Offspring reaction norms shaped by parental environment: transgenerational plasticity of inducible defenses

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Abstract

Within-generational plasticity (WGP) and transgenerational plasticity (TGP) are mechanisms allowing rapid adaptive responses to fluctuating environments without genetic change. These forms of plasticity have often been viewed as separate processes. Recent evidence suggests that WGP is altered by the environmental conditions experienced by previous generations. In the context of inducible defenses, one of the most studied cases of plasticity, the WGP x TGP interaction has never been demonstrated. We provide the first evidence that TGP can alter the reaction norms of inducible defenses in a freswhwater snail. The WGP x TGP interaction patterns are trait-specific and lead to decreased slope of reaction norms (behaviour and shell thickness) and more surprisingly to a switch from a plastic towards a constitutive expression of defenses (shell dimensions). WGP-alteration by TGP may shape the adaptive responses to environmental change and then has a substantial importance to understand the evolution of plasticity.

Keywords: phenotypic plasticity, transgenerational plasticity, inducible defenses, predator, prey interactions, reaction norm, Physa acuta

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