

Floral traits and environmental factors regulate insects visits to flowering plants at night

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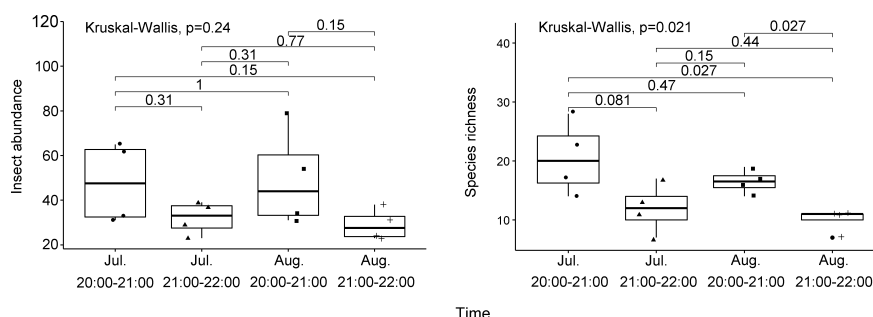
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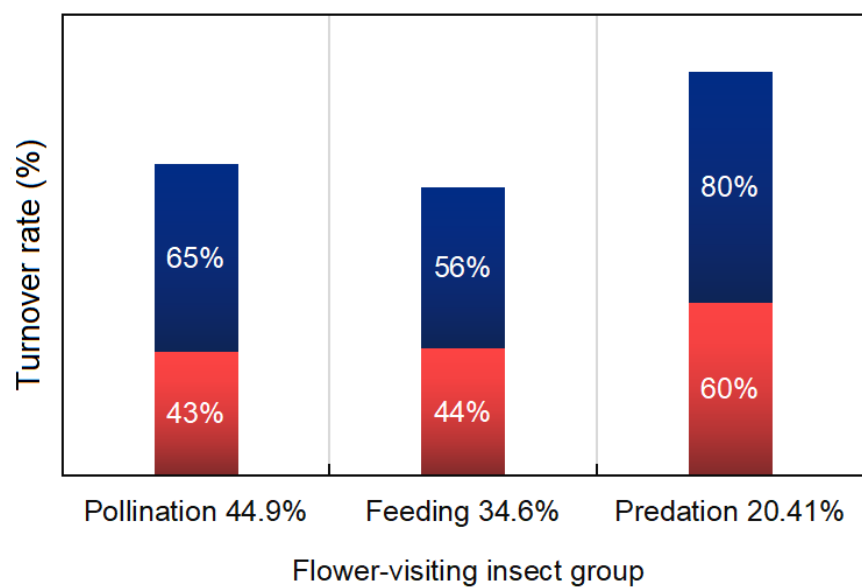
Abstract

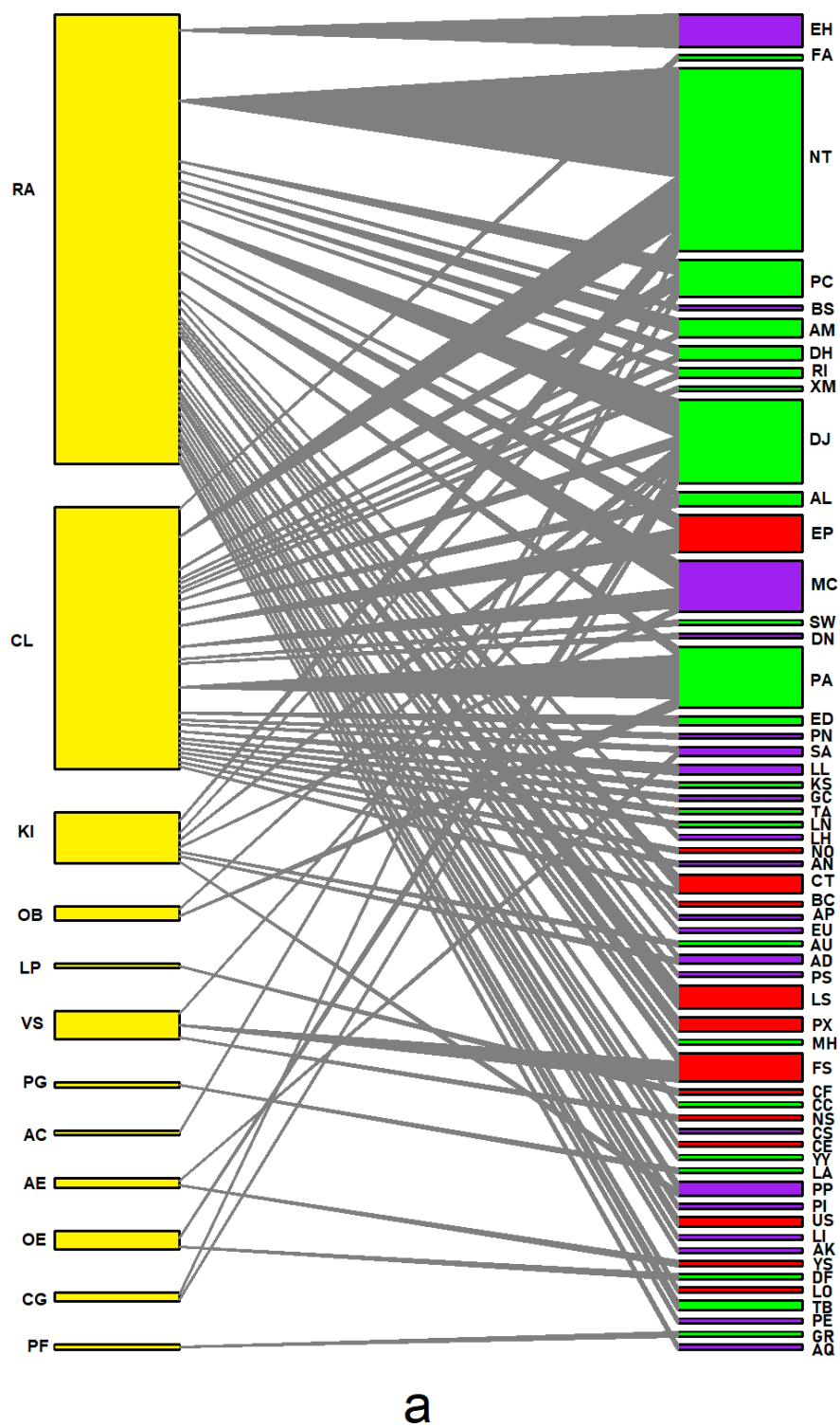
Flower-visiting insects have co-evolved with flowering-plants. While it has been shown that floral traits and environmental factors influence insects visitations during the day, it is yet unclear how these factors influence insects visitations at night. We sampled a montane meadow located near Jilin in northeastern China in July and August in 2019, 4 nights each month, and two time periods each night. We sampled 94 flower-visiting insect species in total and documented the floral traits and ambient factors. First, focusing on the insects functions, we allocated all insects into three functional groups (pollination, predation, and feeding). We found that most nocturnal insects exhibited predation behavior, and they had the highest species turnover rate. Second, focusing on the environmental factors, we found that ambient temperature and relative humidity strongly influence the diversity of flower-visiting insects. Variation partitioning analysis further suggested that ambient temperature has a stronger effect on the flowering-visiting insects at early night, while the relative humidity has a stronger effect on the flowering-visiting insects at late night. Third, focusing on floral traits, we found that most insects have a preference for flowers with moderately-sized corolla diameters (20 to 30 mm). Furthermore, display size had a strong linear correlation with flowering-visiting insect species richness and frequency of presence. In sum, our findings suggest that ambient temperature, relative humidity, and floral display size strongly regulate nocturnal flower-visiting insects.

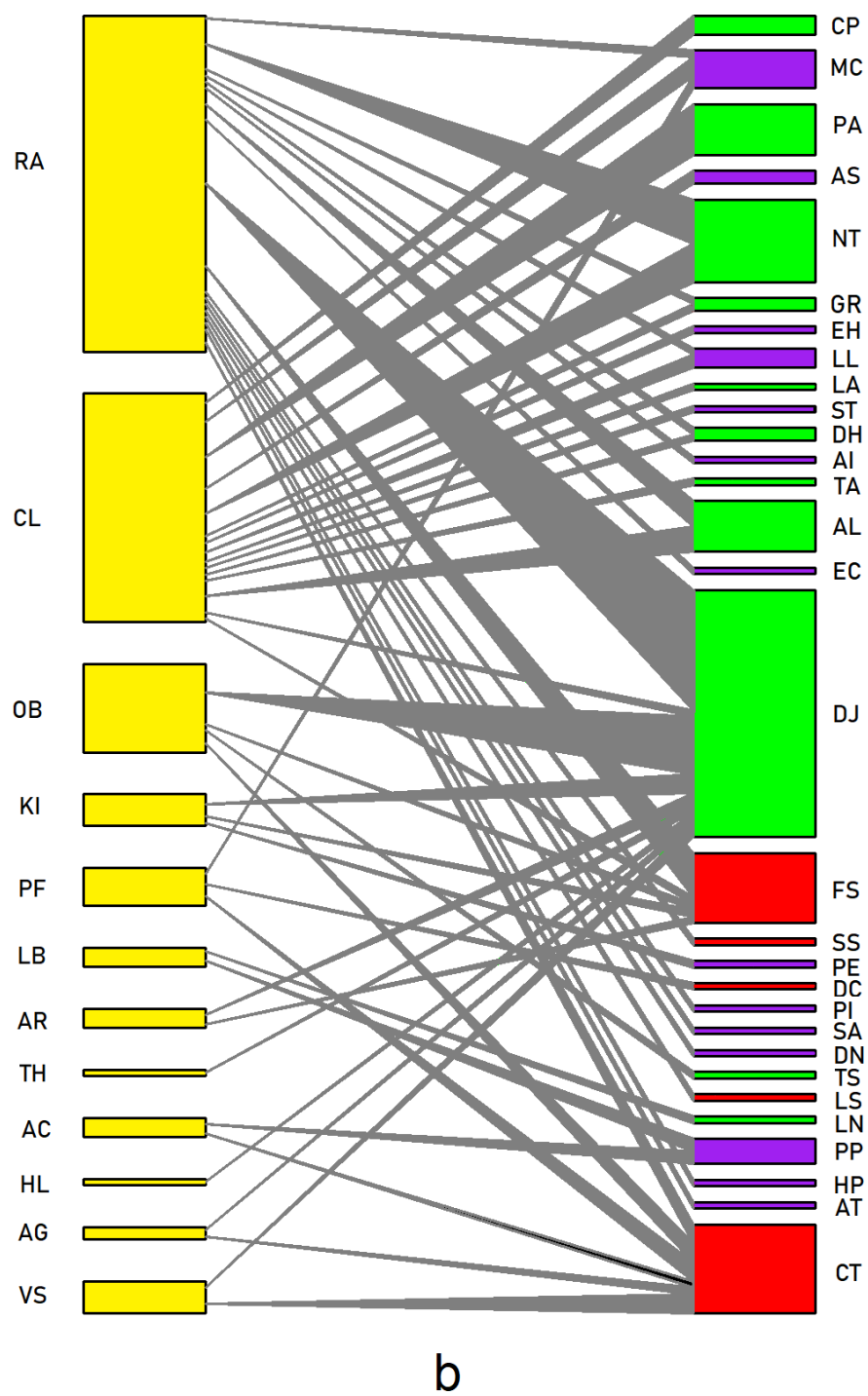
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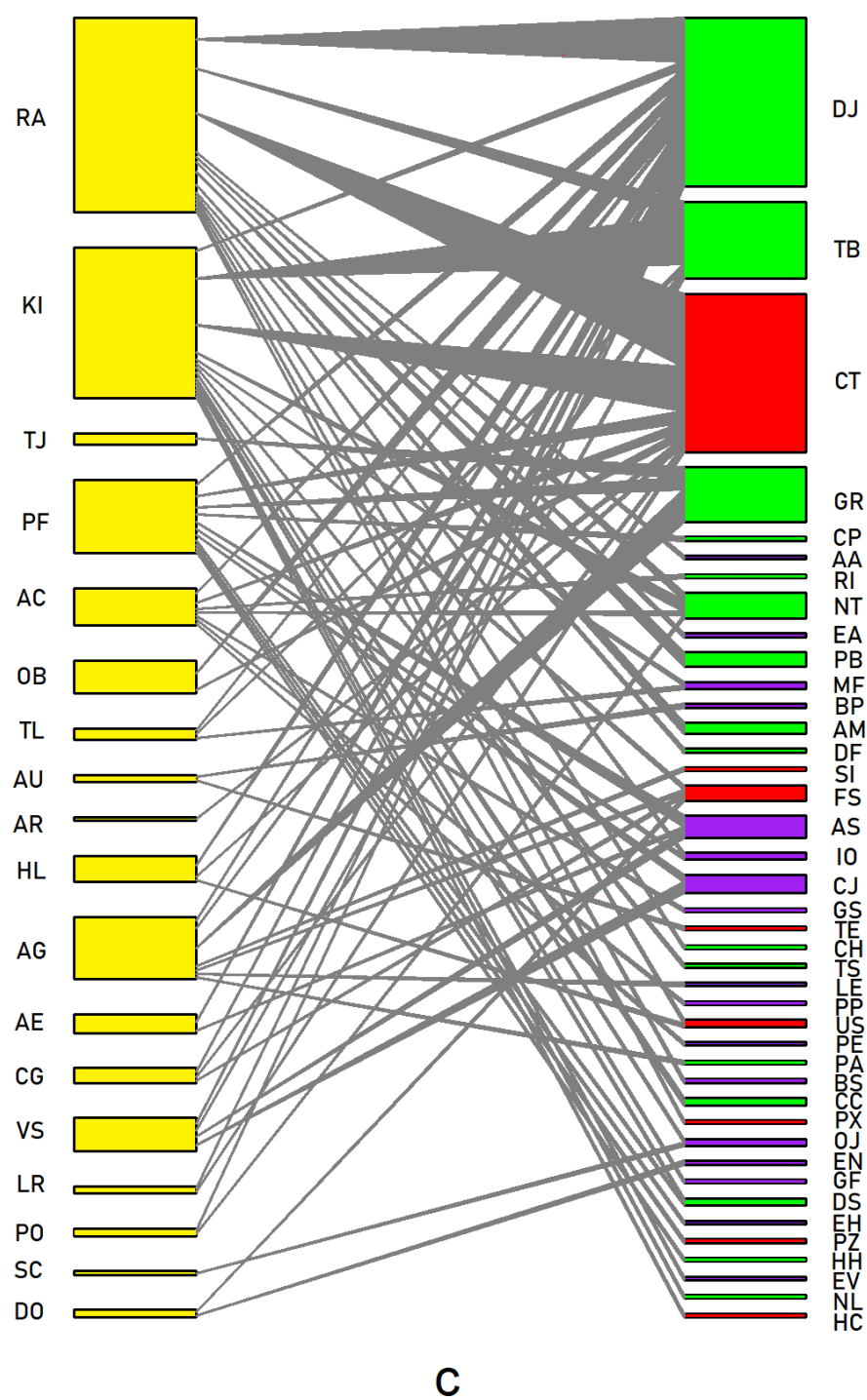
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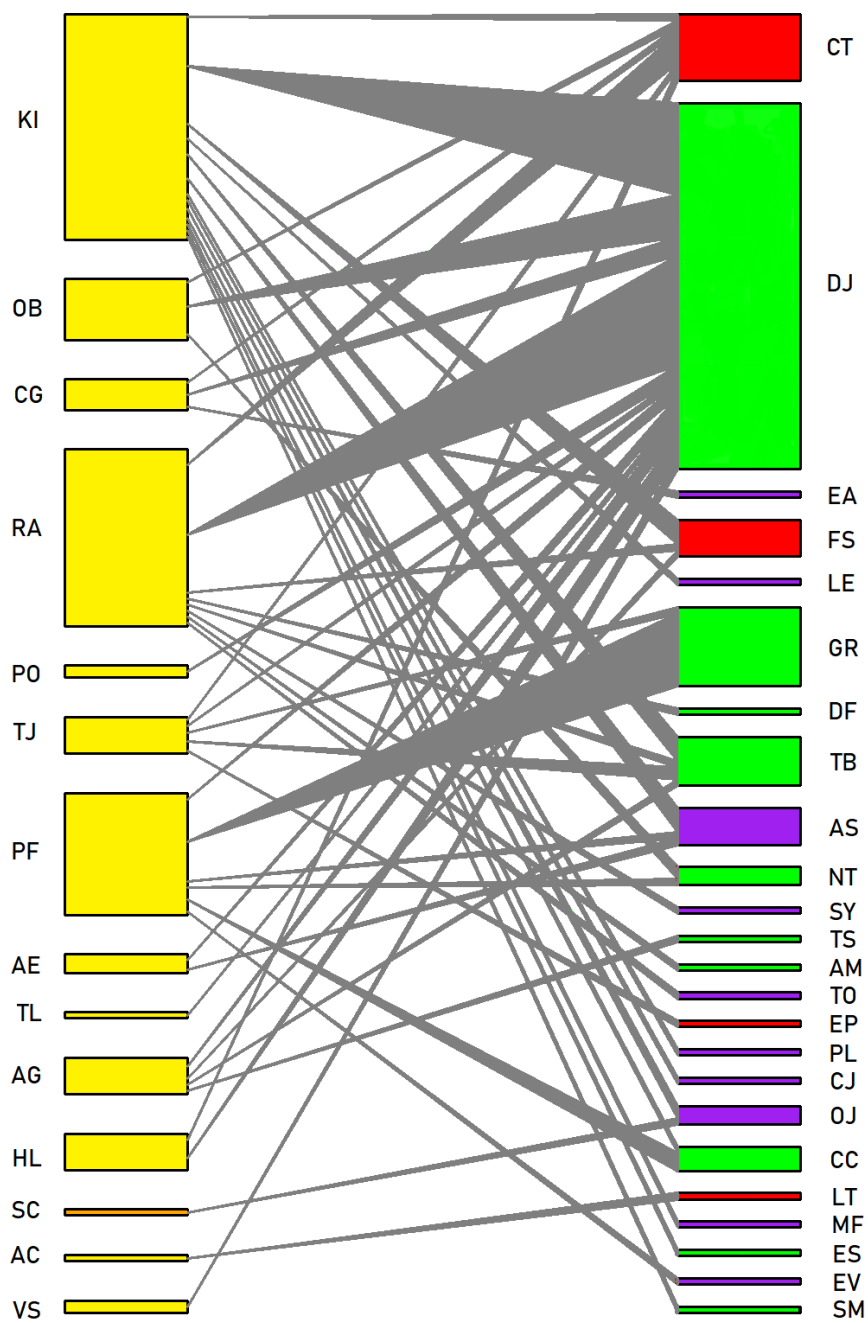












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