



Early life experience of intraguild predation risk shifts the personalities of predatory mites along the shy-bold axis*

PETER SCHAUSBERGER¹, THI HANH NGUYEN¹ & MUSTAFA ALTINTAS¹

Department of Behavioral and Cognitive Biology, University of Vienna, Djerassiplatz 1, 1030 Vienna, Austria

peter.schausberger@univie.ac.at; <https://orcid.org/0000-0002-1529-3198>

*In: Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. & Minor, M.A. (Eds) (2022) *Acarological Frontiers: Proceedings of the XVI International Congress of Acarology (1–5 Dec. 2022, Auckland, New Zealand)*. Magnolia Press, Auckland, 328 pp.

Animal personalities are defined as within-individual consistency and consistent among-individual variation in behavior across time and contexts (Biro & Stamps 2008). Typical categories of behavioral traits used to characterize animal personalities are activity, aggressiveness, boldness, exploration, and sociability (Reale *et al.* 2007). Major determinants of animal personality formation are genetic predisposition, parental effects and early life experiences. Here we hypothesized that (i) adult *Phytoseiulus persimilis* females show personalities in boldness and aggressiveness and (ii) their personalities are influenced by early life experience of intraguild predation risk. We reared *P. persimilis* in groups in spider mite patches and exposed half of the groups during early life (larvae and protonymphs) to gravid females of the intraguild predator *Amblyseius andersoni* (Schausberger & Croft 2000). After reaching adulthood and mating, we assessed the personalities of intraguild predator-experienced and -naïve *P. persimilis* females by subjecting them to three sequential tests each for aggressiveness and boldness. Aggressiveness was quantified as the propensity to kill conspecific larvae in three different contexts, boldness was evaluated by risk-taking behavior in three different microcosms each consisting of risky and benign components. Intraclass correlation coefficients revealed that both aggressiveness and boldness were significantly repeatable, indicating that *P. persimilis* females have distinct personalities. Generalized linear models pointed at higher mean aggressiveness and greater mean boldness of predator-experienced individuals. While the level of behavioral consistency was similar in the two early life treatments (with and without intraguild predation risk), early life experience of predation risk shifted the within-group personality composition along the shy-bold axis towards bolder personalities, and along the aggressiveness continuum towards more aggressive personalities. Both increased boldness and heightened aggressiveness were associated with increased egg production, pointing at the adaptive value of adjusting personality formation to early life experience.

Keywords. Aggressiveness, animal personality, boldness, intraguild predation, predatory mites

References

- Biro, P.A. & Stamps, J.A. (2008) Are animal personality traits linked to life-history productivity? *Trends in Ecology and Evolution*, 23, 361–368.
<https://doi.org/10.1016/j.tree.2008.04.003>
- Réale, D., Reader, S.M., Sol, D., McDougall, P.T. & Dingemanse, N.J. (2007) Integrating animal temperament within ecology and evolution. *Biological Reviews*, 82, 291–318.
<https://doi.org/10.1111/j.1469-185x.2007.00010.x>
- Schausberger, P. & Croft, B.A. (2000) Nutritional benefits and intraguild predation among generalist and specialist phytoseiid mites. *Ecological Entomology*, 25, 473–480.
<https://doi.org/10.1046/j.1365-2311.2000.00284.x>