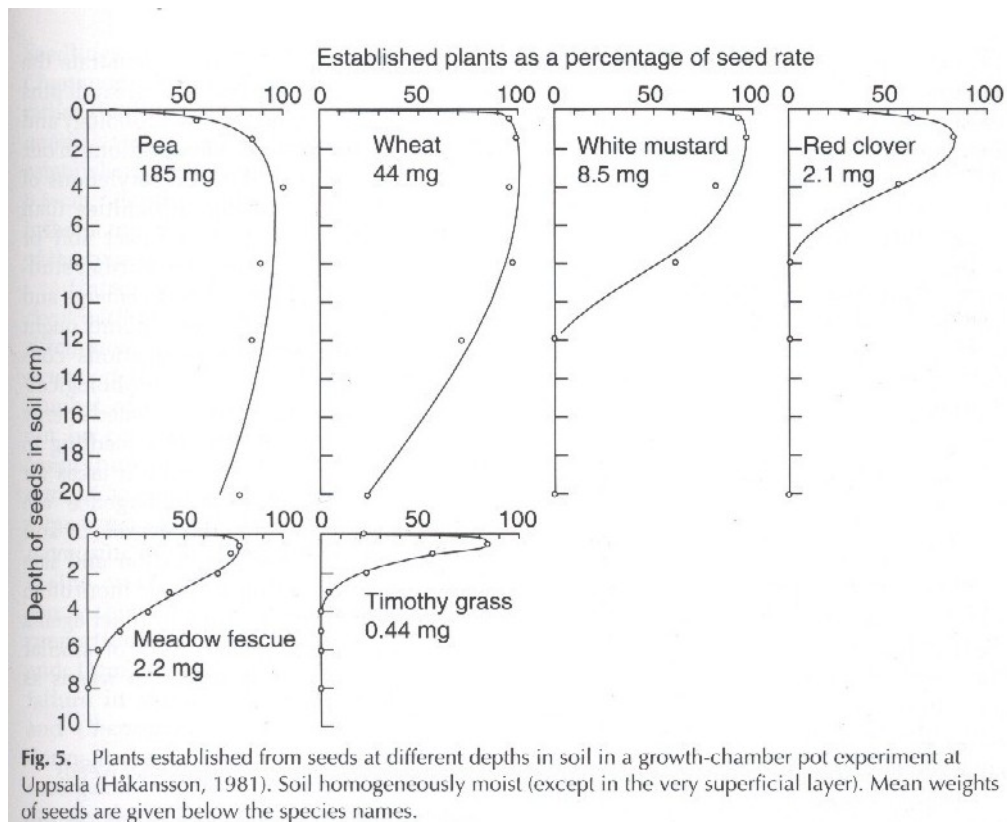


## 1. Purpose of database

1.1. To facilitate the modelling of weed population dynamics by compiling information on species-specific model parameters.

1.2. To establish quantitative links between model parameters and functional traits – see example below of relationship between seed weight and germination at different depths with thanks to Bastiaan Brak at HRI for providing the Figure (sorry about the quality – it is a scan from a book!).



1.3. To quantify the intra-specific variability in both model parameters and functional traits and relate to external drivers including location, season and crop type.

1.4. To derive general principles of community assembly based on response traits, management filters and functional groups.

## 2. Suggested traits and relationship to model parameters and management filters

The choice of traits has been driven by the model requirements and was influenced by what I feel might be available in the literature / on our shelves. Items in italics are those which I think we may struggle to find much information. Initially, we would collect data on the model parameters and trait attributes – I am still unsure how we deal with the management filters. It may be that we just compile a literature database of the response of weed communities to management and then try and relate those studies to our WTDB. In deciding which traits to include, I have also referred to a number of suggested trait lists in the literature<sup>1-4</sup>.

Information required by model	Model parameters	Ecological function	Traits	Units / category	Management filters
Is dispersal through seeds or vegetative spread?	?	Dispersal	Life history	Annual / biennial / perennial	Type and timing of cultivation
How long do seeds persist in the soil?	Seedbank half life Seed surface mortality rate	Seedbank longevity	Seed size Seed shape <sup>5</sup>	mm ratio	
What proportion of the seed bank germinates in each month?	12 monthly points	Canopy establishment	Base temperature <sup>6, 7</sup> Chilling requirement	°C absolute / partial / none	Timing of cultivation <sup>8</sup>
How is relative germination related to soil depth?	2 shape parameters	Canopy establishment	Seed weight <sup>9</sup> Light requirement	mg absolute / partial / none	Type of cultivation <sup>10, 11</sup>
<i>How is germination reduced by crop shading?</i>	Exponential germination reduction by crop LAI	Canopy establishment	?		Crop type Timing of drilling
How is phenology controlled by environment?	Parameters for physiological time scale Average duration Variance of duration	Phenology	Age of first flowering Determinacy	Weeks determinate / indeterminate	Timing of harvest
How is weed biomass limited by crop competition?	<i>a</i> and <i>i</i> in hyperbolic YL eq. Exchange rate of weed to crop biomass Parameters for relating seedling competitiveness to LAI	Competition	Seedling RGR <sup>12</sup> Maximum height <sup>13, 14</sup> Leaf angle Specific leaf area <sup>15, 16</sup> <i>Root weight ratio</i> <i>Maximum rooting depth</i>	cm erectophile / planophile gm <sup>-2</sup>	Crop type
How is fecundity related to weed biomass?	2 allometric shape parameters for fecundity	Fecundity	Seed weight <sup>17</sup>	mg	Timing of harvest

### 3. Additional information required

- 3.1. Contributors to the WTDB will register information on their contact details and competences.
- 3.2. The source of the data will be included. Ideally, this will be a reference to a published paper – grey literature will be given a lower ‘value’ in the database. Expert opinion will be given the lowest value.
- 3.3. For each trait / parameter value, where possible, error terms must be included (variation, degrees of freedom). Entries where this information is lacking will be given a lower value.
- 3.4. Information will be required on experimental conditions used (CE / Field) and, for field experiments, the crop type, time of drilling and location (Longitude / latitude).
- 3.5. There will be an opportunity to include notes that provide further information that is not available in the other fields.

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