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Effect of Anomalous Pollen Grains of Sweet Cherry (*Prunus avium*) on Larval Development of the Wildbee *Osmia cornuta*

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Abstract

We investigated the effect of anomalous empty pollen grains of five sweet cherry cultivars (Kordia, Oktavia, Regina, Sam, Schneiders) on the larval development of *Osmia cornuta* wildbees. Dead pollen is found in different amounts among sweet cherry cultivars: Kordia (62% empty pollen per anther), Oktavia (49%), Schneiders (32%), Regina (24%) and Sam (17%). In wildbees, food provision to larvae consists in a limited amount of pollen. Provision amount differs between males and females, but in all cases, once load is provided, broodcells are sealed and no further provision events occur. Consequently, mixed loads of dead and alive pollen may lead to maldevelopment, anormal adult size or larval death. The hypothesis of higher intake of empty pollen grains increasing occurrence of larval malformation or death is tested. Pollen quality of pure cultivars is considered: *O. cornuta* individuals providing their broodcells with pollen offered by isolated cherry trees. This study was performed during the 2005 blossom period of cherry trees, at the University-of-Bonn experimental station “Obstversuchsanlage-Klein-Altendorf,” Meckenheim, Nordrhein-Westfalen, Germany. Known number of wildbees were released into cages, of isolated trees, per cherry cultivar. Nesting places (trapnests) and constructing material were provided. Intact broodcell provision was obtained by removing egg. Complete larval development was recorded or until death. Results include the effect of pollen provision in broodcells on mortality rate and larval maldevelopment. Quantification of anomalous and normal pollen grains of food provision in broodcells are presented. Discussion includes the effect of pollen quality on mortality rate in those cultivars with the highest number of empty pollen grains provided to *O. cornuta* larvae. Pollination efficiency, survival and reproductive success of malnourished wildbees are discussed. To date, emphasis has been placed on increasing produce quality in orchards, but no attention has being given to germinable cells of trees. Pollen quality has paramount importance to the sustained cultivation of orchard trees. The occurrence of pollen grains of lower quality may pose detrimental consequences to the nourishment of larvae of potential pollinators in orchards too.

Keywords: Empty pollen grains, larval development, *Osmia cornuta* wildbees, pollen provision in broodcells, sweet cherry