

PP-075 [Bee Health]

Brood activity in winter accelerates aging and increases the parasite load in honey bee colonies, which can be mitigated by caging of the queens

Annely Brandt¹, Valon Mustafi²

¹LLH - Bee Institute Kirchhain,

²Rural Development Service Centre, Institute for Bees and Apiculture

Honey bee colonies in temperate zones usually cease to rear brood in the fall. However, recent higher-than-average winter temperatures in Europe correlate with unusual brood activity, with unknown consequences for colony health. To investigate the effects of a brood pause, we caged queens for 0, 74 or 117 days in early October to prevent egg laying. We analysed the effects on the survival of queens, worker physiology, longevity and colony health. The caging had no negative effect on queen survival (control: 38 queens of 40 survived, 74 days caging: 38 queens of 40 survived; 117 days caging: 21 queens of 25 survived) or overall colony strength. Interestingly, the lifespan of the winter bees in the colonies with caged queens was significantly prolonged. The gene expression profiles of workers from these colonies resembled those of young winter bees or summer nurse bees, while workers from continuously breeding control colonies showed typical expression patterns of older, foraging bees. This indicates a connection between brood care and accelerated ageing. In addition, colonies with caged queens were found to have a lower Varroa destructor infestation, indicating reduced reproduction of this brood parasite. Our results indicate that brood activity in winter can lead to an increase in varroa infestation. We show, however, that caging of the queens in winter can help to mitigate the negative consequences of climate change for honey bee colonies. The potential of winter caging to influence the reproduction rate of V. destructor in spring should be evaluated in more detail.