

## **When is reversible phenotypic plasticity advantageous?**

The ability of a genotype to express different phenotypes in variable environments often leads to a fitness advantage. Such adaptive phenotypic plasticity occurs in traits ranging from morphology to physiology and behavior and can be observed in nearly all classes of organisms. Understanding the selective advantage and the limits of plasticity is crucial to numerous issues in evolution and ecology.

Environmental tolerance functions describe how fitness of an organism depends on the environmental state. Mode and variance of tolerance functions can be treated as quantitative genetic traits and its values may be altered if an organism performs phenotypic plastic changes induced by environmental cues. Non-plastic, irreversible plastic or reversible plastic genotypes are favored depending on time pattern and variance of environmental changes, on the reliability of the environmental cues, on the time spans needed to perform plastic shifts and on the costs of plasticity.