
Effect of light intensity on abundance of algae and lichen

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Definition

- ❖ Light intensity: the measure of light
- ❖ provides energy for photochemical reaction of photosynthesis
- ❖ Epiphytes: commensalism -> one benefited, one not affected
- ❖ Alga: protista
- ❖ Lichen: formed by alga and fungus

Equipment and Tools

- ❖ Light meter
- ❖ Thermo Anemometer
- ❖ Thermohygrometer
- ❖ Measuring tape
- ❖ Grid paper

Variables

- ❖ Constant variables: temperature, wind speed, relative humidity
- ❖ Independent variable: light intensity
- ❖ Dependent variables: percentage covered of algae and lichen

Hypothesis

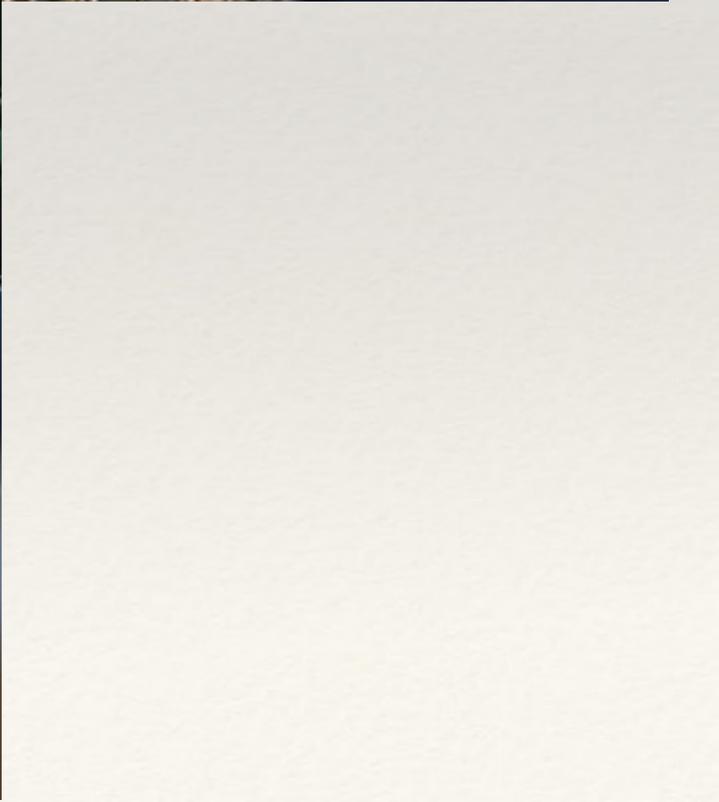
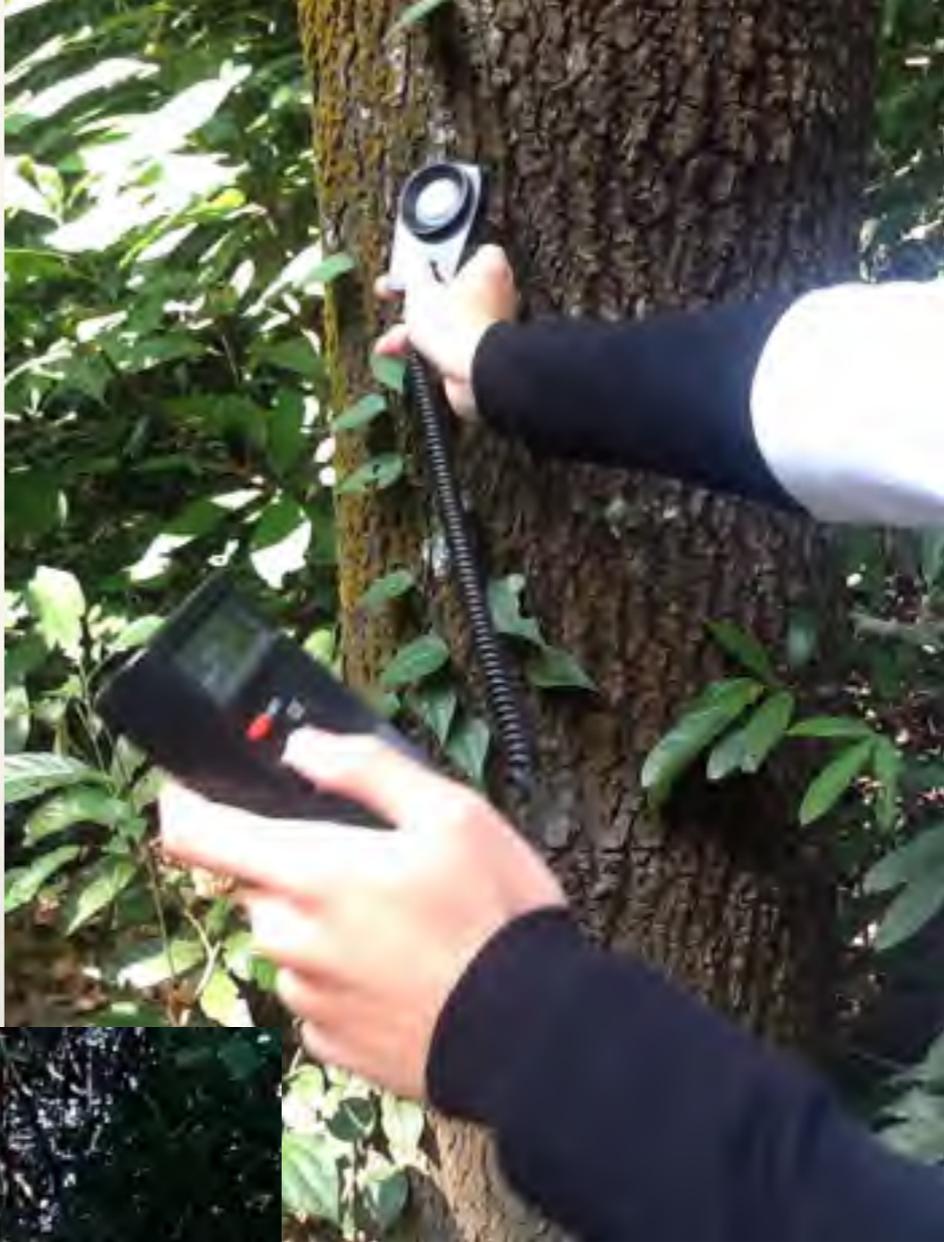
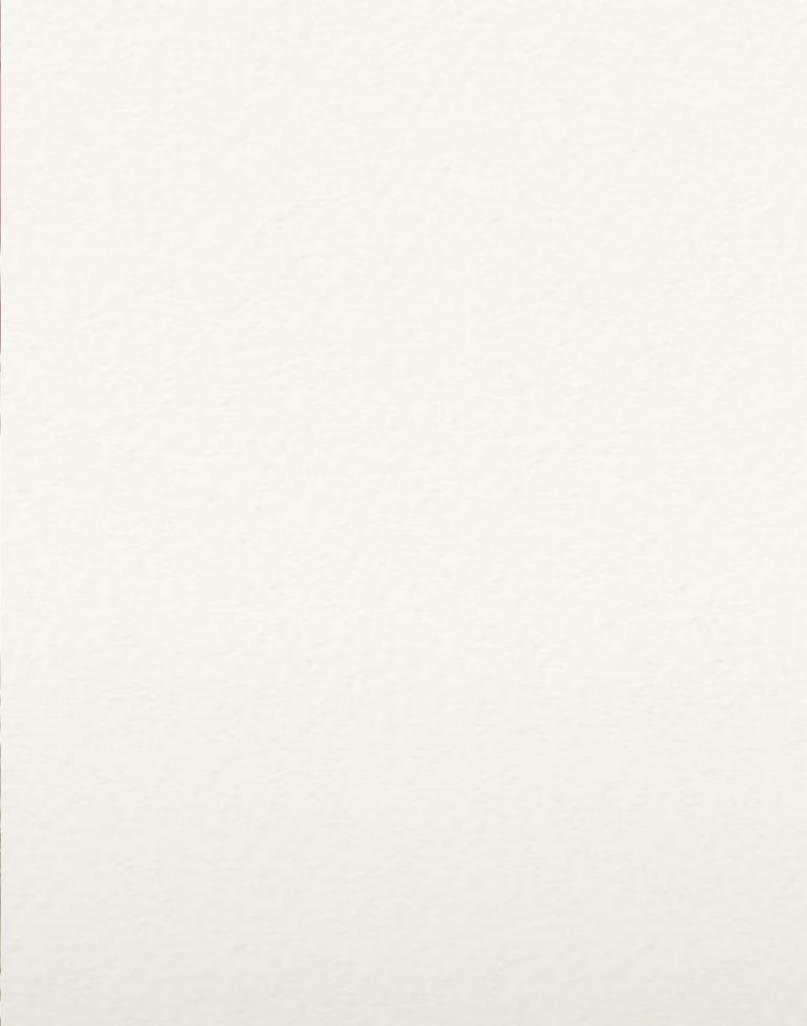
- ❖ Abundance of alga: increases with increasing light intensity
- ❖ --more energy provided to algae
- ❖ Abundance of lichen: not(highly) affected by light intensity-->do not carry out photosynthesis

Methods of measuring variables and percentage cover

- ❖ Systematic sampling (with the same species)
- ❖ Take 5 sample: at the height of 1.5 m from the soil
- ❖ Light intensity: take the average at the side of N,E,S,W. (Reason: to lower the effect of angle of the sun throughout the day and in different seasons.)
- ❖ Control Variables:
 - tree age(with similar thickness)
 - tree species
 - Wind speed, humidity, temperature

Procedure

- ❖ 1. Measure 1.3 m from the ground
- ❖ 2. Measure all the control variables and light intensity from different sides of the tree
- ❖ 3. Put the graph paper on the tree
- ❖ 4. Count the coverage of the lichen or alga



Variables of 5 samples

Sample/ variables	Light intensity (lux)	Temperature	Wind speed (m/s)	Humidity	Circumference of tree trunk
1	6715	15.8	0	36%	140
2	465	15.9	0	35%	139
3	1478	16.0	0	37%	166
4	2085	16.2	0	36%	169

Calculation of % covered of algae and lichen

- ❖ Grid square occupied by alga / lichen in the area. $\frac{\text{The \%}}{\text{circumference of the tree trunk / length of the graph paper}} \times 100$

Result

Sample/variables

Light intensity

% covered of algae

% covered of lichen

1

6715

13.5

1.35

2

465

0

3.6

3

1478

2.77

2.8

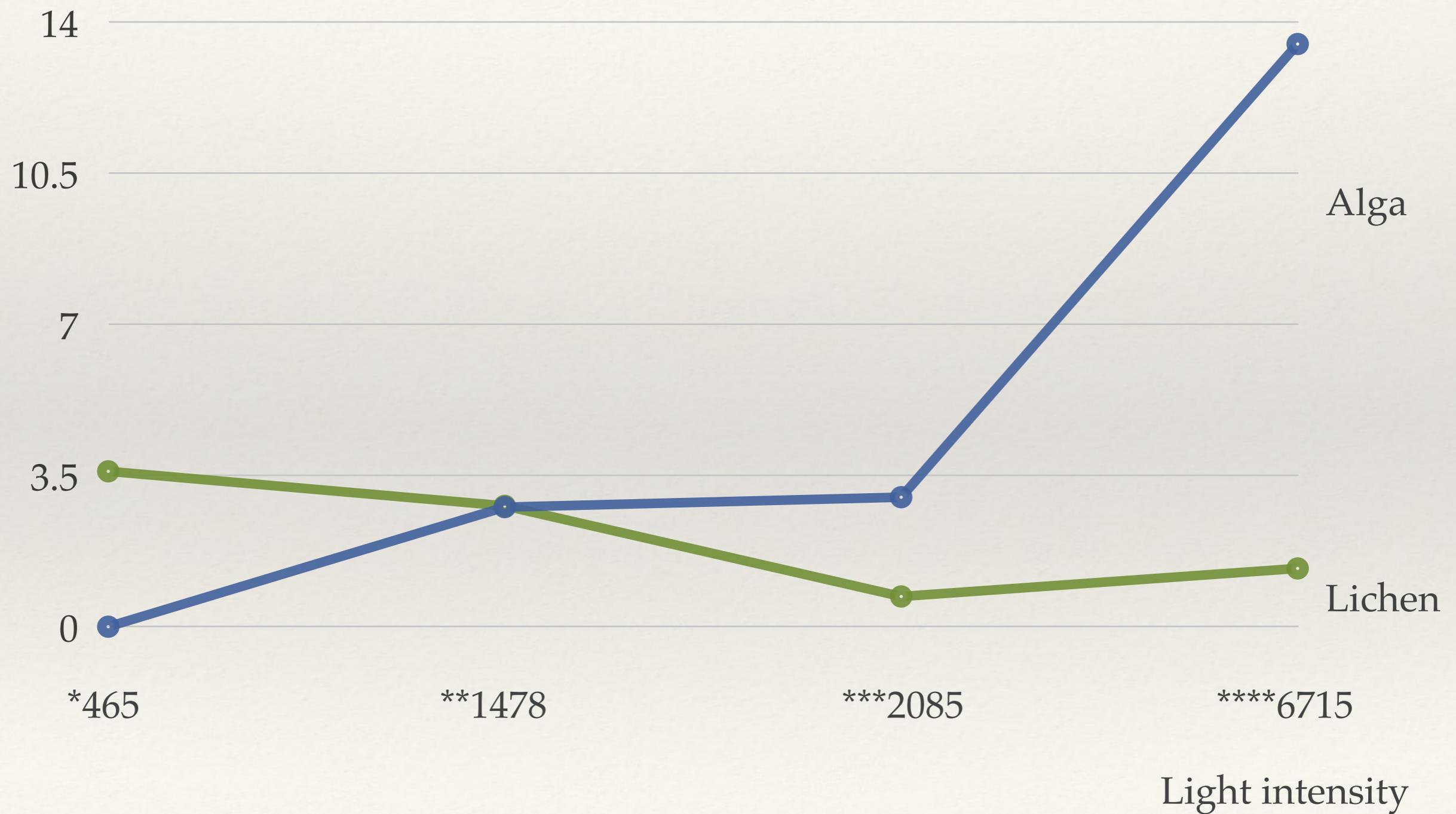
4

2085

3

0.7

Relation between light intensity and the growth of lichen and alga



Result of alga

- ❖ positive relation
- ❖ When the light intensity increases, more light energy is provided to photochemical reaction of photosynthesis ---
> favorable living condition for alga. --->
%cover of alga increase with increasing light intensity

Result of lichen

- ❖ No relationship between the abundance of lichen and light intensity
- ❖ There might be other factors affecting the abundance of lichen ,e.g. Carbon dioxide concentration

conclusion

- ❖ Abundance of alga increases with increasing light intensity
- ❖ Light intensity has no significant effect on the abundance of lichen

Error and limitation

- ❖ Error: Some alga and lichen coverage at the back may not be counted
- ❖ Error: Sample size is not large enough
- ❖ Limitation: There are limiting factors e.g. Seasonal change, carbon dioxide concentration

End