

Internal Glossary & Terminology

Adaptation (for an evolutionary biologist): Non-random alteration of the gene frequency of a reproducing unit towards genotypes with a higher genetic fitness. Natural selection leads to adaptation.

Clones: Without recombination demographically independently evolving lineages. If there is occasionally sexual reproduction (or another way of genetic recombination) among clones, some similarity arises with species which reproduce mostly parthenogenetically but occasionally by sexual reproduction. Hence, we may have a continuous gradient of the frequency of sexual recombination. There may be also (fertile) hybrids arising from clones allocated to different species (e.g. *Daphnia galeata* and *D. hyalina*). Different clones, as individuals of a sexually reproducing species, may differ in adaptive traits. In both cases, adaptation is mostly based on the standing genetic variation. Such genetic adaptation is faster than by positive mutations, but typically does not allow large changes in traits. Hence, it depends on the extent of disturbance, whether this is sufficient or not.

Functional genetic variation: Genetic variation with a functional implication for the phenotype (typically, expressed genetic variation, although there are examples for functional implication of non-expressed variation as well).

Functional traits: any measureable feature at the individual level affecting its fitness directly or indirectly (Lavorel et al. 1997, Violle et al. 2007). Functional traits have been extensively used to describe, group and rank species according to their functions (Díaz & Cabido 2001, McGill et al. 2006).

Phenotypic plasticity: Alteration of traits without alterations of the genotype. The range of phenotypic plasticity (and the reaction norm) is genetically fixed and presumably determined by a trade-off. In monoclonal populations it is the only source for plasticity, except of mutations.

Phenotypic rescue. Phenotypic change that counteracts the decrease in fitness (including extinction) of populations facing adverse environmental change. The phenotypic changes associated with phenotypic rescue can be due to phenotypic plasticity ("*plasticity rescue*") or due to genetic changes ("*evolutionary rescue*") within the population.

Trait variation dynamics: Here used as any change of traits independent of whether it arises due to phenotypic plasticity, evolution or shifts in species composition. Mostly these changes will be adaptive in the sense that they increase the fitness of the organism but due to potential mutations or sexual recombination this will not always be the case.

Sorting: Within communities, species sorting may occur which alters the relative importance of individual species (and hence the genetic composition of the community) as well as the mean trait value and the trait distribution. Within species, clonal sorting regularly occurs and has the same effect. Evolutionary lineage sorting: sorting of evolutionary lineages present in an ancestral population into descent taxa. Gene-specific lineage sorting typically (but not always) follows the phylogeny of the descent taxa.

Standing genetic variation: Genetic variation present in a gene pool at a given time.

The *trait distribution* reflects the biomass (or abundance)-weighted frequency with which a functional trait is represented in a population or community (i.e. the biomasses of the species exhibiting distinct trait values determine the distribution, cf. figure below). It can be quantified by its moments (mean, variance, skewness and kurtosis) and reflects the functional diversity present.

