Improving the performance of infrared reflective night curtains for warming field plots - DTU Orbit (20/08/2019)

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Infrared reflective (IR) curtains have been widely used to obtain passive nighttime warming in field ecosystem experiments in order to simulate and study climate warming effects on ecosystems. For any field installation with IR-reflective curtains in an ecosystem the achieved heating effect depends on the heat gain determined by the stored energy during daytime (incoming radiation can be used as a proxy) the heat conservation determined by the IR-reflective effect of the curtains (cloudiness can be used as a proxy) and the heat loss determined by convectional heat loss (wind speed can be used as a proxy). In this study, we demonstrate some feasible avenues for improving the achieved temperature increase (ΔT) when using IR-reflective curtains at field scale by attacking the three main factors determining the efficiency of the curtains: (i) improving the long wave IR reflection by the curtains, (ii) insulating the curtains and (iii) reducing the lateral wind speed. We provide experimentally based replies to the major concerns raised in the literature about the passive nighttime warming method. We show (a) that using IR-reflective curtains during night does in fact not result in nighttime warming only as there is a small carryover (b) that...