

Supplementary File 3. Seed burial experiments

In all three experiments, replicated groups of 50 seeds were enclosed in synthetic nets and buried. In 2011, seeds from Unterpurkla (Austria, maize field) were buried at a depth of about 10 cm in the university garden in Vienna, Austria. In 2012, seeds from Kaposvar (Hungary, maize field) and Hagenbrunn (Austria, ruderal place) were buried at 8 or 25 cm at Grossenzersdorf, Austria. A subset of 5 or 7 replicate bags had been tested for viability by germination and a subsequent TTC-test at the time of burial, and this procedure was yearly repeated for 5 or 7 freshly excavated bags. We did not use data from seeds buried at 25 cm as only seeds germinating in the upper soil layer can successfully establish (Kazinczi et al. 2008). Table S3 gives an overview of the experimental data used, further details of design and methods can be found in Karrer et al. (2016).

We estimated yearly survival for each of the experiments (Table S3) by fitting exponentially declining models to the numbers of viable seeds (Fig. S5). No yearly data are available for longer periods, but some seeds that had been buried for 39 years in the UK were still found to be alive (Toole and Brown, 1946), suggesting that some seeds can reach high ages in the soil. In roadside populations, however, seeds are unlikely to be buried deeply. When they remain on the surface of the ground, they are exposed to different abiotic conditions and additional factors that may cause mortality, such as seed predators. In the main manuscript, we therefore only show results of the scenario with the lowest estimated survival rates, H.

References:

Karrer G, Hall R, Lener F, Waldhäuser N, Kazinczi G, Kerepesi I, Máte S, Soeltner U, Starfinger U, Verschwele A, Mathiassen SK, Kudsk P, Leskovšek P, Simončič A (2016) Field experiment on longevity of the seeds in the soil seed bank (Joint experiment). - in: Soeltner U, Starfinger U, Verschwele A (Hrsg.) HALT Ambrosia – final project report and general publication of project findings. Julius-Kühn-Archiv 455: 41-47.

Kazinczi G, Béres I, Novák R et al (2008) Common ragweed (*Ambrosia artemisiifolia*): a review with special regards to the results in Hungary. I. Taxonomy, origin and distribution, morphology, life cycle and reproduction strategy. *Herbologia* 9:55–92

Toole E, Brown E (1946) Final results of the Durvel buried seed experiment. *Journal of Agricultural Research* 72:201-210

Table S3. Overview of seed burial experiments used and estimated survival.

Seed scenario	Seed origin and sampling year	Burial year	Burial place	Burial depth	Number replicate seed bags/year	Number seeds/bag	Estimated survival/year
H	Ruderal place in Hagenbrunn, Austria, 2011	2012	Grossenzersdorf N 48.198935, E 16.558577	8 cm	5	50	0.792
K	Maize field in Kaposvar, Hungary, 2010	2012	Grossenzersdorf N 48.198935, E 16.558577	8 cm	5	50	0.963
U	Maize field in Unterpurkla, Austria, 2010	2011	Vienna N 48.237131, E 16.332444	10 cm	7	50	0.921

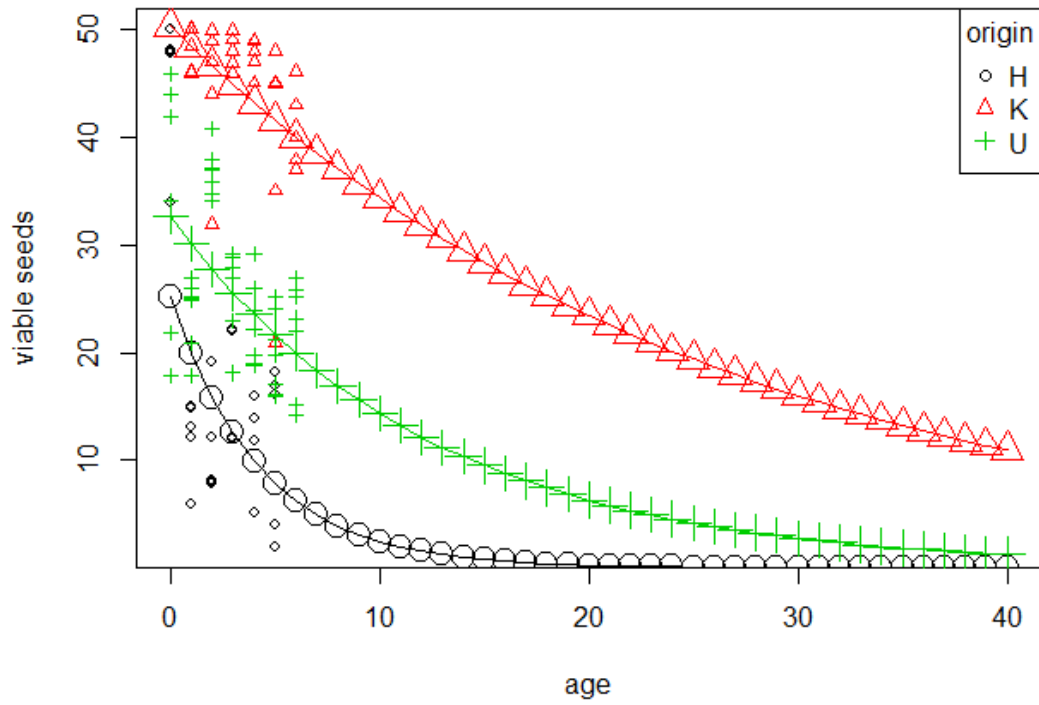


Fig. S5. Observed (small symbols) and fitted (large symbols) viability of seeds in each of the burial experiments. Age is expressed as years after collection. Note that models extrapolate beyond the period observed, due to the absence of longer time series.