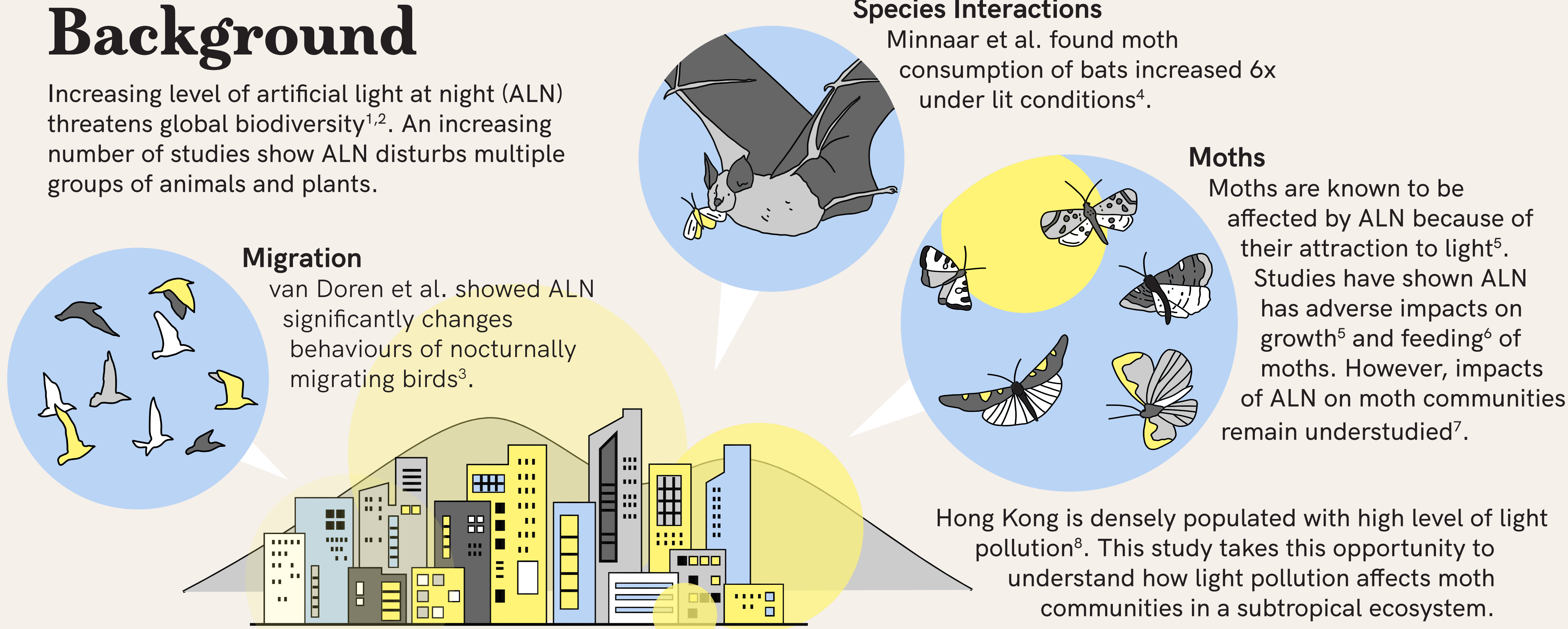


# Effects of Light Pollution on Moth Communities in Hong Kong

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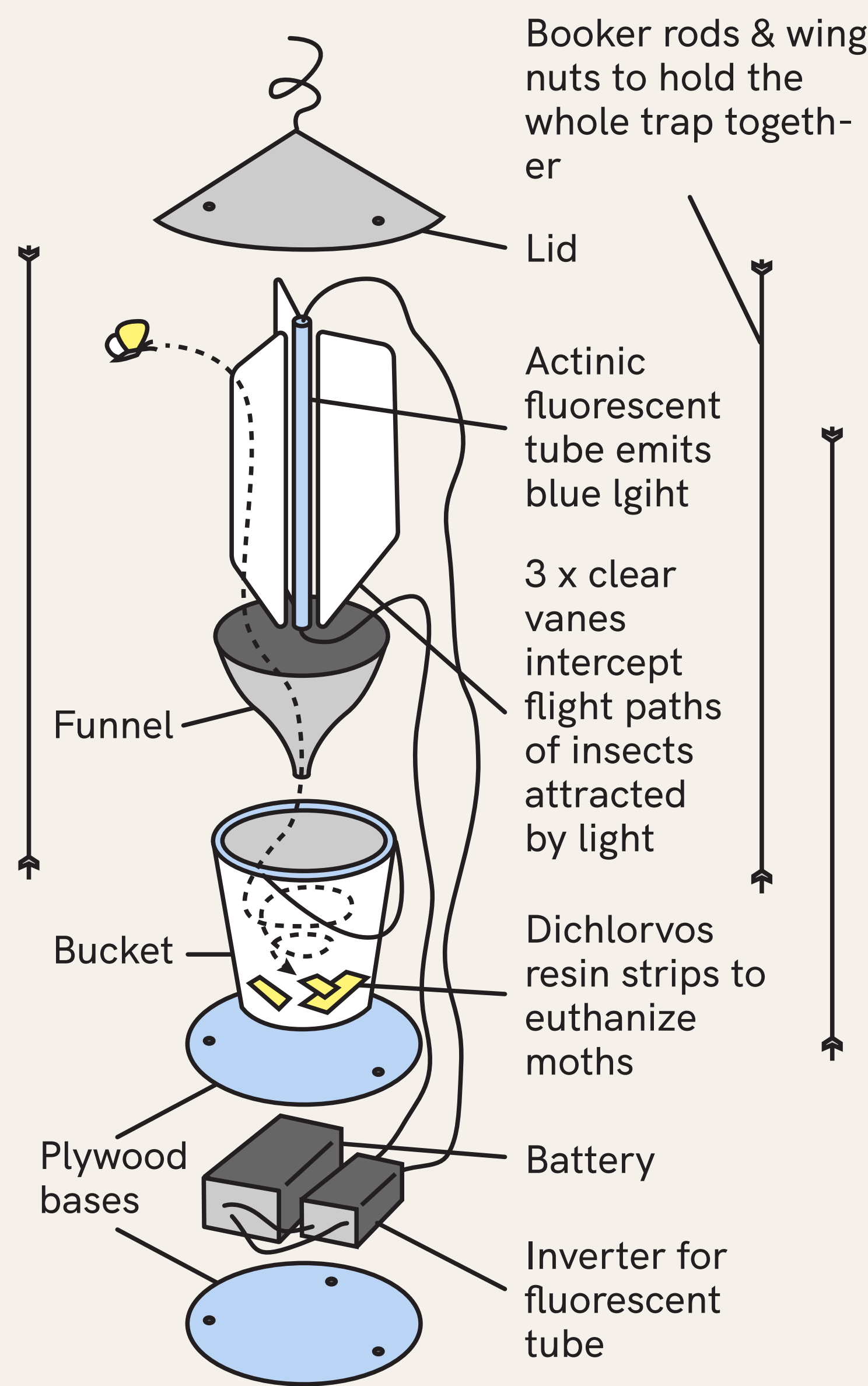
## Background

Increasing level of artificial light at night (ALN) threatens global biodiversity<sup>1,2</sup>. An increasing number of studies show ALN disturbs multiple groups of animals and plants.

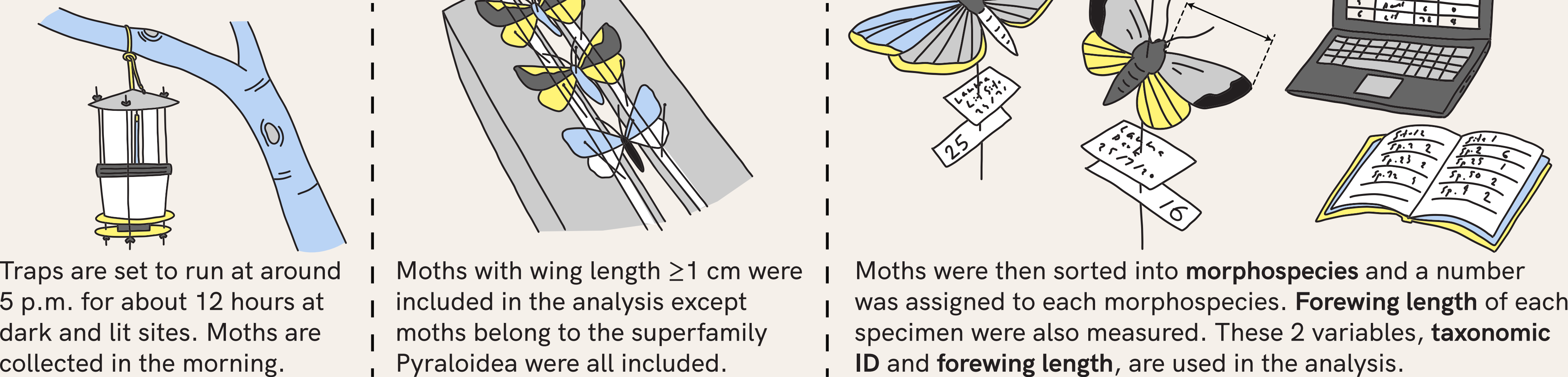


We hypothesize that there will be differences in moth communities at different levels of ALN. We also expect a shorter forewing length in moths that are exposed to ALN.

## Modified Pennsylvania Light Traps<sup>9</sup>

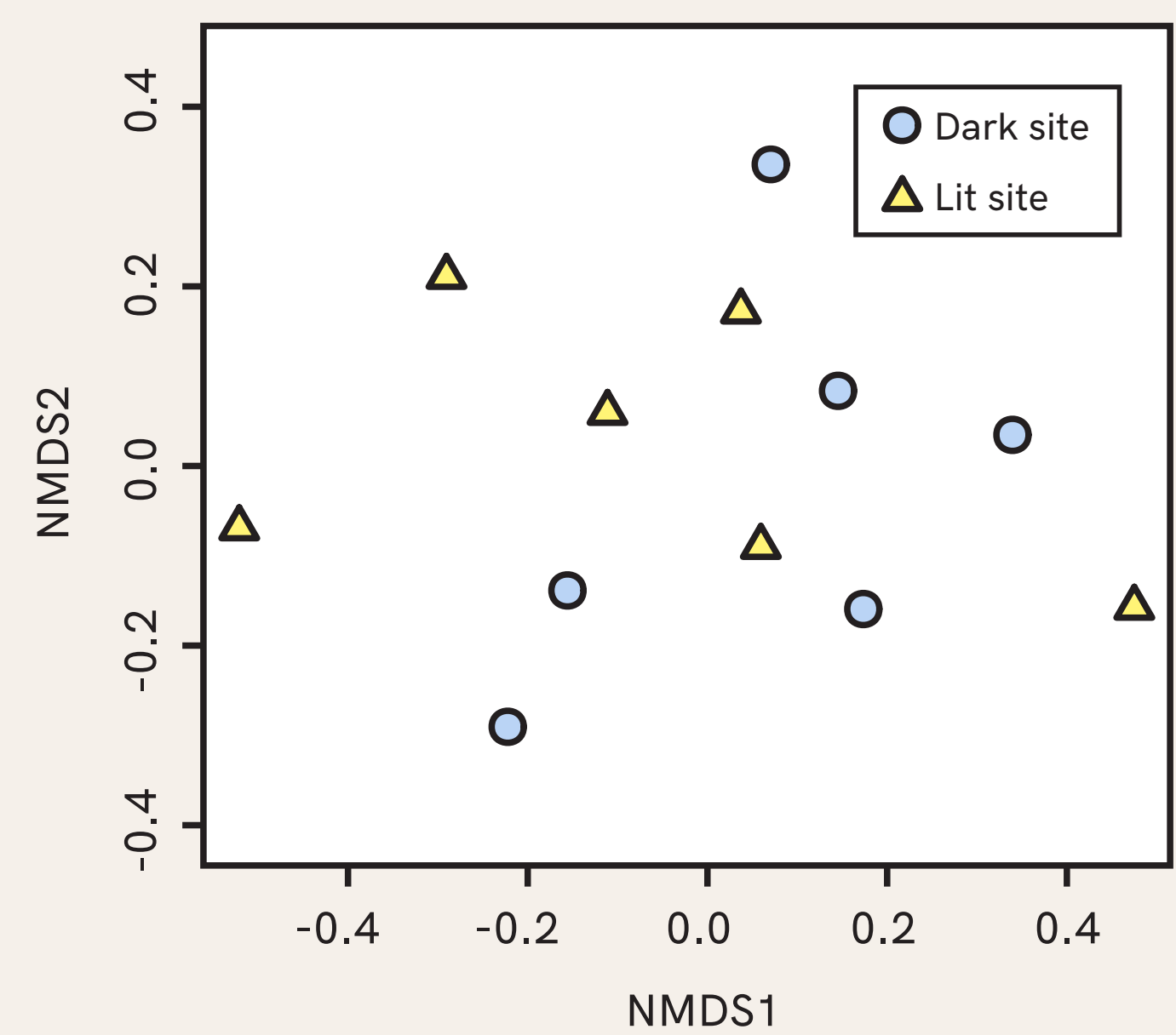


## Methods



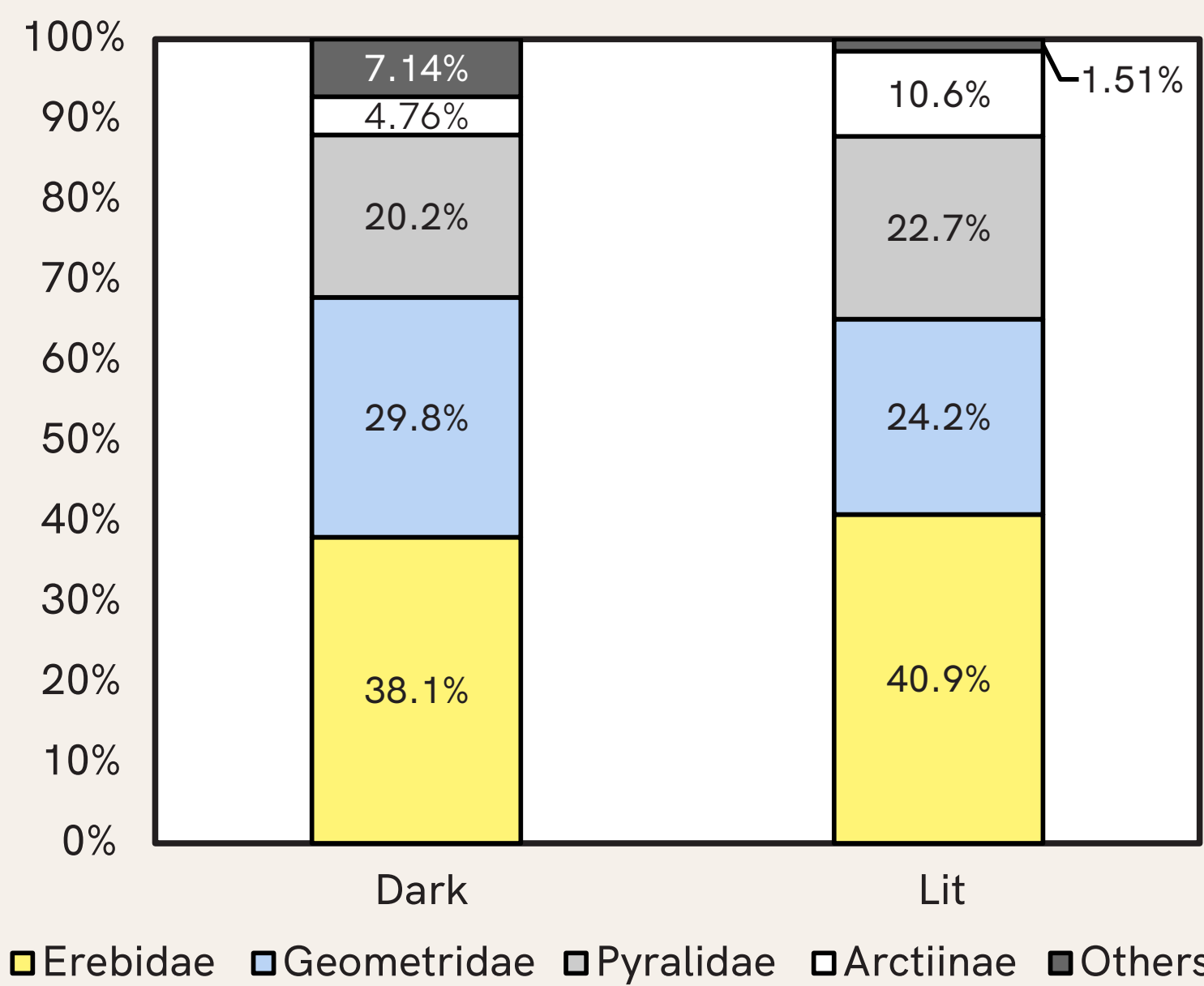
## Data Analysis & Results

Due to the COVID-19 outbreak, only two sites on Lamma Island were sampled. 150 moths were collected (84 from the dark site, 66 from the lit site). Light intensity was measured as 0 lux at the dark site and 6.7 lux at the lit site.



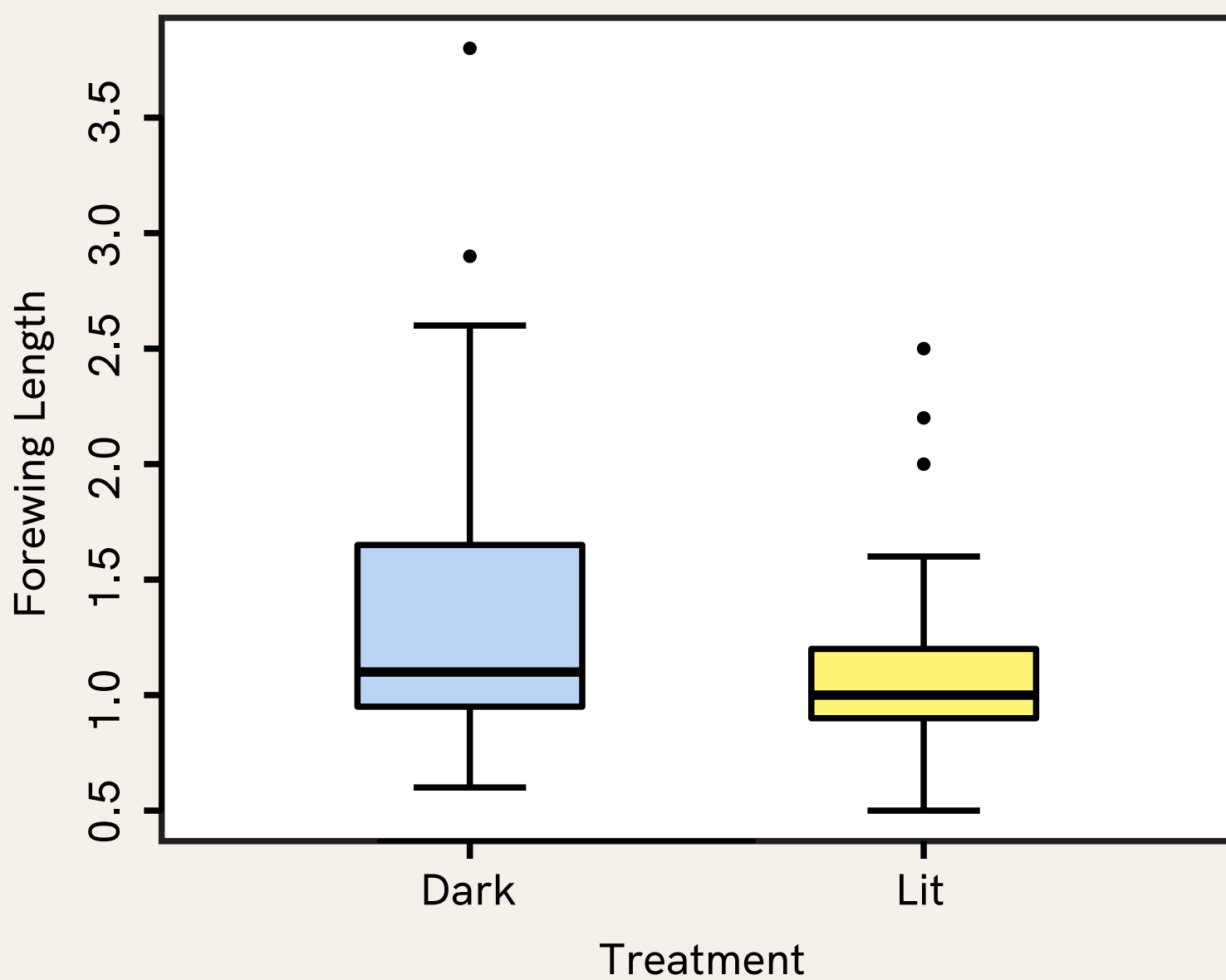
▲ Moth communities did not differ between dark and lit sites

Each sampling night was treated as a replicate. Non-metric Multi-dimensional Scaling (NMDS): no clustering shown on the NMDS plot (see above) Permutational multivariate analysis of variance (PERMANOVA): no significant relationship ( $p=0.186$ ) between moth communities and light intensity



▲ Proportion of moth families sampled at dark and lit sites

After grouping moth species by families, NMDS plot and PERMANOVA results show no significant difference ( $p=0.549$ ) in moth communities by families.

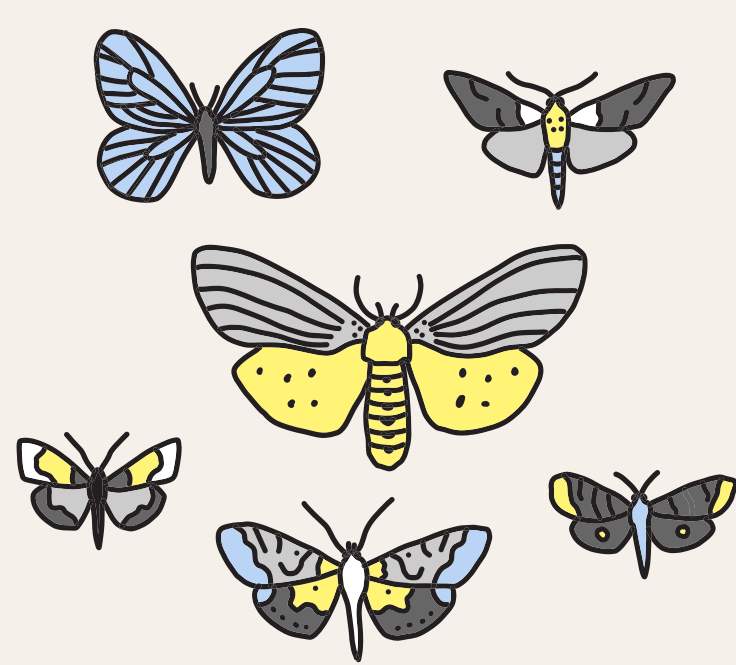


▲ Forewing length of moths at dark site was greater than that of lit site

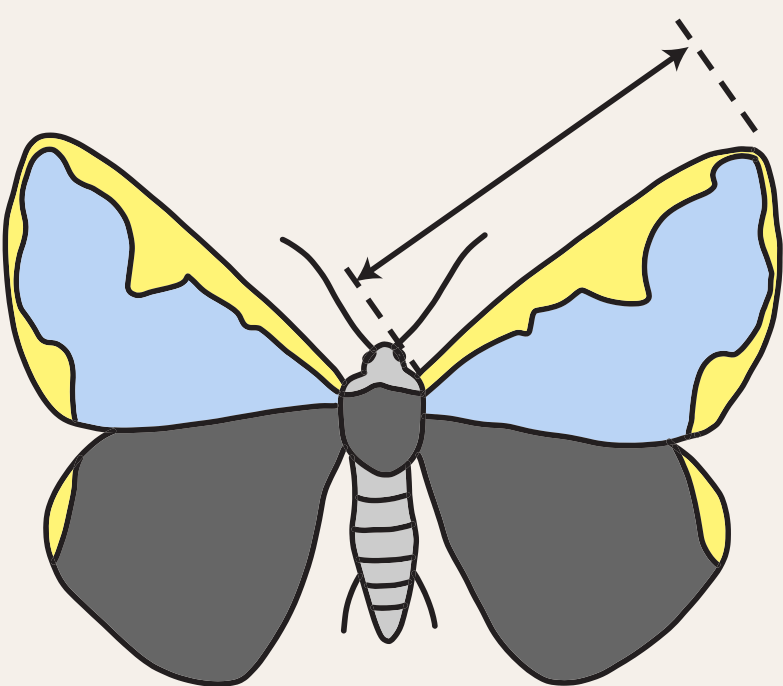
**Wilcoxon signed-rank test:** significant difference ( $p<0.01$ ) in forewing length of moths between dark and lit sites, where median of moths' forewing length at the dark site is greater (dark site: 1.1 cm, lit site: 1 cm)

## Discussion & Conclusion

Moth communities did not differ between dark and lit sites, while moths were slightly greater in size at the dark site.



Assuming forewing length of moths is related to their biomass, ALN may be related to loss of biomass in moths, which may affect other trophic levels. Further investigation on the cause of the size difference is needed.



Forewing length of moths can be considered in the future studies on ALN.

Though the sampling was impeded by COVID-19 outbreak, methods proposed in this study are still valuable in order to have a more complete understanding of how ALN affects moth communities and possibly other arthropod groups.



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