Data set description:

The dataset bases on a common garden experiment with 16 *Silene latifolia* **populations** (ac, be, ca, ce, cv, es, gi, hg, je, lb, ma, mp, mt, ng, nh, nj) from two different distribution **range**s (native [eu] *versus* invasive [us]). **N** corresponds to the latitudinal origin of the regarding population. We exposed plants from all populations to a **breeding treatment** (inbred [i] *versus* outbred [a]) using five different **maternal families** (a, b, c, d, e) per population for the experimental crossings. Subsequently inbred and outbred plants were exposed to a **herbivory treatment** (exclusion [ex] versus inclusion [in]), which was applied on a **plot** basis (∑ = 16 plots, of which 8 were exclusions [ex] and 8 were inclusions [in]). **Individual**s within the experiment received consecutive numbers. We determined plant sex (female [f] *versus* male [m]), assessed plant growth and reproduction related traits (**number leaves**, **aboveground biomass**, **corolla size**, **number of flowers and buds**, **number of fruits**), as well as traits related to infestation damage (**damaged leaves**, **flowers**, **fruits** ) and morphological resistance (**leaf trichome density**).