



## Diet experiences early in life mold individual foraging niches and personalities of omnivorous predatory mites\*

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The theory of individual niche specialization posits that members of local groups should diversify in their realized individual diet niches to alleviate inter-individual food competition and ensuing conflicts (Bolnick et al. 2003). Here we tested the hypothesis that early life experiences co-shape individual specialization in diet niches and animal personality expression in the omnivorous plant-inhabiting predatory mite *Amblyseius swirskii*. Animal personality is defined as within-individual consistency linked to consistent among-individual variation in behavior in a given population across time and/or contexts (e.g. Réale et al. 2007). In many animals, including mammals, birds, fishes, insects, spiders and mites, early life experiences, after birth or hatching, are known to have profound and persistent effects on behavioral trajectories later in life (e.g. West-Eberhard 2003). Before experiments, we exposed individual predators in their early life phase (larva and early protonymph) to one of three diets (pollen, two-spotted spider mites or thrips) or no food. Subsequently, individuals of all four treatments were reared under exactly the same conditions with pollen until they became adult and mated. In experiments, we first recorded the response of gravid females from the four early life treatments to familiar and unfamiliar diet cues in choice experiments. Then, the females were subjected to standardized experimental paradigms assessing their personalities in activity, exploration, and aggressiveness. Contextual and temporal behavioral consistency was assessed over two to three consecutive tests for each behavioral trait. Movement activity patterns of the predators were assessed in familiar environments. To characterize exploration, the predators were challenged to find novel diets in closed acrylic microcosms and novel objects in open-field-tests (using small acrylic arenas with novel objects in the corners). Aggressiveness was judged by cannibalism propensity tests. Personality expression was analyzed by intraclass correlation coefficients (ICC). Preliminary analyses confirmed that early life diet experience changes the response of *A. swirskii* females to prey cues (spider mites and thrips). ICCs revealed that aggressiveness was highly repeatable across treatments, which indicates personality formation, but repeatability varied with early life experience. Activity and exploration were significantly repeatable in some early life treatments but not in others. Taken together, our study suggests that diet experiences early in life have persistent influences on the foraging phenotypes and personalities expressed by adult *A. swirskii* females.

**Keywords:** Activity, aggressiveness, animal personality, early life experience, exploration, individual niche specialization, predatory mites

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