OR034
BEEHAVE: modelling multifactorial causes of honeybee colony losses
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Honeybee colonies can be subject to multiple stressors like parasites (e.g. varroa mites and varroa transmitted viruses), insufficient forage availability and pesticide exposure. We developed a honeybee model that integrates colony dynamics, agent-based foraging in realistic landscapes and population dynamics of varroa mites, acting as vectors for viruses (Deformed Wing Virus and Acute Paralysis Virus). We explore the potential impact of pesticide applications by increased mortality rates of foragers and in-hive stages and how this is affected by food availability in the landscape. Our results suggest that the timing of the pesticide exposure is crucial and the impact is more severe, if colonies are already under food stress. The BEEHAVE model is available for free download at http://beehave-model.net/ and comes together with a detailed model description and a user manual.