1.4.P Establishing realistic exposure estimates of solitary bee larvae via pollen using inter species correlation models

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Abstract

In recent years there is growing concern that some solitary bee populations are in decline, potentially compromising pollination security in agricultural and non-agricultural landscapes. Among the numerous causes associated with this trend bee exposure to plant protection products (PPP) in agricultural landscapes has been discussed. Bees can be exposed to PPP directly resulting from overspray and/or to residues in pollen and nectar. In the case of solitary bee larvae, the main exposure route is likely pollen and the amount consumed depends on the size of the bee larvae and the pollen composition and (e g. pollen protein concentration). So far exposure estimates for wild bee larvae for risk assessment purposes have often been based on a limited number of observations making their accuracy uncertain. As a first step to tackle this question we combine information on solitary bee ecology (plant preference), plant pollen quality (pollen protein concentration), bee larvae weight and pollen consumption to build a phylogenetically controlled inter-species correlation model to estimate the protein/pollen needs of solitary bee larvae. We use this model to predict the protein/pollen needs of *Osmia* bees (the currently discussed solitary bee surrogate for EU risk assessment) and contrast our results with the proposed default pollen consumption estimates. We find that the currently used default pollen consumption values likely overestimate exposure and we discuss the implications of our findings for the future solitary bee risk assessment in Europe.