

The change of stretch of spider's tractile fiber by UV-irradiation

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Introduction

Spider thread is a material that is attracting attention. However, spiders are so various that we haven't learned enough about their threads. Then we decided to research how the stretch of female *Nephila clavata*'s thread changes by UV-irradiation.

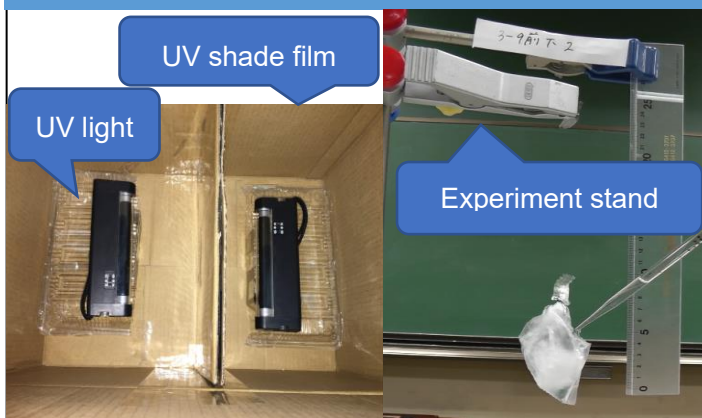
Hypothesis

1. There is no individual difference in the stretch of thread.
2. The stretch of the thread becomes smaller by UV-irradiation.

Stretch: The difference between the length of the thread when it breaks and its natural length.

Natural length: The length of the thread installed to the device when it is at rest.

Method



- ↑Fig.① Experiment1: Experiment on threads of each individual.
Experiment2: Irradiate thread of an individual with UV. Then conduct the experiment.

Hours	24	48	72
Number of battery (UV-light)	8	16	24

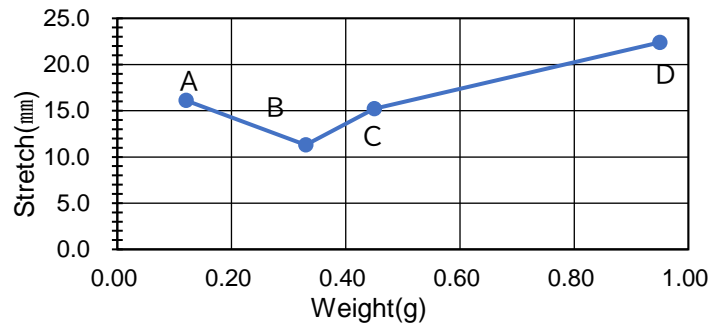
[Experimental procedures]

- ① Install a thread and a weight to the device.
- ② Drip water with a pipet into the weight until the thread breaks.
- ③ Record the process on video.
- ④ Measure the final mass, stretch and natural length with Kinovea, ClickMeasure.

Bibliography

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大崎 茂芳(2015):クモの糸の不思議, 日本家政学会誌, Vol. 6 6, No. 10, 521~528
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Result and Consideration

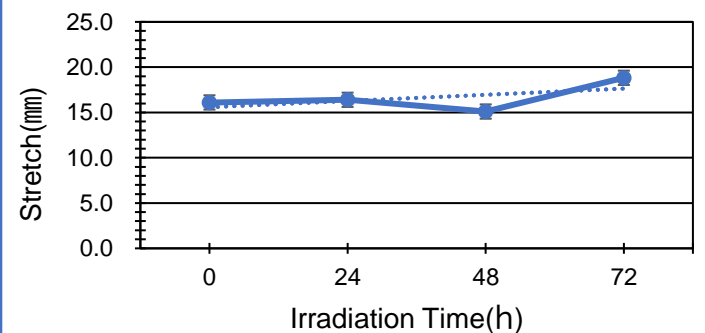


↑Fig.③: Weight of each spider and stretch of threads

There wasn't a correlation between the stretch of the thread and the weight of the spiders.

➡ The stretch varied according to the individual.

We think there are individual differences in spider's tractile fiber.

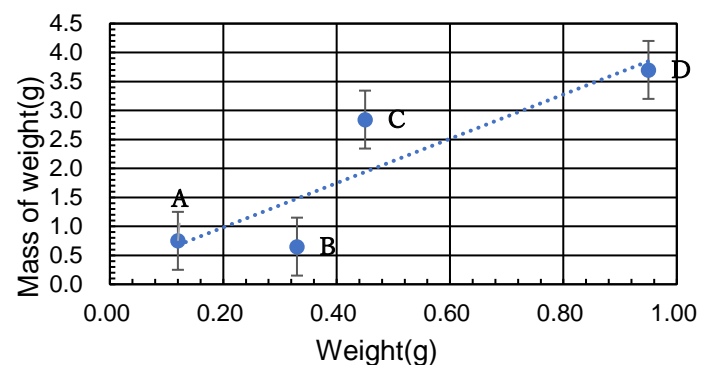


↑Fig.④: UV irradiation time and stretch of threads

The change of stretch compared to UV-irradiation was little.

➡ We think UV light makes little influence on *Nephila clavata*'s tractile fiber.

[Other discovery]



↑Fig.⑤: Weight of spider and mass of weight

When the spider's weight was heavier, the endurance weight of the thread was larger.

➡ We think spiders adopt the strength of tractile fiber to their weight.