Effect of Artemia on phototaxis with light color change

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Research Motivate

・I was interested in the phototaxis of *Artemia* last year.
・I wonder if the color of the light source changes the phototaxis. →I started my research.
・I have been continuing this research since last year.

Aim

The purpose of this study is to analyze the effects of different colored light sources on the positive and negative phototaxis of *Artemia*.
→focused on red light and green light

Figure1
adult of *Artemia*

〈breeding surroundings 〉

- Water temperature →26℃
- Salinity→2.0%
- Volume of the aquarium used for breeding →18㎝×31㎝×23㎝
- *Nannochloropsis* are always in the aquarium as baits of Artemia.

〈experimental method 〉

① Prepare 15 adults (7 males and 8 females).
② Place them in a dark room for 30 minutes.
③ Set the illuminance of the light source to 200lx at the water surface.
④ Irradiate the LED light sources (red and green) from the edge of area A.
⑤ Keep irradiating for 10 minutes and record the number of individuals in each area every minute.
⑥ Repeat steps (2) to (5).

Research Method

〈implementation period〉

July 29, 2021 (Thursday) - August 25, 2021 (Wednesday)

〈materials, equipment〉

Plastic water tank (17cm x17 cm x17 cm)LED light (red, green), illuminance meterIron stand, video cameraString, duct tape, black construction paper

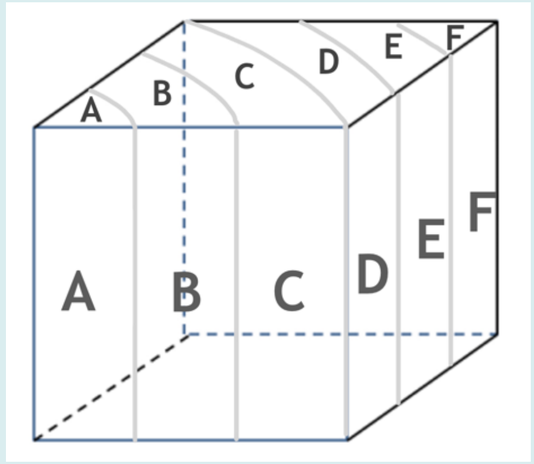

Figure2 zoning

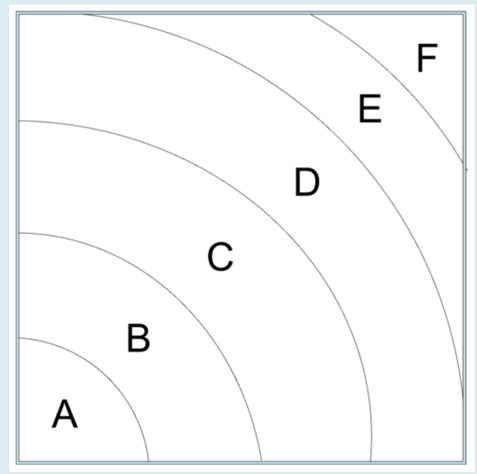

Figure3 View from above

Results

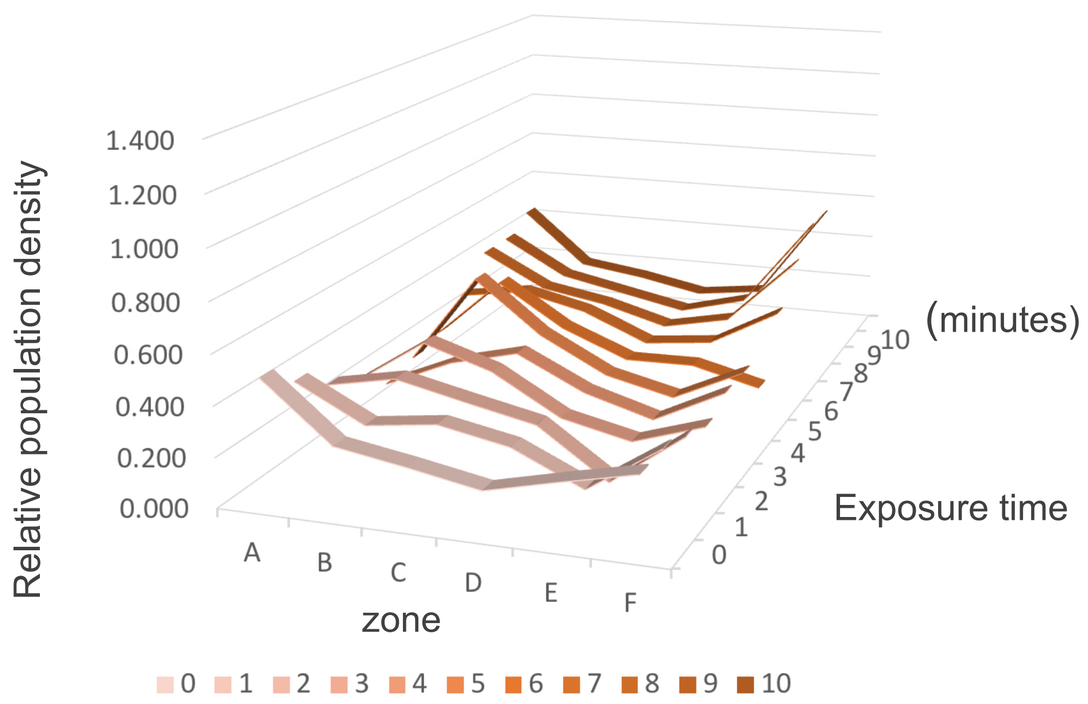

Figure4 result of red light

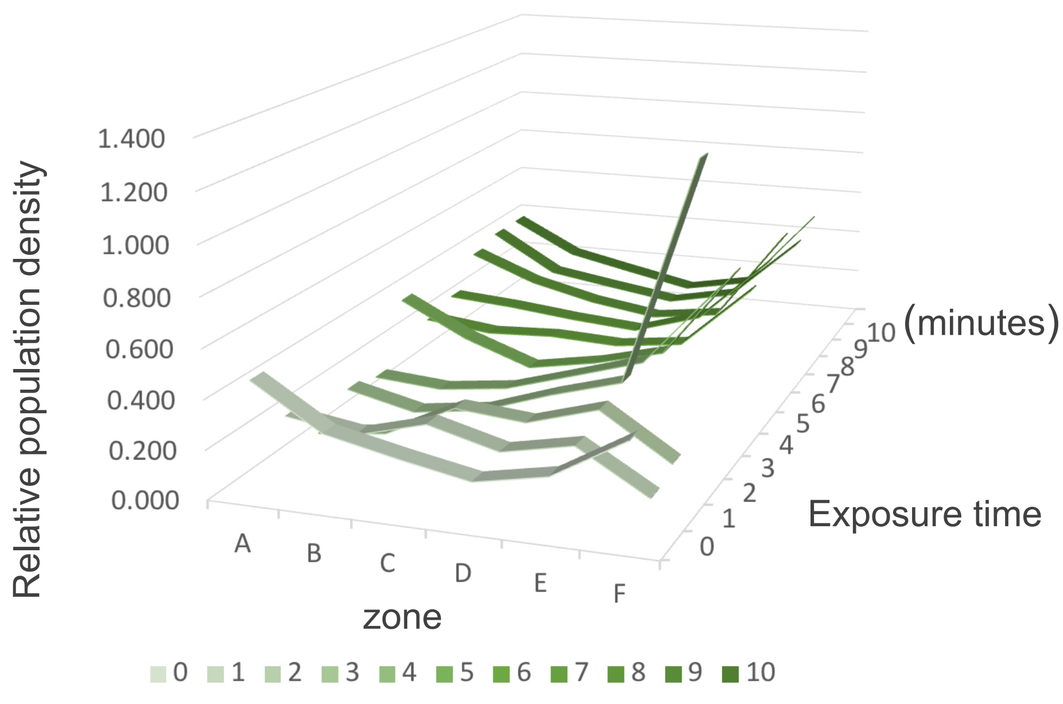

Figure5 result of green light

Considerations

・**Red light** → positive phototaxis
・**Green light** → negative phototaxis

【factor】

I suspect that the photosynthesis of their food, *Nannochloropsis*, has something to do with it.
Nannochloropsis:Contains high levels of chlorophyll a,b→ Red light...more efficient for photosynthesis →Easier to grow →Adults: may go where more food is thought to exist?

・The relative population density by area became close to the original distribution in 8 minutes after the start.

【factor】

Multiple experiments were conducted using the same individual.→**Habituation** to light stimulation of the noparietal eye or compound eye may have been established.However,this tendency does not start immediately after the start of irradiation.The question remains. I am considering making this an issue for future research.

References

Yajima, E. and T. Mizunatani (1980), "A Study of the Traveling Nature of Artemia: Action Spectrum of One Light Set," Nagasaki University, Natural Science and Technology, Vol.Department of Biological Sciences, Faculty of Science, University of Shizuoka, "Artemia," https://wwp.shizuoka.ac.jp/biological-science/生物紹介/アルテミア/, (reference 2020-09-30)M. Hiroki and T. Koshida (1976), "The Role of the No-Priori Eye in the Phototaxis Behavior of Artemia," Journal of Zoology, 85 (1), p. 78-83, Zoological Society of Japan.