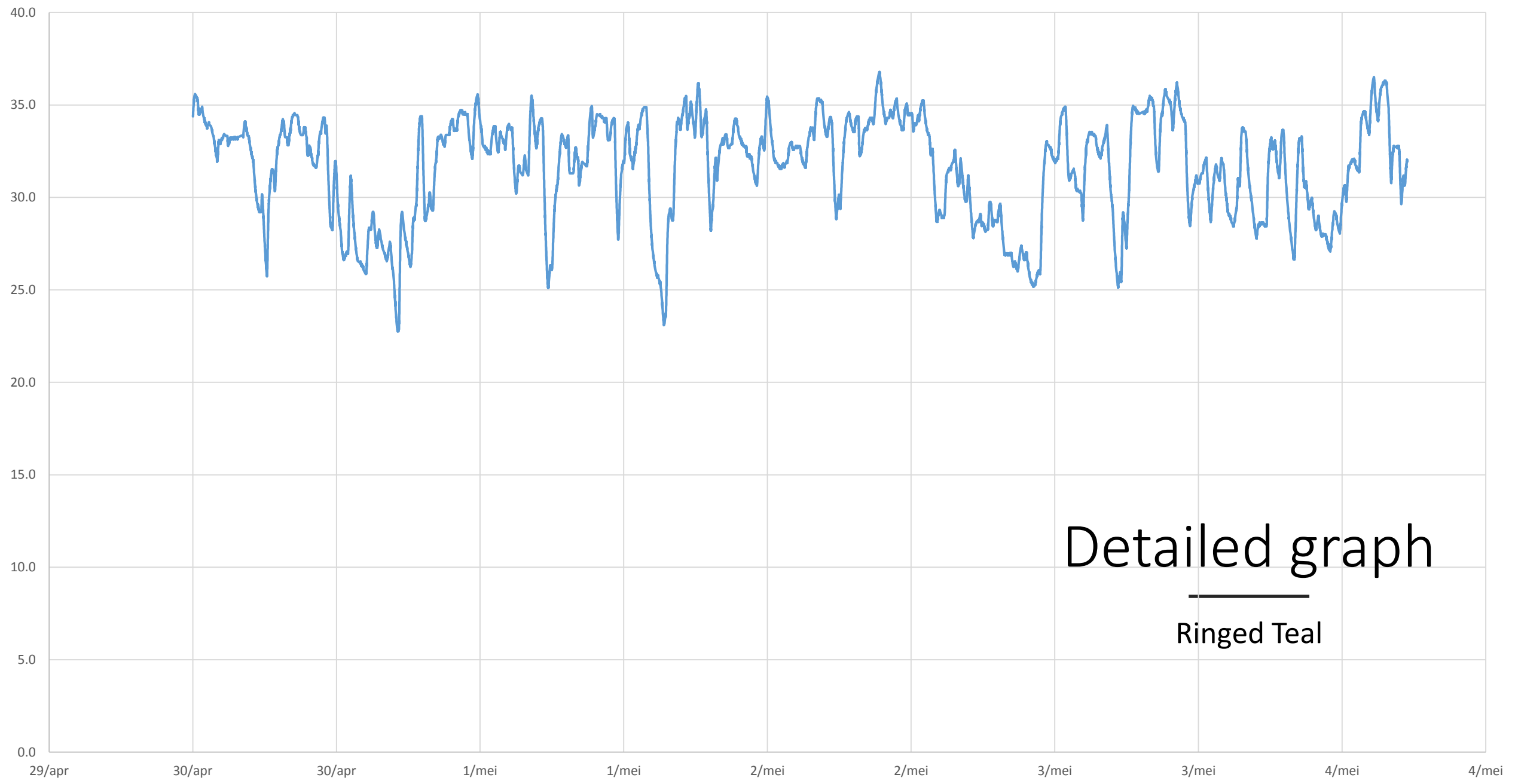
Wood Duck



Results:
EggLogger data
Ringed Teal



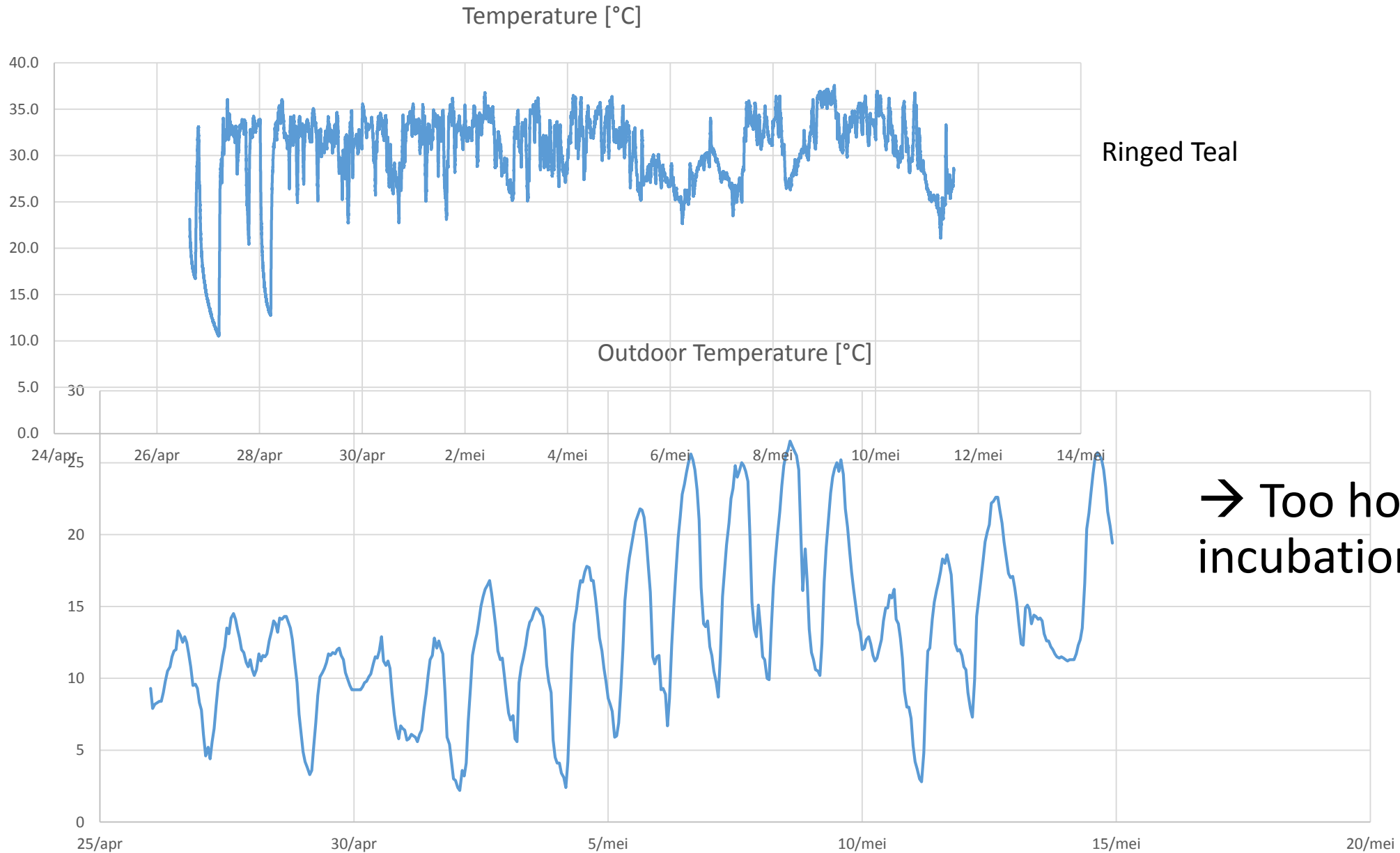
Temperature [°C]



Detailed graph

Ringed Teal

Comparison Ringed Teal with outdoor temperature data



Discussion

EggLogger risks (battery, corrosion) and solutions.

Validation and calibration. Temperature measured by the EggLogger is extremely similar to real eggs.

Ventilation of the air pocket during natural incubation is higher than in an artificial incubator.

Variation between species.

Influence of the outside temperature and weather.

New research questions and hypotheses.

Conclusion

Incubators mimic nature poorly.

Ventilation of the air pocket during natural incubation is higher than during artificial incubation.

Outdoor temperature may be of influence (and therefore, climate change as well).

Follow-up:

- More nests per species.
- More EggLoggers per nest.
- Research of the oxygen demand of the embryo.

Any questions?



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