Title:
Switch off the light! Artificial light at night negatively impacts reproductive output of wild flowers in the Swiss agricultural landscape

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Abstract:
Among drivers of environmental change, artificial light at night (ALAN) is poorly understood, yet is increasing on a global scale and affects biodiversity in multiple ways. Plant-pollinator networks, as an example, are impacted and disruptive effects of ALAN have been quantified on diurnal pollination, leading to negative consequences for plants reproductive success. We investigated the mechanisms driving the indirect effects of ALAN on the interactions between plants and day-active pollinators. As ALAN may impact plants' development and growth, we hypothesized that ALAN may also alter the expression of several floral traits involved in plant-pollinators interactions, leading to a reduced attractiveness for the pollinators. This question was investigated by means of garden experiments as well as a large field study, in which six out of a total of 12 Swiss wild flowers stripes were illuminated using commercial LED streetlamps. The expression of three morphological floral traits were measured on seven native wild flowers grown with and without light treatment. Attractiveness of these plants where quantified by the means of choice experiments, where the number of insects visiting potted plots displayed in a neutral surrounding were quantified and the number of seeds produced at the end of the season were counted. Our results only showed an effect of ALAN on the expression of one trait (number of flowers), but an overall negative impact on the number of flower visitors and seeds sets. These results suggest that other mechanisms are involved in the alteration of diurnal pollinators visitors due to ALAN.