

White LED lighting increases the ecological impact of light pollution on flying nocturnal invertebrates irrespective of colour temperature

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Recognition of the extent and magnitude of night-time light pollution impacts on natural ecosystems is increasing, with pervasive impacts observed in both nocturnal and diurnal species. Municipal and industrial lighting is on the cusp of a step-change where energy efficient lighting technology is driving a shift from 'yellow' high pressure sodium vapour lamps (HPS) to new 'white' Light Emitting Diodes (LEDs). We hypothesised that white LEDs would have greater ecological impacts than HPS due to the peak UV/green/blue visual sensitivity of nocturnal invertebrates. Our results confirmed this hypothesis that white LED lights are more attractive to nocturnal flying invertebrates than HPS lamps, although the effect was dependent on temperature (light * temperature, $df=42$, $t=-2.3$, $P<0.027$). We found no evidence that manipulating the colour temperature of white LEDs would minimise the ecological impacts of wide-scale adoption of white LED lights. As such, large-scale adoption of energy efficient white LED lighting for municipal and industrial use is likely to exacerbate ecological impacts and may amplify phytosanitary pest infestations.

