

Supplementary File 1. Analysis of mowing experiment data

Table S1 provides an overview of the full statistical model for each vital rate, including all fixed effects tested. For each vital rate, we evaluated a set of models including subsets of these fixed effects by comparing values of the corrected Akaike information criterion (AICc). We thus selected the best model for parameterisation.

For plant height we built generalised mixed effect models (GLMM) with fixed effects of treatment, year and their interaction and location as random effect. We fitted them with a Gamma distribution and the optimizer "bobyqa" using R package lme4 (Bates et al. 2015). To explore temporal patterns of treatment effects over time, year was initially included as a continuous variable. Because we found no evidence for any directional effects of year, it was changed into a categorical factor instead. We then examined size-dependent effects of treatments on reproduction (female flowering, fecundity, and seed ripening), therefore adding log-transformed values of plant height as covariate to the fixed effects.

For logistic regressions of female flowering we used a binomial error distribution and the optimizer "bobyqa", and we needed to move the factor year to the random effects (nested within location) in order to run models (otherwise algorithms failed to converge).

For linear mixed effect models on fecundity, we used log-transformed number of seeds as response variable and applied a Gaussian distribution fit with Maximum Likelihood.

For seed development, we used a multinomial model with the three developmental stages (flower, developing seed, ripe seed) as response variable, and the most common stage "developing seed" as reference category. We pooled data from all locations and years to have sufficient data for this model.

Reference

Bates D, Maechler M, Bolker BM, et al. (2015) Fitting linear mixed-effects models using lme4. *Journal of Statistical Software* 67:1-48

Table S1. Overview of the statistical models used to obtain effects of mowing on vital rates from the mowing experiment. Fixed and random effects of the initial full models (including all possible fixed effects) are presented.

Vital rate	Fixed effects	Random effect	Model
Plant height	treatment * year	location	GLMM: glmer, family=Gamma
Flowering	treatment * log(plant height)	location\year	GLMM: glmer, family=binomial
Fecundity	treatment * log(plant height) * year	location	GLMM: lme, family=Gaussian
Seed ripening	treatment * log(plant height)		multinomial model with 3 categories of seed development as response

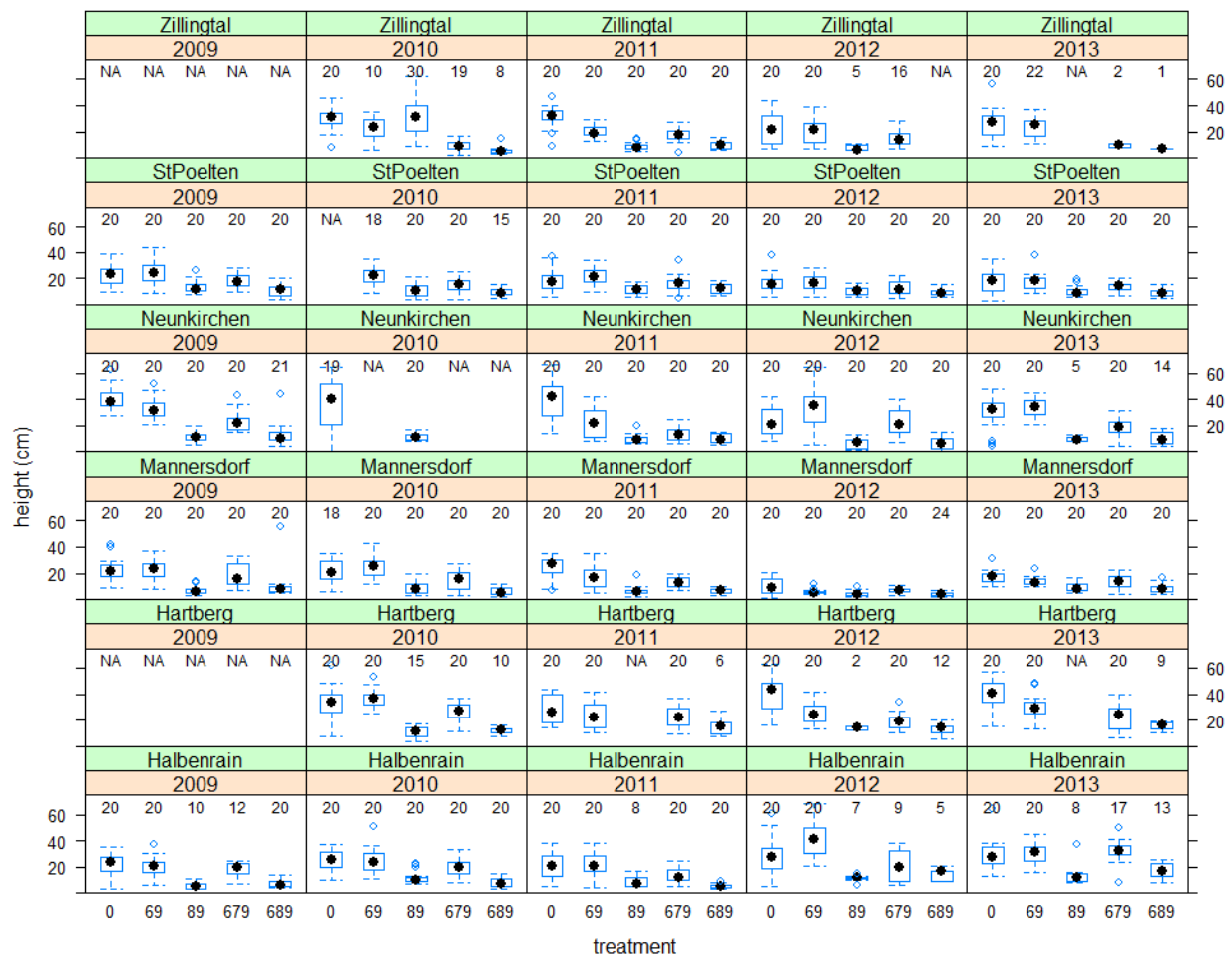


Fig. S1. Observed plant height in September for each combination of location and year, for each of the treatments, with number of measured plants above bars. Missing data points are due to a later start of the experiment (Zillingtal 2009), to the absence of ragweed plants or to the lack of measurements taken.

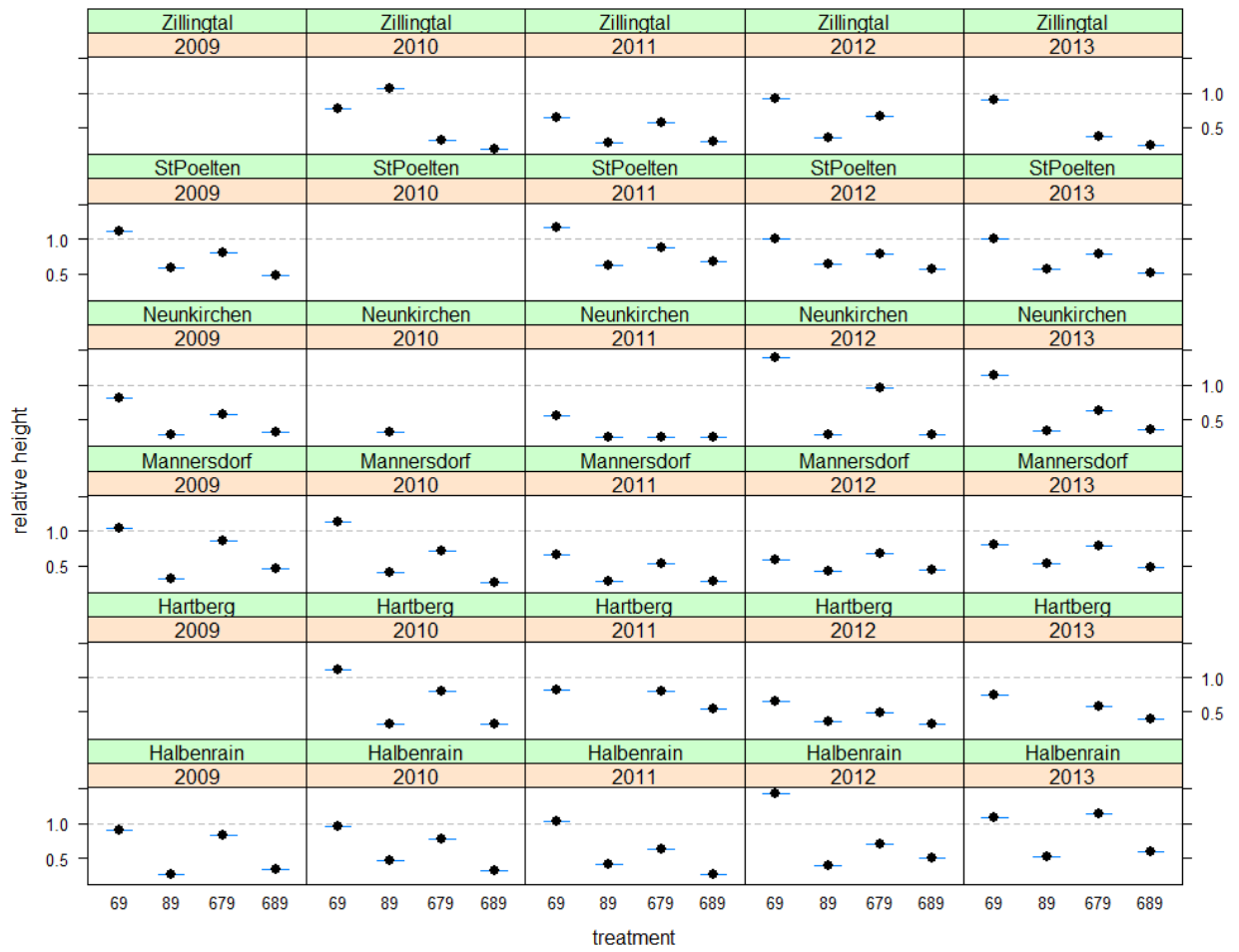


Fig. S2. Observed average relative plant height for each site and year combination, for each of the mowing treatments compared to the untreated control (treatment 0, indicated by the dashed line).

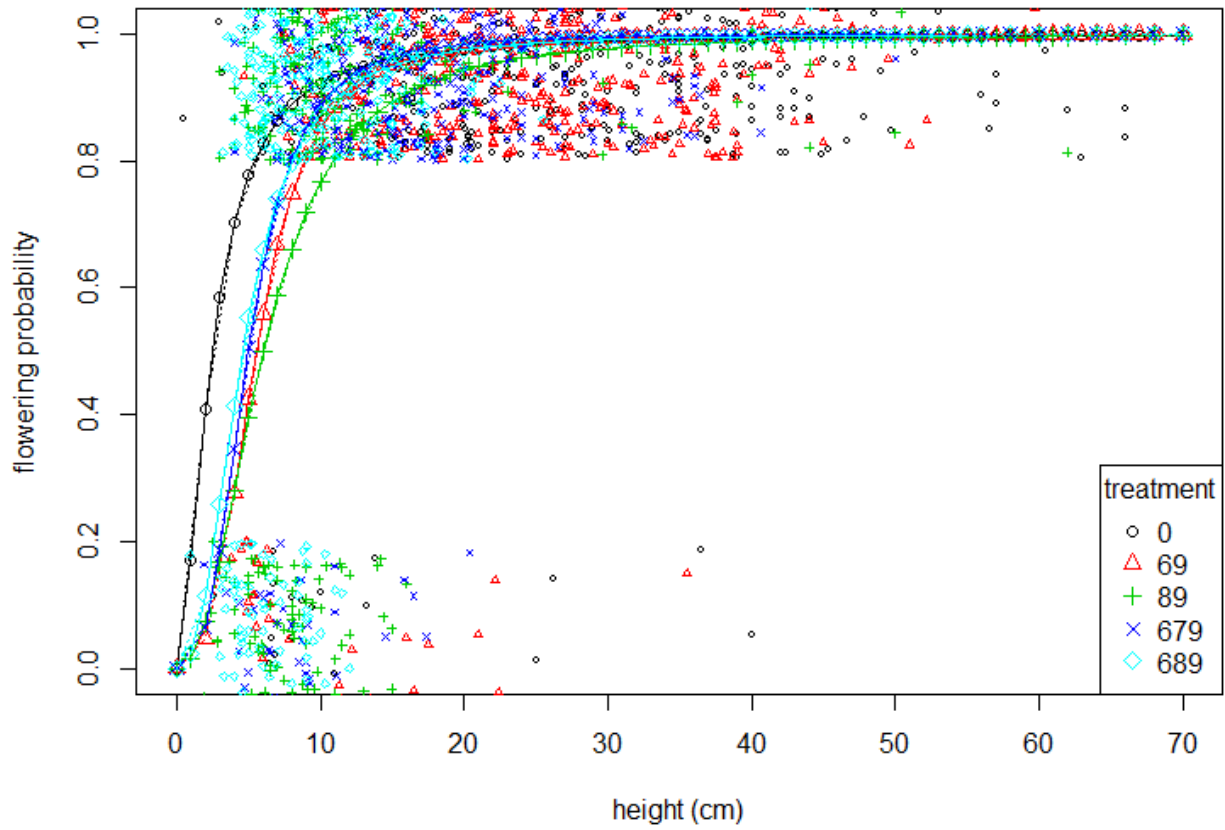


Fig. S3. Height-dependent flowering probability per treatment (in different colours/symbols), symbols represent observed values, corresponding lines the back-transformed fitted models. Dotted ends at both sides indicate extrapolation of effects outside the observed range of values.

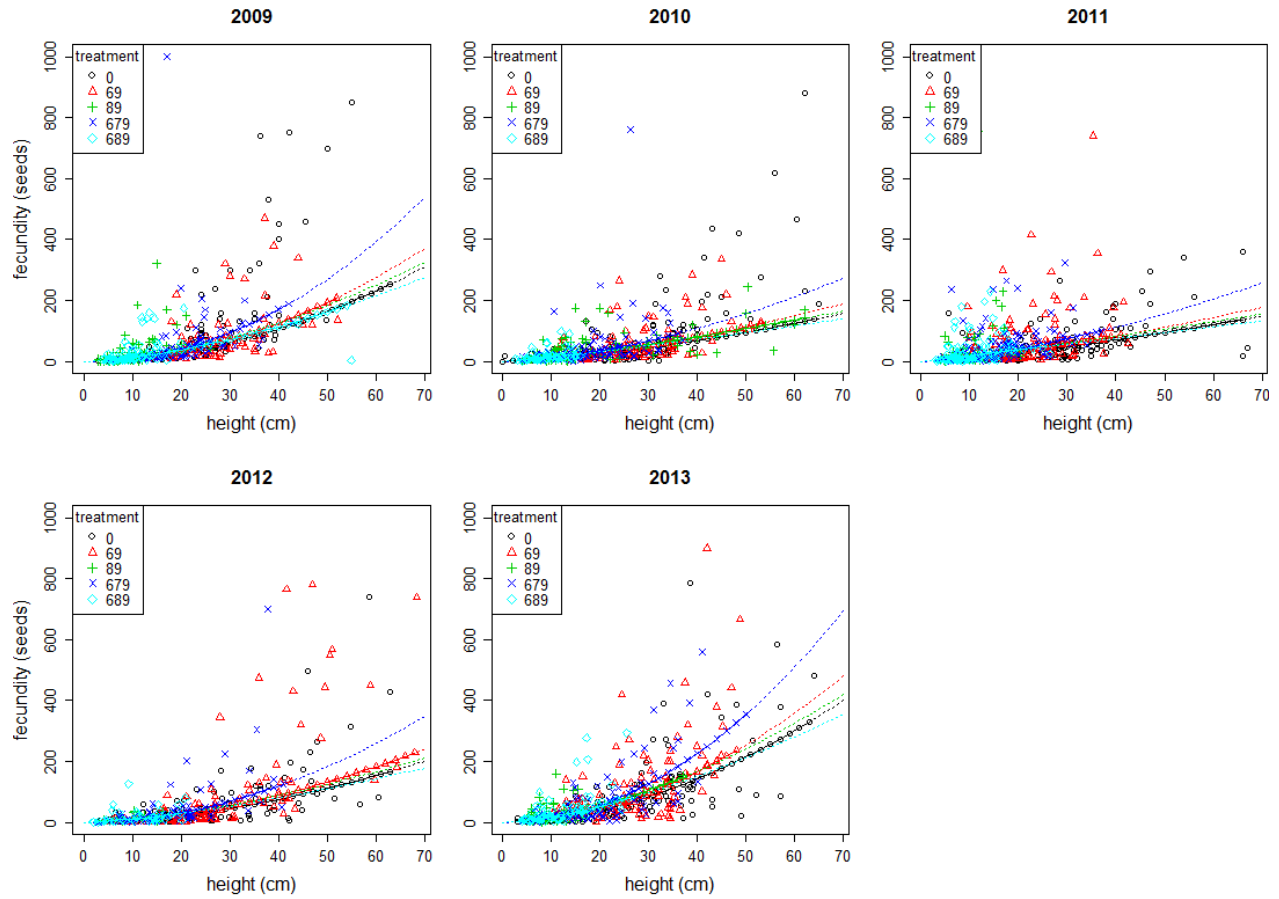


Fig. S4. Height-dependent fecundity (number of seeds produced) for each treatment (in different colours/symbols) in each year (panels). Symbols represent observed values, corresponding lines the back-transformed fitted models. Dotted ends at both sides indicate extrapolation of effects outside the observed range of values. Note that we found no evidence for a treatment*year interaction.