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Seasonal change in phototropic behavior of Formica polyctena

Stepanka Kadochova, Jan Frouz

Red wood ants are an important part of boreal forests, they are considered ecosystem engineers because they affect the nutrition flow and tree growth in the vicinity of their nests. *Formica polyctena* ants build huge nests, which may contain over one million workers. In those nests a precise thermoregulation takes place thanks to unique properties of nest material (heat capacity, isolative properties), microbial heating and trapping of solar radiation. Moreover the ants are capable of active nest thermoregulation via metabolic heating and several behavioral reactions. One of those is sunning on the nest surface in the spring. In my research I combined novel approach (use of thermo camera) with classical field ecology methods to study spring sunning behavior and phototropism of ant workers under different ambient situations. I found out that the phototropism is switched from positive, which occurs mainly in the spring, to negative, which is more common in late summer. This change of phototropic reaction correlates significantly with time of year. In early spring the workers behavior is affected by date, solar income and air temperature, whereas in summer nest surface temperature and nest volume plays a vital role. We can suggest that this seasonal switch of phototropic reaction is an adaptive strategy which helps to establish thermal homeostasis in the nest in the spring and avoids overheating of ant workers later in summer, when the nest surface temperature reaches level which is harmful for the ants.