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*Queen signalling in social wasps*

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Social Hymenoptera are characterized by a reproductive division of labour, whereby queens perform most of the reproduction and workers help to raise her offspring. A long-lasting debate is whether queens maintain this reproductive dominance by manipulating their daughter workers into remaining sterile (queen control), or if instead queens honestly signal their fertility and workers reproduce according to their own evolutionary incentives (queen signalling). Here, we test these competing hypotheses using data from Vespine wasps. We show that in natural colonies of the Saxon wasp, *Dolichovespula saxonica*, queens emit reliable chemical cues of their true fertility and that these putative queen signals decrease as the colony develops and worker reproduction increases. Moreover, these putative pheromones of *D. saxonica* show significant conservation with those of *Vespula vulgaris* and other Vespinae, thereby arguing against fast evolution of signals as a result of a queen - worker arms race ensuing from queen control. Lastly, levels of worker reproduction in these species correspond well with their average colony kin structures, as predicted by the queen signalling hypothesis but not the queen control hypothesis. Altogether, this correlative yet comprehensive analysis provides compelling evidence that honest signalling explains levels of reproductive division of labour in social wasps.