
DIMO, a plant dispersal model

Annexes 1-7

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Annex 1 Input maps for DIMO

DIMO needs six input maps

1. a barrier map,
2. a water height map,
3. a water velocity map,
4. a seedbank map,
5. a species occurrence map,
6. a habitat suitability map.

All maps may be based on field data or derived from other models. All maps in DIMO are grid based. The model is independent from the grid size, but often the model is run on a 250 by 250m grid size.

Barrier map

The barrier map describes impermeable barriers and divides the modeled area into separate areas where in between no seed transport is possible. In DIMO this is only implemented for dispersal with animals. Barriers that cannot be crossed, such as high ways or rivers, divide the landscape in different parts. The barrier map is species specific and can change during a model run by submitting a new map to the model, e.g. as the result of the realization of an overpass for animals over a highway.

Seed bank map

Plant species can 'reappear' from the seed bank that was built up in the past. New seeds that arrive from outside a grid due to dispersal also end up in the seed bank. The initial seed bank map can be left empty, but ideally information from field inventories is used to fill the seed bank map. The data needed from the inventory is not only the presence of the species, but also when it was found. If the last finding was five years before the start of the model run the seed bank age is set to the maximum seedbank age minus five years. The presence of a species in the seed bank depends on the period the seed can survive in the seed bank. This varies per species and is one of the species-specific parameters that has to be given. Data on the maximum seed bank age is retrieved from the LEDA (Thompson et al. 1997, Knevel et al. 2003) database and the TRY database (Kattge et al. 2011). Each year the seedbank becomes one year older, unless new seed enters the seed bank. When the maximum seed bank age is reached, the species is removed from the seed bank.

Water height map

The height of the water level is used to determine the direction of water flow between cells. Water heights are based on the Dutch national height map (AHN, Rijkswaterstaat-AGI, 2005). Conflicts in the map (water flowing to higher grounds) is solved by hand.

Water velocity map

The water velocity map is used in combination with the water height map. The map is used to determine the time it will take to cross a cell. The time is based on the slope of the stream and derived from the Dutch national height map.

Species occurrence map

Dispersal of seeds is based on the presence of reproducing species in a grid. The model is initialized with the present occurrence (or occurrence at the start of the model run). The occurrence can be derived from (national) inventories, e.g. in our case often from the Dutch vegetation databank (Hennekens & Schaminee 2001).

Habitat suitability map

A key map for DIMO is the habitat suitability map for a species. This map may be based on several sources of information, e.g. abiotic suitability, climate preference, vegetation type or management. The end result is a map that indicates whether or not a species potentially can be present (0-1). This map may be changed during the model run; a new map is given during the model run when appropriate. A new habitat can be given every run year.

Data may also be derived from another species simulation model, e.g. MOVE (van Adrichem et al. 2010), GBMOVE (Smart et al. 2010) or VEG (Belyazid et al. 2006). These models provide DIMO with the potential occurrence of a species that DIMO uses, based on dispersal capacity and seed bank, to calculate if the species actually can be present.

Output maps

DIMO produces several maps. The most important is the age-map that gives the number of years that a species is present in a grid as a reproductive plant. A map containing the suitability for the species is used to support the age-map. Another important map is the seed bank map, which keeps track of the remaining number of years a seed is still able to germinate. A seed rain map is produced to support seed bank map and contains grids where seeds were dispersed in the previous year. The maps are adjusted after every time step.

References

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Annex 2 Decisions made to build the DIMO model

For each decision we give the topic, the assumption and the effect on the model result.

The simulation is grid cell size independent.

1. Outcome: The set of input maps defines the grid cell size. Input maps must have the same grid cell size. Beware, in principle it is therefore possible to use senseless grid cell sizes, e.g. square cm or 100 * 100 km. It is up to the user to choose the grid cell size.
2. Reason: the model is more flexible and easier to apply on different landscape scales, e.g. regional versus pan European.
3. Effect: No effect on the calculations and outcome of the model.

The seed bank map and the actual presence of species are based on data from Dutch national inventories (FLORON, www.floron.nl; National Data Base; Schaminée et al. 2012). Both have a different grid cell size than the standard grid cell size used for the modelling (250*250m).

1. Outcome: The inventories from FLORON are downscaled from 1*1 km to 250*250m. The occurrence of a species in a 1*1km cell is appointed to all 16 250*250m cells. A relevé from the National Data Base is appointed to the grid cell it occurs in.
2. Reason: The mostly used grid cell size is 250*250m.
3. Effect: Overestimation of the actual and seed bank occurrence of species.

For the data provided by FLORON there is the possibility to fill in the gaps in plant species occurrence, based on accompanying species.

1. Outcome: We did not use this option for DIMO.
2. Reason: The uncertainty is too high.
3. Effect: Possible underestimation of actual species occurrence and seed bank occurrence.

The species occurrence data are merged to one final map, if one source acknowledges the occurrence; it is assumed the species occurs.

1. Outcome: Different sources provide extra information
2. Reason: The occurrence of species is simulated better.
3. Effect: A more complete seed bank map and actual occurrence map.

The number of starting years for the model with standard input maps will be limited. Note it is possible to make your own input maps, for every start year.

1. Outcome: Not every year is available for a model run start.
2. Reason: Too many input maps are needed.
3. Effect: None on the model results.

The actual occurrence map will only be used in the initial year.

1. Outcome: Realistic simulation of dispersal.
2. Reason: After the first year the situation may already be changed and is the initial map outdated.
3. Effect: None.

The seed bank map is partly based on the same data as the Actual occurrence map.

1. Outcome: maps are not totally independent.
2. Reason: data are used in a consistent way and in line with each other and lack of sufficient independent data.
3. Effect: seed bank map and actual occurrence map are consistent, but not independent.

The seed bank map is dynamic.

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1. Outcome: The seed bank map is adjusted every year based on seed bank age and dispersal of seeds.
 2. Reason:
 3. Effect: Seed bank age and map may change every year

The centre of a cell is the starting point for dispersal in the first year of the model run.

1. Outcome: On average the dispersal in the first year is underestimated. This effect is larger for smaller cells.
2. Reason: Practical reasons to keep the model simple. Also it is often not known where the species is exactly located within a cell.
3. Effect: A small underestimation in the first years of the model run. The effect depends on the grid cell size and the dispersal distance of the species.

Species that never form seeds are never present in the seed bank.

1. Outcome: Species can only disperse vegetative.
2. Reason: No seed forming.
3. Effect: These species cannot reappear from the seed bank.

Seed bank longevity according LEDA database.

1. Outcome: Up till now only three different classes available.
2. Reason: knowledge is limiting; when more information gets available this can be adjusted.
3. Effect: Unknown, seed bank longevity may be over- and underestimated.

The seed bank is every year supplied with new seed as long as the species is present. The seed bank age is every time step set back to one year.

1. Outcome: We assume that every year seeds are produced and end up in the seed bank.
2. Reason: Unknown what good and what bad years of seed setting will be.
3. Effect: Overestimation of the seed in the seed bank, bad years are not accounted for.

The seed bank can be supplied every year due to dispersal; again the seed age is set to one year.

1. Outcome: Seed bank is refilled with new seeds.
2. Reason: Unknown what good and what bad years of seed setting will be.
3. Effect: Overestimation of the seed in the seed bank, bad years are not accounted for.

The amount of seed produced or the vitality of the seed.

1. Outcome: They are both neglected in the model
2. Reason: simplicity of the model and lack of data to incorporate this. In the future a factor for the vitality could be incorporated.
3. Effect: Overestimation of the seed bank vitality, age and amount of seed. Thus overestimation of the dispersal speed.

A seed will germinate as long as the habitat is suitable.

1. Outcome:
2. Reason: Simplification of the model and lack of data. In the future a factor for predation could be incorporated.
3. Effect: Overestimation of germination and thus occurrence of the species.

Predation of seeds.

1. Outcome: No seed predation of the seeds included.
2. Reason: Simplification of the model and lack of data. In the future a factor for predation could be incorporated.
3. Effect: If all seeds would be eaten an overestimation of the dispersal.

Effect of groundwater table on the germination or seed longevity.

1. Outcome: Seeds may germinate under non favourable conditions. This effect may be partly solved by the habitat suitability map.
2. Reason:
3. Effect: Overestimation of germination and thus occurrence of species.

The model will include wind, water and animal dispersal, self-inflicted dispersal and vegetative dispersal.

The model will not include human dispersal.

1. Outcome: All natural courses of dispersal are included in the model.
2. Reason: For a general model as ours, it is impossible to incorporate the dispersal of plant species via garden centres, gardens and humans disposing of plant species in natural areas.
3. Effect: We cannot model invasive species dispersal inflicted by humans.

A barrier map can be included in DIMO.

1. Outcome: A more realistic modelling of dispersal. A barrier map can be used as an extra map layer for every means of dispersal.
2. Reason: Animal dispersal can be blocked by roads, rivers etc., but also wind dispersal may be blocked by forest.
3. Effect: Dispersal can be blocked by barriers.

Species can have more than one way of dispersal in the model.

1. Outcome: Species have often several means of dispersal, e.g. wind floating in water. Sometimes one mean is blocked by a barrier but can the other still make dispersal possible beyond the barrier.
2. Reason:
3. Effect: More realistic simulation of plant dispersal

We use the LDD for dispersal.

1. Outcome: LDD is the dispersal way in the model.
2. Reason: We choose to model the long distance dispersal events, rather than the distance where the bulk of the seeds are deposited. We assume that LDD is responsible for the real dispersal and that from these newly established sites near distance dispersal takes place to fill up the possible gaps between the sites.
3. Effect: Simulation of the rare dispersal events, thus longer dispersal distances, which may lead to an overestimation of the dispersal.

If there are no measurements available in the LEDA database.

1. Outcome: We fall back on expert knowledge on dispersal distance. See Appendix * for the data and the method used (LDD is partly based on traits of the seed/species and on expert knowledge and comparison with similar species with similar traits).
2. Reason: We wanted to make a model that is able to calculate the dispersal for many species in a simple way. For this lots of information is necessary, but not always measurements are available.
3. Effect: We can simulate many species, but the uncertainty in the LDD and other characteristics may be larger for species based on expert knowledge than for species characteristics based on LEDA data.

Effect of (abiotic) conditions is not included in the model.

1. Outcome: Seed quality and seed amount does not depend on abiotic conditions and does not change between the years. Note that the establishment of species can depend on habitat quality, via the habitat suitability map.
2. Reason: Lack of information and the complexity of the model. In principle the models that could simulate abiotic conditions, also for the future, are available.
3. Effect: Seed amount and quality is constant, we assume thus that there will always be enough seed of sufficient quality to give LDD.

Annex 3 Input data for DIMO

Dispersal distances, for wind (including self-inflicted, rain-water, raindrop ballists, geocarpie, stolons and turionen) and animal dispersal, seed bank longevity and germination delay. The last four columns give the (literature) source of the value with:

1. Ozinga, W.A., 2008. Assembly of plant communities in fragmented landscapes: the role of dispersal. Alterra, Wageningen. Thesis.
2. Grashof-Bokdam, C.J., 1997. Colonization of forest plants: the role of fragmentation. Thesis Leiden University.
3. Alterra, 2001. Handboek Robuuste Verbindingen; ecologische randvoorwaarden. Wageningen, Alterra, Research Instituut voor de Groene Ruimte. Data behind this and estimation method are given in Appendix 4.
4. LEDA. Kleyer, M., Bekker, R.M., Knevel, I.C., Bakker, J.P, Thompson, K., Sonnenschein, M., Poschlod, P., Van Groenendael, J.M., Klimes, L., Klimesová, J., Klotz, S., Rusch, G.M., Hermy, M., Adriaens, D., Boedeltje, G., Bossuyt, B., Dannemann, A., Endels, P., Götzenberger, L., Hodgson, J.G., Jackel, A-K., Kühn, I., Kunzmann, D., Ozinga, W.A., Römermann, C., Stadler, M., Schlegelmilch, J., Steendam, H.J., Tackenberg, O., Wilmann, B., Cornelissen, J.H.C., Eriksson, O., Garnier, E., Peco, B., 2008. The LEDA Traitbase: A database of life-history traits of Northwest European flora. *Journal of Ecology* 96: 1266-1274.
5. ECPE. Hodgson, J. G., J. P. Grime, R. Hunt and K. Thompson. 1995. The Electronic Comparative Plant Ecology.
6. BBR. Centraal Bureau voor de statistiek, 1992. Botanisch basisregister. Voorburg/Heerlen.
7. Value based on a species from the same family, in the case of sub species/species the value of the species/subspecies taken (values and numbers are in red).

Species	Dispersal \ Wind \ Distance (m)	Dispersal \ Animal \ Distance (m)	Seedbank \ Longevity (y)	Germination \ Delay (y)	floating time (days)	Source Dispersal \ Wind \ Distance	Source Dispersal \ Animal \ Distance	Source Seedbank \ Longevity	Source Germination \ Delay	floating time
Acer campestre	550.00		1	7		1		4	4	
Acer platanoides	550.00		1	15		1		4	4	
Acer pseudoplatanus	550.00		1	16		1		4	4	
Achillea millefolium	5.50		5	0		1		4	4	
Achillea ptarmica	0.55		50	1		1		4	4	
Aconitum vulparia	55.00			1		3			6	
Acorus calamus			1	1				4	6	
Actaea spicata			1	3				4	4	
Adoxa moschatellina	2000.00		1	1		2		4	6	
Aegopodium podagraria	0.55		50	3		1		4	4	
Aesculus hippocastanum				6					4	
Aethusa cynapium	0.55		5	2		1		4	4	
Agrimonia eupatoria	0.55	2000	4	3		1	3	4	4	
Agrimonia procera	0.55	2000	4	3		7	3	7	4	
Agrostemma githago	5.50	550	4	1		3	3	4	4	
Agrostis canina	5.50		50	2		7		4	6	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Agrostis canina + Agrostis vinealis	5.50		2	1		7		7	7	
Agrostis capillaris	5.50		7	1		1		4	6	
Agrostis gigantea	5.50		4	3		1		4	4	
Agrostis stolonifera	5.50		14	1		1		4	6	
Agrostis vinealis	5.50		2	1		1		4	6	
Aira caryophyllea	5.50		2	2		1		7	4	
Aira praecox	5.50		2	2		1		4	4	
Ajuga chamaepitys		55	50	1			3	7	4	
Ajuga reptans		55	50	4			2	4	4	
Alchemilla filicaulis	55.00	2000	1	1		3	3	4	6	
Alchemilla glabra	55.00	2000	1	1		3	3	7	6	
Alchemilla micans	55.00	2000	1	1		3	3	7	6	
Alchemilla monticola	55.00	2000	1	3		3	3	7	4	
Alchemilla subcrenata	55.00	2000	1	1		3	3	7	6	
Alchemilla vulgaris	55.00	2000	50	4		3	3	4	4	
Alchemilla xanthochlora	55.00	2000	1	1		3	3	7	6	
Alisma gramineum	0.55		50	1		7		7	6	
Alisma lanceolatum	0.55		50	1		7		7	6	
Alisma plantago-aquatica	0.55		50	2		1		4	4	
Alliaria petiolata	0.55		5	1		1		4	4	
Allium oleraceum	0.55	55	1	3		1	3	4	4	
Allium ursinum	0.55	55	1	4		1	3	4	4	
Allium vineale	0.55	55	50	3		1	7	4	4	
Alnus glutinosa	55.00		50	21		1		4	6	
Alnus incana	55.00		5	20		3		4	6	
Alopecurus aequalis	0.55	550	10	1		7	7	4	6	
Alopecurus bulbosus	55.00	550	3	1		3	3	7	6	
Alopecurus geniculatus	0.55	550	3	2		7	7	4	4	
Alopecurus myosuroides	0.55		4	0		7		4	4	
Alopecurus pratensis	0.55	550	50	0		1	7	4	4	
Althaea officinalis	5.50			3		3			4	
Alyssum alyssoides		550	1	1			3	4	4	
Amelanchier lamarckii			1	10				4	6	
Ammophila arenaria	0.55		4	3		1		4	4	
Anagallis arvensis subsp. arvensis	5.50	550	32	1		7	7	7	6	
Anagallis arvensis subsp. foemina	5.50	550	32	1		3	3	7	6	
Anagallis minima	5.50	550	32	1		1	7	4	4	
Anagallis tenella	55.00	550	50	1		3	7	4	6	
Anchusa arvensis	0.55	55	2	1		7	3	4	4	
Anchusa officinalis	0.55	55	4	1		1	3	4	4	
Andromeda polifolia			4	3				4	6	
Anemone nemorosa	0.55	55	4	3		1	2	4	4	
Angelica archangelica	55.00		5	1		3		7	4	
Angelica sylvestris	55.00		5	3		1		4	4	
Antennaria dioica	550.00		1	3		1		4	4	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Anthemis arvensis		5.5	11	1			7	4	6	
Anthemis cotula		5.5	6	1			3	4	6	
Anthericum liliago	5.50			3		3			4	
Anthoxanthum aristatum	0.55		2	1		1		7	4	
Anthoxanthum odoratum	5.50		2	2		1		4	4	
Anthriscus caucalis	0.55		5	1		1		4	4	
Anthriscus sylvestris	0.55		1	3		1		4	4	
Anthyllis vulneraria	5.50		3	2		1		4	4	
Apera spica-venti	5.50		11	0		1		4	4	
Aphanes arvensis	0.55	550	8	1		1	3	4	4	
Aphanes inexpectata	0.55	550	8	1		7	7	7	6	
Apium graveolens	0.55		39	3		7		4	4	
Apium inundatum	0.55		39	1		7		7	6	
Apium nodiflorum	0.55		39	1		1		7	6	
Apium repens	0.55		39	1		7		7	6	
Arabidopsis thaliana	5.50		5	1		1		4	4	
Arabis glabra	55.00		1	3		3		4	4	
Arabis hirsuta	5.50		50	3		1		4	4	
Arabis hirsuta subsp. sagittata	55.00		50	2		3		7	6	
Arabis hirsuta subsp. hirsuta	55.00		50	2		3		7	6	
Arctium lappa	0.55		5	1		1		4	4	
Arctium minus	0.55		5	1		7		4	4	
Arctostaphylos uva-ursi		40000	1	3			3	4	4	
Arenaria serpyllifolia	0.55		5	0		1		4	4	
Armeria maritima	0.55		1	0		1		4	4	
Armoracia rusticana	5.50		1	3		3		4	4	
Arnica montana	550.00		1	1		3		4	4	
Arnoseris minima	5.50		4	1		3		4	6	
Aronia x prunifolia				10					6	
Arrhenatherum elatius	5.50		2	0		1		4	4	
Artemisia absinthium	5.50	550	50	4		3	3	4	4	
Artemisia campestris subsp. campestris	5.50	550	4	1		3	3	7	6	
Artemisia campestris subsp. maritima	5.50	550	4	1		7	7	7	6	
Artemisia maritima	0.55	550	4	3		1	7	4	4	
Artemisia vulgaris	55.00	550	5	1		1	7	4	4	
Arum maculatum		2000	1	6			2	4	4	
Asparagus officinalis subsp. officinalis	0.55			1		7			6	
Asparagus officinalis subsp. prostratus	0.55			1		1			6	
Asperugo procumbens		2000		1			3		4	
Asplenium ruta-muraria	5000.00			3		3			4	
Aster tripolium	550.00		50	3		1		4	4	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Athyrium filix-femina	5000.00			3		2			4	
Atriplex littoralis	0.55		5	1		1		7	4	
Atriplex patula	5.50		58	1		1		4	4	
Atriplex pedunculata	0.55		5	1		1		7	6	
Atriplex portulacoides	0.55		5	1		7		7	6	
Atriplex prostrata	5.50		5	1		1		4	4	
Atropa bella-donna		2000	50	3			3	4	4	
Avena sativa	0.55		1	1		1		4	4	
Avenula pubescens	5.50		4	1		1		4	4	
Azolla filiculoides	5000.00			1		3			6	
Azolla mexicana	5000.00			1		3			6	
Ballota nigra subsp. foetida				1					6	
Barbarea intermedia	5.50		5	3		3		7	4	
Barbarea vulgaris	0.55		5	2		1		4	4	
Bellis perennis	5.50		2	1		1		4	4	
Berberis vulgaris			1	10				4	6	
Berteroa incana	0.55		4	1		1		4	4	
Berula erecta			4	1				4	6	
Betula pendula	550.00		5	6		1		4	4	
Betula pubescens	550.00		4	5		1		4	4	
Bidens cernua	0.55		4	1		7		4	4	
Bidens connata	0.55		1	1		7		4	4	
Bidens frondosa	0.55		50	1		1		4	4	
Bidens tripartita	0.55		4	1		7		4	4	
Blackstonia perfoliata	550.00			1		1			4	
Blechnum spicant	5000.00			3		2			4	
Blysmus compressus		550		1			3		6	
Botrychium lunaria	5000.00			1		3			6	
Brachypodium pinnatum	0.55		2	1		1		4	6	
Brachypodium sylvaticum	0.55		4	2		1		4	6	
Brassica napus	0.55		50	0		7		4	4	
Brassica nigra	0.55		5	1		1		4	4	
Briza media	5.50		50	0		1		4	4	
Bromopsis inermis (subsp. inermis)	5.50	550	1	1		1	7	4	4	
Bromopsis ramosa subsp. benekenii	55.00	550	1	1		3	3	7	6	
Bromopsis ramosa subsp. ramosa	55.00	550	1	1		3	3	7	6	
Bromus hordeaceus	0.55	550	2	0		1	7	4	4	
Bromus racemosus	55.00	550	1	1		3	3	4	4	
Bromus secalinus	55.00	2000	4	1		3	3	4	4	
Bromus sterilis	0.55	550	1	0		1	7	4	4	
Bromus tectorum	0.55	550	4	0		1	7	4	4	
Bryonia cretica (subsp. dioica)				1					6	
Bupleurum tenuissimum	55.00			1		3			4	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Butomus umbellatus			1	3				4	4	
Cakile maritima				1					6	
Calamagrostis canescens	55.00		4	1		1		4	6	
Calamagrostis epigejos	550.00		50	1		1		4	6	
Calamagrostis stricta	5.50		4	1		1		4	6	
Calammophila baltica (x-)				1					6	
Calepina irregularis	5.50			1		3			4	
Calla palustris	0.55			1		1			6	
Callitriche cophocarpa	5.50		4	1		7		7	4	
Callitriche hamulata	5.50		4	1		7		7	4	
Callitriche hermaphroditica	5.50		4	1		7		7	6	
Callitriche obtusangula	5.50		4	1		7		7	4	
Callitriche palustris	5.50		4	1		7		4	6	
Callitriche platycarpa	5.50		4	1		7		7	4	
Callitriche stagnalis	5.50		4	1		1		4	4	
Calluna vulgaris	550.00		68	3	3.5	1		4	4	1
Caltha palustris subsp. araneosa				1					6	
Caltha palustris subsp. palustris				1					6	
Calystegia sepium	0.55		39	2		1		4	4	
Campanula glomerata	5.50		4	3		3		4	4	
Campanula patula	5.50		40	1		3		4	4	
Campanula rapunculus	5.50		1	1		3		4	4	
Campanula rotundifolia	5.50		1	1	1.1 8	1		4	4	4
Campanula trachelium	5.50		50	1		1		4	6	
Capsella bursa-pastoris	0.55		5	1		1		4	4	
Cardamine amara	0.55		50	2		7		4	6	
Cardamine flexuosa	55.00		4	1		3		4	6	
Cardamine hirsuta	5.50		5	1	7	1		4	4	4
Cardamine pratensis	0.55		1	1		1		4	4	
Carduus crispus	550.00	550	40	1		1	7	4	4	
Carduus nutans	550.00	550	10	2		1	7	4	6	
Carduus tenuiflorus	550.00	550	1	2		3	3	4	6	
Carex acuta	0.55	550	50	1		1	7	4	6	
Carex acutiformis	0.55	550	50	2		7	7	4	6	
Carex appropinquata	55.00	550	1	1		3	7	7	6	
Carex aquatilis	55.00	550	50	1		3	7	4	6	
Carex arenaria	0.55	550	50	3		1	7	4	4	
Carex brizoides	55.00	550	1	1		3	7	7	6	
Carex buxbaumii	55.00	550	1	1		3	7	7	4	
Carex caryophyllea	0.55	550	50	2		1	7	4	6	
Carex cespitosa	55.00	550	4	1		3	7	4	6	
Carex cuprina	0.55	550	1	1		7	7	7	6	
Carex curta	0.55	550	4	1		1	7	4	4	
Carex diandra	55.00	550	1	3		3	7	7	4	

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Carex digitata	55.00	550	50	2		3	3	4	4	
Carex dioica	55.00	550	1	1		3	7	4	6	
Carex distans	0.55	550	1	3		1	7	4	4	
Carex disticha	0.55	550	50	3		1	7	4	4	
Carex divulsa	55.00	550	1	3		3	7	7	4	
Carex echinata	0.55	550	4	4		1	7	4	4	
Carex elata	0.55	550	4	3		7	7	4	4	
Carex elongata	0.55	550	4	3		1	7	4	4	
Carex ericetorum	55.00	550	1	1		3	7	7	4	
Carex extensa	0.55	550	1	1		1	7	7	4	
Carex flacca	0.55	550	20	2		1	7	4	4	
Carex flava	55.00	550	6	3		3	7	4	4	
Carex hirta	0.55	550	50	1		1	7	4	4	
Carex hostiana	0.55	550	4	4		1	7	4	4	
Carex laevigata	55.00	550	1	1		3	7	7	4	
Carex lasiocarpa	5.50	550	50	1		1	7	4	4	
Carex lepidocarpa	55.00	550	1	1		3	7	4	6	
Carex muricata	55.00	550	100	1		3	7	4	6	
Carex nigra	5.50	550	50	2		1	7	4	6	
Carex oederi	0.55	550	1	1		1	7	7	6	
Carex oederi subsp. oederi	0.55	550	1	1		7	7	7	6	
Carex oederi subsp. oedocarpa	0.55	550	1	1		7	7	7	6	
Carex ovalis	55.00	550	14	2		3	7	4	4	
Carex pallescens	55.00	550	50	2		3	7	4	6	
Carex panicea	0.55	550	50	4		1	7	4	4	
Carex paniculata	0.55	550	4	1		7	7	4	6	
Carex pendula	55.00	550	4	2		3	7	4	6	
Carex pilulifera	0.55	550	68	2		7	7	4	6	
Carex praecox	55.00	550	4	1		3	7	4	6	
Carex pseudocyperus	0.55	550	4	1		7	7	4	6	
Carex pulicaris	55.00	550	50	1		3	7	4	6	
Carex remota	5.50	550	50	2		1	7	4	6	
Carex riparia	0.55	550	4	1		1	7	4	6	
Carex rostrata	0.55	550	4	1		1	7	4	6	
Carex spicata	5.50	550	50	1		1	7	4	6	
Carex strigosa	55.00	550	1	1		3	7	7	4	
Carex sylvatica	0.55	550	100	2		1	7	4	6	
Carex tomentosa	55.00	550	50	1		3	7	4	6	
Carex trinervis	0.55	550	4	1		7	7	4	6	
Carex vesicaria	0.55	550	50	3		7	7	4	4	
Carex vulpina	55.00	550	4	1		3	7	4	6	
Carex x timmiana	0.55	550	1	1		7	7	7	7	
Carlina vulgaris	55.00		4	1		1		5	4	
Carpinus betulus	550.00		1	15		1		4	4	
Carum carvi	55.00		4	2		3		4	6	

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Carum verticillatum	55.00		4	1		3		7	6	
Castanea sativa			1	5				4	4	
Catabrosa aquatica				1					6	
Centaurea calcitrapa	55.00	550	3	1		3	3	4	4	
Centaurea cyanus	0.55	55	2	0		1	7	4	4	
Centaurea jacea	0.55	55	1	1		1	7	4	4	
Centaurea scabiosa	5.50	55	3	1		1	3	4	4	
Centaurium erythraea	550.00		50	1		1		4	6	
Centaurium littorale	5.50		50	1		7		4	4	
Centaurium pulchellum	5.50		50	1		1		4	4	
Cephalanthera longifolia	11000.00			1		3			4	
Cerastium arvense	0.55		4	1		1		4	4	
Cerastium diffusum	0.55		1	1		7		4	4	
Cerastium fontanum subsp. holosteoides	0.55		50	1		1		7	6	
Cerastium fontanum subsp. vulgare	0.55		50	1		1		4	6	
Cerastium glomeratum	0.55		5	1		1		4	4	
Cerastium semidecandrum	5.50		50	1		1		4	4	
Ceratocarpus claviculata		55		1			3		4	
Ceratophyllum demersum			1	1	0.04			4	6	4
Ceratophyllum submersum				1					6	
Chaenorrhinum minus	5.50			1		1			6	
Chaerophyllum temulum	0.55		1	2		1		4	6	
Chamerion angustifolium	2000.00		1	2	211	1		5	6	1
Chara globularis										
Chara major										
Chara species										
Chara vulgaris										
Characeae										
Chelidonium majus	5.50	55	50	1		1	3	4	4	
Chenopodium album	5.50		8	1		1		4	4	
Chenopodium bonus-henricus	55.00		1	1		3		4	6	
Chenopodium ficifolium	5.50		5	1		7		4	6	
Chenopodium glaucum	5.50		4	1		7		4	6	
Chenopodium polyspermum	5.50		5	0		1		4	4	
Chenopodium rubrum	5.50		54	2		1		4	6	
Chenopodium vulvaria	55.00		1	1		3		7	6	
Chondrilla juncea	550.00		1	1		3		4	4	
Chrysanthemum segetum	0.55		8	2		1		4	6	
Chrysosplenium oppositifolium	0.55		1	1		7		4	6	
Cicendia filiformis	55.00			1		3			6	
Cichorium intybus	0.55		4	1		1		4	4	
Cicuta virosa			1	1				4	6	

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Circaea alpina	0.55	550	1	1		7	3	4	6	
Circaea lutetiana	0.55	2000	1	2		1	2	4	6	
Circaea x intermedia	0.55	550	1	1		7	3	7	6	
Cirsium acaule	55.00	55	1	3		1	3	4	4	
Cirsium arvense	550.00	55	5	1		1	7	4	4	
Cirsium dissectum	550.00	55	1	1		1	3	4	4	
Cirsium eriophorum	550.00	55	4	0		3	3	4	4	
Cirsium palustre	550.00	55	3	3		1	7	4	4	
Cirsium vulgare	550.00	55	5	1		1	7	4	4	
Cladium mariscus	0.55		1	1		1		4	4	
Claytonia perfoliata		55		1			3		6	
Clematis vitalba	550.00		4	1		1		4	6	
Clinopodium vulgare	0.55		50	2		1		4	4	
Cochlearia danica	5.50			3		1			4	
Cochlearia officinalis subsp. Officinalis	5.50			2	0.04	7			6	7
Coeloglossum viride	11000.00			1		3			6	
Colchicum autumnale		55	1	1			3	4	4	
Conopodium majus	55.00		4	2		3		4	4	
Consolida regalis	5.50		11	1		3		4	4	
Convallaria majalis	0.55		4	2		1		4	4	
Convolvulus arvensis	0.55		8	2		1		4	4	
Conyza canadensis	550.00		11	0		1		4	4	
Corallorhiza trifida	11000.00			1		3			6	
Cornus mas		2000	1	3			3	4	4	
Cornus sanguinea		2000	4	10			7	4	6	
Cornus suecica		2000	1	3			3	4	4	
Coronopus squamatus	0.55		5	2		1		4	6	
Corrigiola litoralis				1					6	
Corydalis solida		55	50	3			3	4	4	
Corylus avellana			1	7				4	4	
Corynephorus canescens	5.50		2	3		1		4	4	
Crataegus laevigata			4	10				4	6	
Crataegus monogyna			4	2				4	4	
Crepis biennis	55.00		1	1		1		4	4	
Crepis capillaris	550.00		5	0		1		4	4	
Crepis foetida	55.00		4	1		3		4	6	
Crepis paludosa	55.00		1	1		1		4	4	
Crepis vesicaria	550.00		1	1		1		4	4	
Cruciata laevipes	0.55	550	1	1		1	3	4	4	
Cucubalus baccifer		550		3			3		4	
Cuscuta epithimum			50	3				4	4	
Cymbalaria muralis	5.50		1	2		3		4	4	
Cynodon dactylon	5.50		4	1		1		4	4	
Cynoglossum officinale			5	1				4	4	

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Cynosurus cristatus	5.50	550	50	0		1	3	4	4	
Cyperus flavescens		550		1			3		6	
Cystopteris fragilis	5000.00			1		3			6	
Cytisus scoparius	0.55	55	4	11	0.0 4	1	3	4	6	4
Dactylis glomerata	0.55		2	1		1		4	4	
Dactylorhiza incarnata	5000.00		1	1		1		4	6	
Dactylorhiza maculata	5000.00		1	3		1		4	4	
Dactylorhiza majalis	5000.00		1	3		1		4	4	
Dactylorhiza majalis subsp. majalis	11000.00		1	1		3		7	6	
Dactylorhiza majalis subsp. praetermissa	11000.00		1	1		3		7	6	
Danthonia decumbens	5.50		2	2		1		4	6	
Daphne mezereum		2000		5			3		4	
Daucus carota	5.50		5	1	2.5	1		4	4	1
Deschampsia cespitosa	5.50		2	1		1		4	4	
Deschampsia flexuosa	5.50		5	5		1		4	4	
Deschampsia setacea	55.00		2	1		3		7	6	
Dianthus armeria	55.00		1	1		3		7	4	
Dianthus carthusianorum	55.00		1	3		3		4	4	
Dianthus deltoides	0.55		50	3		1		4	4	
Dianthus superbus	55.00		1	3		3		4	4	
Digitalis purpurea	5.50		3	3		1		4	4	
Digitaria ischaemum	5.50		50	1		1		4	4	
Diphasiastrum tristachyum	5000.00			1		3			6	
Diplotaxis tenuifolia			1	1				4	6	
Dipsacus fullonum	0.55		5	2		1		4	6	
Drosera intermedia	5000.00	550	4	3		3	3	4	4	
Drosera longifolia	5000.00	550	4	1		3	3	7	6	
Drosera rotundifolia	550.00	550	4	3		1	3	4	4	
Dryopteris carthusiana	5000.00			1		3			6	
Dryopteris cristata	5000.00			3		3			4	
Dryopteris dilatata	5000.00			3		3			4	
Dryopteris filix-mas	5000.00			2		1			4	
Echinochloa crus-galli			4	0				4	4	
Echinodorus ranunculoides	0.55			1		1			6	
Echinodorus repens				1					6	
Echium vulgare	0.55		2	0		1		4	4	
Elatine hexandra		550		1			3		6	
Elatine hydropiper		550		1			3		6	
Eleocharis acicularis	0.55	550	4	1		7	7	4	6	
Eleocharis multicaulis	0.55	550	4	1		1	7	4	6	
Eleocharis ovata	0.55	550	4	1		7	3	7	4	
Eleocharis palustris	0.55	550	50	4		7	7	4	4	

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Eleocharis palustris subsp. palustris	0.55	550	50	1		7	7	7	6	
Eleocharis palustris subsp. uniglumis	0.55	550	50	1		1	7	7	6	
Eleocharis quinqueflora	0.55	550	4	1		1	3	7	6	
Eleogiton fluitans				1					6	
Elodea canadensis				3					4	
Elodea nuttallii			1	1				4	6	
Elymus athericus	0.55		4	1		1		7	6	
Elymus farctus	0.55		4	1		7		7	6	
Elymus repens	0.55		4	2		1		4	4	
Empetrum nigrum			1	3				4	4	
Enteromorpha species									6	
Epilobium ciliatum	550.00		50	1		1		4	4	
Epilobium hirsutum	550.00		50	3		1		4	4	
Epilobium lanceolatum	55.00		4	1		3		7	4	
Epilobium montanum	550.00		45	0		1		4	4	
Epilobium obscurum	550.00		50	1		3		4	4	
Epilobium palustre	550.00		50	1		1		4	4	
Epilobium parviflorum	550.00		4	1		1		4	4	
Epilobium tetragonum	2000.00		50	1		1		4	4	
Epipactis atrorubens	11000.00		1	1		3		4	6	
Epipactis helleborine	5000.00		1	3		1		4	4	
Epipactis muelleri	11000.00		1	1		3		7	6	
Epipactis palustris	5000.00		1	3		1		4	4	
Equisetum arvense	5000.00		1	1		1		5	6	
Equisetum fluviatile	5000.00		1	1		3		5	6	
Equisetum palustre	5000.00		1	1		1		5	6	
Equisetum variegatum	5000.00		1	1		3		7	6	
Equisetum x litorale	5000.00		1	1		3		7	6	
Erica cinerea	5.50		50	4		3		4	4	
Erica tetralix	550.00		30	4		1		4	4	
Erigeron acris	550.00			1		1			6	
Eriophorum angustifolium	550.00		4	3	1	1		4	4	1
Eriophorum gracile	550.00		1	1		3		4	6	
Eriophorum latifolium	550.00		1	1		3		4	6	
Eriophorum vaginatum	550.00		50	3		1		4	4	
Erodium cicutarium	0.55		5	1		1		4	4	
Erodium cicutarium subsp. cicutarium	0.55		5	1		7		7	6	
Erodium cicutarium subsp. dunense	0.55		5	1		1		7	6	
Erodium glutinosum	0.55		5	1		1		7	6	
Erophila verna	5.50		50	2		1		4	4	
Eryngium campestre	0.55		1	3		7		4	4	

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Eryngium maritimum	0.55		1	1		1		7	6	
Erysimum cheiranthoides	0.55		5	0		1		4	4	
Erysimum cheiri	55.00		5	1		3		7	6	
Erysimum hieracifolium	55.00		5	2		3		7	6	
Eupatorium cannabinum	550.00		50	2		1		4	4	
Euphorbia cyparissias	0.55	55	20	1		1	3	4	4	
Euphorbia esula	0.55	55	8	3		7	7	4	4	
Euphorbia exigua	0.55	55	5	0		7	3	4	4	
Euphorbia helioscopia	0.55	55	5	2		7	7	4	4	
Euphorbia palustris	0.55	55	1	3	1.2	7	3	4	4	4
Euphorbia peplus	0.55	55	20	1		7	7	4	4	
Euphorbia platyphyllos	0.55	55	1	1		7	3	7	4	
Euphorbia seguieriana	0.55	55	50	1		7	3	4	6	
Euphorbia stricta	0.55	55	1	1		7	3	7	6	
Euphrasia rostkoviana	5.50		50	1		3		4	6	
Euphrasia stricta	5.50		2	1		1		4	4	
Evonymus europaeus				10					6	
Fagus sylvatica		11000	1	31			3	4	4	
Festuca arundinacea	0.55		4	1		1		4	6	
Festuca gigantea	0.55		4	2		1		4	6	
Festuca ovina	55.00		50	2		3		4	4	
Festuca ovina subsp. cinerea	5.50		4	1		7		7	6	
Festuca ovina subsp. tenuifolia	5.50		4	1		1		7	6	
Festuca pratensis	0.55		4	1		1		4	6	
Festuca rubra	0.55		50	1		1		4	6	
Festuca rubra subsp. arenaria	0.55		50	1		7		7	6	
Filago lutescens	5.50		1	1		3		4	4	
Filago minima	55.00		1	1		1		7	6	
Filago pyramidata	5.50		4	1		3		4	4	
Filago vulgaris	5.50		1	1		3		7	4	
Filipendula ulmaria	5.50		1	3		1		4	4	
Filipendula vulgaris	55.00		1	3		3		4	4	
Fragaria moschata	0.55	11000	45	1		7	3	7	6	
Fragaria vesca	0.55	11000	45	2		1	3	4	4	
Fraxinus excelsior	550.00		4	31		1		4	4	
Fritillaria meleagris			4	3				4	4	
Fumaria officinalis		55	8	2			3	4	4	
Gagea pratensis		55	4	1			3	4	6	
Gagea spathacea		55	1	1			3	4	6	
Galanthus nivalis		55		3			3		4	
Galeobdolon luteum	0.55	55		1		1	3		6	
Galeopsis angustifolia	5.50	550	1	0		3	3	7	4	
Galeopsis bifida	0.55	550	1	1		1	7	7	4	
Galeopsis bifida + Galeopsis tetrahit	0.55	550	1	1		7	7	7	7	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Galeopsis pubescens	0.55	550	1	1		7	3	7	4	
Galeopsis speciosa	0.55	550	1	1		7	7	4	4	
Galeopsis tetrahit	0.55	550	8	1		1	7	4	4	
Galinsoga parviflora	5.50		5	0		1		4	4	
Galinsoga quadriradiata	55.00		5	1		1		7	6	
Galium aparine	0.55	550	3	1		1	7	4	4	
Galium boreale	0.55	550	1	1		7	3	4	6	
Galium glaucum	0.55	550	1	1		7	3	7	6	
Galium mollugo	0.55	550	50	1		1	7	4	4	
Galium odoratum	0.55	550	50	2		1	7	4	4	
Galium palustre	0.55	550	50	1		1	7	4	4	
Galium pumilum	0.55	550	1	1		1	7	4	6	
Galium saxatile	0.55	550	120	1		1	7	4	6	
Galium sylvaticum	0.55	550	1	1		7	3	7	4	
Galium uliginosum	0.55	550	50	2		1	7	4	6	
Galium verum	0.55	550	50	1		1	7	4	4	
Genista anglica	5.50		1	3		7		4	6	
Genista germanica	5.50		1	3		7		4	6	
Genista pilosa	5.50		1	3		7		4	4	
Genista tinctoria	5.50		1	3		1		4	6	
Gentiana pneumonanthe	5.50		1	3		3		4	4	
Gentianella amarella	5.50		1	2		1		4	4	
Gentianella campestris	5.50		1	1		3		7	4	
Gentianella ciliata	5.50		1	3		3		4	4	
Gentianella germanica	5.50		3	1		1		4	4	
Geranium columbinum	5.50	550	1	2		7	3	4	4	
Geranium dissectum	5.50	550	5	1		7	7	4	4	
Geranium molle	5.50	550	5	1		1	7	4	4	
Geranium pusillum	5.50	550	5	0		7	7	4	4	
Geranium pyrenaicum	5.50	550	4	1		7	3	4	4	
Geranium robertianum	5.50	550	5	1		1	7	4	4	
Geum rivale	0.55	550	1	3		7	3	4	4	
Geum urbanum	0.55	2000	4	0		1	2	4	4	
Glaux maritima			50	3				4	4	
Glechoma hederacea	0.55		460	2	0.04	1		4	4	4
Glyceria fluitans	0.55		50	2		1		4	6	
Glyceria maxima	0.55		2	4		7		4	4	
Glyceria notata subsp. declinata	0.55		2	1		7		7	6	
Glyceria notata subsp. notata	0.55		2	1		7		7	6	
Gnaphalium luteo-album	550.00		50	1		1		7	4	
Gnaphalium sylvaticum	55.00		50	1		1		7	6	
Gnaphalium uliginosum	550.00		50	1		1		5	6	
Goodyera repens	11000.00		1	5		3		4	4	
Gratiola officinalis	55.00			3		3			4	

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Groenlandia densa				3					4	
Gymnadenia conopsea	5000.00		1	3		1		4	4	
Gypsophila muralis	5.50		5	1		3		4	4	
Hammarbya paludosa	11000.00			1		3			6	
Hedera helix			1	6				4	4	
Helichrysum arenarium	550.00		1	3		3		4	4	
Helleborus viridis		55	1	1			3	4	6	
Heracleum sphondylium	55.00		5	2		1		4	4	
Herminium monorchis	11000.00			1		3			6	
Herniaria glabra	5.50			0		1			4	
Hieracium lactucella	550.00		1	1		3		4	6	
Hieracium laevigatum	55.00		1	1		1		4	6	
Hieracium murorum	550.00		1	1		3		7	6	
Hieracium pilosella	550.00		5	2		1		4	4	
Hieracium sabaudum	550.00		1	1		1		7	4	
Hieracium umbellatum	550.00		1	1		1		4	6	
Hieracium vulgatum	550.00		1	1		1		4	4	
Hierochloa odorata	55.00		1	3		3		4	4	
Himantoglossum hircinum	11000.00			1		3			6	
Hippophae rhamnoides			1	3				4	4	
Hippuris vulgaris				3					4	
Holcus lanatus	5.50		2	0		1		4	4	
Holcus mollis	0.55		4	1		1		4	4	
Holosteum umbellatum	5.50		1	0		3		4	4	
Honckenya peploides				1					6	
Hordeum marinum	0.55	2000	1	1		7	3	7	4	
Hordeum murinum	0.55	550	4	0		1	7	4	4	
Hordeum secalinum	0.55	550	50	1		7	3	4	6	
Hordeum vulgare	0.55	550	1	0		1	7	4	4	
Hottonia palustris				3					4	
Humulus lupulus	55.00		50	2		3		4	6	
Huperzia selago	5000.00					3				
Hydrocharis morsus-ranae				1					6	
Hydrocotyle vulgaris			50	2				4	6	
Hydrodictyon reticulatum										
Hyoscyamus niger	5.50		90	1		3		4	4	
Hypericum canadense	5.50		4	1		3		4	6	
Hypericum dubium	5.50		4	1		7		7	6	
Hypericum elodes	5.50		4	1		3		7	6	
Hypericum hirsutum	5.50		5	3		3		4	4	
Hypericum humifusum	5.50		18	1		1		4	6	
Hypericum maculatum	5.50		50	2		3		4	6	
Hypericum montanum	5.50		4	3		3		4	4	
Hypericum perforatum	5.50		5	2		1		4	4	
Hypericum pulchrum	0.55		50	4		1		4	4	

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Hypericum quadrangulum	5.50		4	1		1		7	6	
Hypochaeris glabra	55.00		1	1		3		4	6	
Hypochaeris maculata	550.00		1	3		3		4	4	
Hypochaeris radicata	550.00		4	1	35	1		5	6	1
Ilex aquifolium			1	7				4	4	
Illecebrum verticillatum				1					4	
Impatiens noli-tangere	5.50		1	1		7		4	4	
Impatiens parviflora	5.50		1	0		1		4	4	
Inula britannica	550.00		4	3		1		4	4	
Inula conyzae	550.00		1	1		1		7	6	
Inula salicina	550.00		1	3		3		4	4	
Iris pseudacorus	0.55		1	4		1		4	4	
Isoetes echinospora	5000.00			1		3			6	
Isoetes lacustris	5000.00			1		3			6	
Jasione montana	5.50		4	1		1		4	4	
Juncus acutiflorus	55.00	550	50	1		1	3	4	6	
Juncus alpinoarticulatus subsp. Alpinoarticulatus	5.50	550	1	1		3	3	7	6	
Juncus alpinoarticulatus subsp. atricapillus	550.00	550	1	1		1	7	7	6	
Juncus ambiguus	5.50	550	1	1		7	7	7	6	
Juncus arcticus (subsp. balticus)	5.50	550	1	1		7	7	7	6	
Juncus articulatus	55.00	550	35	1	0	1	3	4	6	1
Juncus bufonius	55.00	550	4	2		1	3	4	4	
Juncus bufonius + Juncus ambiguus	55.00	550	4	1		7	7	7	7	
Juncus bulbosus	55.00	550	30	1		1	3	4	6	
Juncus capitatus	5.50	550	4	1		3	3	4	6	
Juncus compressus	55.00	550	50	1		1	7	4	6	
Juncus conglomeratus	55.00	550	100	4		1	3	4	4	
Juncus effusus	55.00	550	73	0		1	3	4	4	
Juncus filiformis	5.50	550	50	1		3	3	4	6	
Juncus gerardi	5.50	550	50	1		1	7	4	6	
Juncus inflexus	55.00	550	45	3		1	3	4	4	
Juncus maritimus	5.50	550	4	1		7	7	4	6	
Juncus pygmaeus	5.50	550	1	1		3	3	7	4	
Juncus squarrosus	55.00	550	35	3		1	3	4	4	
Juncus subnodulosus	5.50	550	1	1		7	7	4	6	
Juncus tenageia	5.50	550	4	1		3	3	4	6	
Juncus tenuis	55.00	550	50	1		1	7	4	6	
Juniperus communis	0.55	2000	1	5		1	3	4	4	
Knautia arvensis	0.55		36	2		1		4	4	
Koeleria macrantha	5.50		4	0		1		4	4	
Lactuca saligna	550.00		5	1		3		7	4	
Lactuca serriola	550.00		5	0		1		4	4	

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Lamium album	0.55	55	660	1		1	3	4	4	
Lamium amplexicaule	0.55	55	25	0		7	3	4	4	
Lamium maculatum	0.55	55	50	0		7	3	4	4	
Lamium purpureum	0.55	55	660	1		7	3	4	4	
Lapsana communis	0.55		6	1		1		4	4	
Larix decidua	550.00		1	20		1		4	6	
Larix kaempferi	55.00		1	20		3		7	6	
Lathraea squamaria	5.50	55	1	1		3	3	4	6	
Lathyrus aphaca	0.55		1	0		7		7	4	
Lathyrus linifolius	0.55		1	1		7		7	6	
Lathyrus niger	0.55		1	2	0.04	7		4	4	4
Lathyrus nissolia	0.55		1	1		7		7	4	
Lathyrus palustris	0.55		1	3		7		4	4	
Lathyrus pratensis	0.55		5	2		1		4	4	
Lathyrus sylvestris	0.55		1	3		7		4	4	
Lathyrus tuberosus	0.55		1	3		1		4	4	
Leersia oryzoides		550	50	1			3	4	6	
Legousia speculum-veneris	5.50		1	0		3		4	4	
Lemna gibba				1					4	
Lemna gibba + Lemna minor										
Lemna minor			1	1				4	4	
Lemna trisulca			1	1				4	4	
Leontodon autumnalis	5.50		5	1		1		4	4	
Leontodon hispidus	5.50		5	1		1		4	4	
Leontodon saxatilis	550.00		5	1		1		7	6	
Lepidium heterophyllum		550		2			3		6	
Leucanthemum vulgare	0.55		5	1		1		4	4	
Leucojum aestivum		55		5			3		4	
Leymus arenarius			1	3				4	4	
Ligustrum vulgare			50	11				4	6	
Lilium bulbiferum subsp. croceum	55.00			1		3			6	
Limonium vulgare	0.55		50	3		1		4	4	
Limosella aquatica			4	1				4	4	
Linaria vulgaris	5.50		5	2		1		4	4	
Linnaea borealis		550	4	5			3	4	4	
Linum catharticum	5.50	550	50	2		1	3	4	4	
Liparis loeselii	5000.00			3		1			4	
Listera cordata	11000.00		1	5		3		7	4	
Listera ovata	5000.00		1	2		1		4	4	
Lithospermum arvense		550	4	0			3	4	4	
Lithospermum officinale		550	4	1			7	7	4	
Littorella uniflora		550	50	1			3	4	6	
Lobelia dortmanna	5.50	550	4	3		3	3	4	4	
Lolium multiflorum	0.55		7	0		1		4	4	

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Lolium perenne	0.55		2	0		1		4	4	
Lonicera periclymenum		2000	50	2			2	4	6	
Lotus corniculatus subsp. corniculatus	0.55		50	1	1.0 5	7		7	6	7
Lotus corniculatus subsp. tenuifolius	0.55		50	1	1.0 5	7		7	6	7
Lotus uliginosus	0.55		50	2		1		4	4	
Ludwigia palustris			1	1				4	6	
Luronium natans				1					4	
Luzula campestris	0.55	55	45	3		1	3	4	4	
Luzula multiflora	0.55	55	20	4		1	3	4	4	
Luzula pilosa	0.55	55	100	3		1	3	4	4	
Luzula sylvatica	0.55	55	50	4		1	3	4	4	
Lychnis flos-cuculi	0.55		1	1		1		4	4	
Lycopodiella inundata	5000.00			1		3			6	
Lycopodium annotinum	5000.00			1		3			6	
Lycopodium clavatum	5000.00			1		3			6	
Lycopus europaeus	0.55		50	2		1		4	6	
Lysimachia nemorum	55.00		50	4	0.0 4	3		4	4	4
Lysimachia nummularia	0.55		50	1	30	7		4	4	7
Lysimachia thyrsoiflora	0.55		1	3	30	7		4	4	4
Lysimachia vulgaris	0.55		4	4		1		4	4	
Lythrum hyssopifolia	5.50		5	1		3		7	4	
Lythrum portula	55.00		50	1		1		4	4	
Lythrum salicaria	5.50		5	1		1		4	4	
Maianthemum bifolium	0.55	2000	1	1	0	1	2	4	4	1
Malus sylvestris			1	21				4	6	
Malva neglecta	55.00		5	2		3		4	4	
Malva sylvestris	0.55		90	2		1		4	6	
Marrubium vulgare		2000		1			3		4	
Matricaria discoidea	0.55		11	1		1		7	6	
Matricaria maritima	5.50		11	1		1		4	6	
Matricaria recutita	5.50		11	1		1		7	6	
Medicago arabica	0.55	2000	20	1		7	7	7	4	
Medicago falcata	0.55		20	1		1		7	6	
Medicago lupulina	0.55		80	1		1		4	4	
Medicago minima	0.55	2000	50	1		7	3	4	4	
Medicago sativa	0.55		20	1		1		4	4	
Melampyrum arvense	0.55	55	4	1		7	3	4	4	
Melampyrum pratense	0.55	55	1	2		1	2	4	4	
Melica uniflora	0.55	55	1	2		1	3	4	6	
Melilotus albus	0.55		4	1		7		4	4	
Melilotus altissima	0.55		5	3		1		4	4	
Mentha aquatica	0.55	550	50	4		1	7	4	4	

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Mentha arvensis	0.55	550	30	3		1	7	4	4	
Mentha pulegium	0.55	550	1	3		7	3	4	4	
Mentha suaveolens	0.55	550	1	1		7	3	7	6	
Mentha x verticillata	0.55	550	1	1		7	7	7	6	
Menyanthes trifoliata			1	2				4	6	
Mercurialis perennis	0.55		1	4		1		4	4	
Mespilus germanica				20					6	
Milium effusum	0.55		50	3		1		4	4	
Minuartia hybrida				1					4	
Moehringia trinervia		55	50	1			3	4	4	
Moenchia erecta	5.50			1		3			4	
Molinia caerulea	5.50		4	2		1		4	6	
Moneses uniflora	55.00			1		3			6	
Monotropa hypopitys	5000.00		1	1		3		4	6	
Mycelis muralis	550.00		4	2		1		4	4	
Myosotis arvensis	5.50	55	3	1		1	7	4	4	
Myosotis discolor	5.50	55	4	2		7	7	4	4	
Myosotis laxa (subsp. cespitosa)	5.50	55	1	1		7	7	7	6	
Myosotis laxa + Myosotis scorpioides	5.50	55	1	1		7	7	7	7	
Myosotis palustris	5.50	55	1	1		1	7	7	6	
Myosotis ramosissima	5.50	55	22	1		1	7	4	4	
Myosotis stricta	5.50	55	18	1		3	3	4	4	
Myosotis sylvatica	5.50	55	1	1		7	7	4	4	
Myosurus minimus			4	1				4	4	
Myrica gale	0.55		1	3		1		4	4	
Myriophyllum alterniflorum				1					6	
Myriophyllum spicatum			1	1				4	6	
Myriophyllum verticillatum				1					6	
Najas marina				1					4	
Najas minor				1					4	
Narcissus pseudonarcissus subsp. pseudonarcissus		55		1			3		6	
Nardus stricta	0.55	550	4	2	1	1	3	4	4	1
Narthecium ossifragum	5.50		4	3		1		4	4	
Neottia nidus-avis	11000.00			5		3			4	
Nepeta cataria	5.50			1		3			4	
Nitella flexilis										
Nitella mucronata										
Nitelopsis obtusa										
Nuphar lutea			1	4				4	4	
Nymphaea alba			1	3				4	4	
Nymphoides peltata			1	1				4	6	
Odontites vernus	5.50			1		1			6	
Odontites vernus subsp. serotinus	5.50			1		3			4	

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Odontites vernus subsp. vernus	5.50			1		3			6	
Oenanthe aquatica	0.55		1	1		1		4	4	
Oenanthe crocata	0.55		1	2		7		7	6	
Oenanthe fistulosa	0.55		1	2		7		4	4	
Oenanthe lachenalii	0.55		1	1		7		7	6	
Oenanthe pimpinelloides	0.55		1	1		7		7	6	
Oenanthe silaifolia	0.55		1	1		7		7	6	
Oenothera biennis	5.50		5	3		1		4	4	
Ononis repens subsp. repens	5.50			1		1			6	
Ononis repens subsp. spinosa	5.50			1		1			6	
Ophioglossum vulgatum	5000.00			1		3			6	
Ophrys insectifera	11000.00			1		3			6	
Orchis coriophora	11000.00		1	1		3		7	6	
Orchis mascula	11000.00		1	5		3		7	4	
Orchis militaris	11000.00		1	2		3		7	4	
Orchis morio	11000.00		1	3		3		4	4	
Origanum vulgare	5.50		3	2		1		4	4	
Ornithogalum umbellatum		55	1	1			3	4	6	
Ornithopus perpusillus			4	1				4	4	
Orobanche caryophyllacea	5000.00		1	1		3		7	6	
Orobanche lutea	5000.00		1	1		3		7	6	
Orobanche minor	5000.00		1	1		3		7	6	
Orobanche rapum-genistae	5000.00		1	1		3		7	6	
Orobanche reticulata	5000.00		1	1		3		4	6	
Orthilia secunda	55.00		1	3		3		4	4	
Osmunda regalis	5000.00			1		2			6	
Oxalis acetosella	0.55	550	4	2		1	3	4	4	
Oxalis fontana	0.55	550	4	1		7	7	7	6	
Vaccinium macrocarpon			4	3				4	6	
Vaccinium oxycoccos			1	3				4	4	
Papaver argemone	5.50		5	2		3		4	4	
Papaver dubium	5.50		5	2		1		4	4	
Papaver rhoeas	5.50		8	1		1		4	4	
Parapholis strigosa	0.55			1		1			4	
Paris quadrifolia	0.55	2000	1	1		1	2	4	6	
Parnassia palustris	55.00		4	3		1		4	4	
Pastinaca sativa	0.55		1	1		1		4	4	
Pedicularis palustris	5.50	55	4	3		1	3	4	4	
Pedicularis sylvatica	5.50	55	1	3		7	3	4	6	
Persicaria bistorta	0.55		8	1		1		4	6	
Persicaria minor	0.55		50	1		7		4	4	
Petasites hybridus	550.00		1	3		1		4	4	
Petrorhagia prolifera	5.50		1	0		3		4	4	
Petroselinum segetum	55.00			8		3			6	
Peucedanum carvifolia	55.00		1	1		3		7	6	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Peucedanum palustre	5.50		1	3		1		4	4	
Phalaris arundinacea	5.50		50	2		1		4	4	
Phleum arenarium	0.55		1	1		1		4	4	
Phleum pratense subsp. bertolonii	0.55		1	1		1		7	6	
Phleum pratense subsp. pratense	0.55		1	1		7		7	6	
Phragmites australis	2000.00		4	3	124	1		4	4	1
Phyteuma spicatum subsp. nigrum	5.50			1		3			6	
Phyteuma spicatum subsp. spicatum	5.50			1		3			6	
Picea abies	550.00		4	20		1		4	6	
Picea sitchensis	55.00		4	20		3		7	6	
Picris echioides	550.00		1	1		3		4	6	
Picris hieracioides	550.00		5	1		1		4	4	
Pilularia globulifera	5000.00			1		3			6	
Pimpinella major	0.55		1	1		1		4	6	
Pimpinella saxifraga	0.55		4	2		1		4	4	
Pinguicula vulgaris	55.00		1	3		3		4	4	
Pinus nigra	55.00		1	20		3		4	6	
Pinus sylvestris	550.00		1	5		1		4	4	
Plantago coronopus	0.55	550	50	1		1	3	4	4	
Plantago lanceolata	0.55	550	9	1		1	3	4	4	
Plantago major	0.55	550	5	2		1	3	4	4	
Plantago major subsp. major	0.55	550	3	1		7	7	7	6	
Plantago major subsp. pleiosperma	0.55	550	3	1		1	7	7	6	
Plantago maritima	0.55	550	4	1		1	7	4	6	
Plantago media	0.55	550	3	1		1	3	4	4	
Platanthera bifolia	550.00		1	1		1		4	6	
Poa angustifolia	5.50		50	0		1		4	4	
Poa annua	0.55		5	0		1		4	4	
Poa compressa	0.55		50	0		1		4	4	
Poa nemoralis	0.55		50	1		1		4	4	
Poa palustris	0.55		50	0		1		4	4	
Poa pratensis + Poa angustifolia	5.50		50	0		7		7	7	
Poa trivialis	0.55		2	1		1		4	6	
Polygala comosa	0.55	55	50	1		1	3	4	6	
Polygala serpyllifolia	0.55	55	4	2		7	3	4	6	
Polygala vulgaris	0.55	55	4	2		1	3	4	4	
Polygonatum multiflorum	0.55	2000	1	1		1	2	4	6	
Polygonatum odoratum	0.55	2000	1	1		1	7	4	6	
Polygonatum verticillatum	0.55	2000	1	1		7	3	7	6	
Polygonum amphibium	0.55		1	2		7		4	6	
Polygonum aviculare	0.55		8	2		1		4	4	
Polygonum convolvulus	0.55		1	1		1		7	6	
Polygonum dumetorum	0.55		1	1		7		7	6	

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Polygonum hydropiper	0.55		50	2		1		4	4	
Polygonum lapathifolium	0.55		5	2		7		4	4	
Polygonum mite	0.55		50	0		7		4	4	
Polygonum persicaria	0.55		8	1		1		4	4	
Polypodium interjectum	5000.00			3		3			4	
Polystichum lonchitis	5000.00			1		3			6	
Polystichum setiferum	5000.00			3		3			4	
Populus alba	550.00		1	20		1		7	6	
Populus nigra	550.00		1	20		3		4	6	
Populus tremula	2000.00		1	20		1		4	6	
Populus x canadensis	550.00		1	20		3		7	6	
Potamogeton acutifolius	0.55	2000	1	1		7	3	7	6	
Potamogeton alpinus	0.55	2000	1	1		7	7	7	6	
Potamogeton berchtoldii	0.55	2000	1	1		7	7	7	4	
Potamogeton compressus	0.55	2000	1	1		7	3	7	6	
Potamogeton crispus	0.55	2000	1	2		7	7	7	6	
Potamogeton gramineus	0.55	2000	1	1		7	3	7	6	
Potamogeton lucens	0.55	2000	1	1		7	7	7	6	
Potamogeton mucronatus	0.55	2000	1	1		7	7	7	6	
Potamogeton natans	0.55	2000	1	4		1	7	7	4	
Potamogeton obtusifolius	0.55	2000	1	1		7	3	7	6	
Potamogeton pectinatus	0.55	2000	4	1		7	7	4	6	
Potamogeton perfoliatus	0.55	2000	1	1		7	7	4	6	
Potamogeton polygonifolius	0.55	2000	1	1		1	7	7	6	
Potamogeton praelongus	0.55	2000	1	1		7	3	7	6	
Potamogeton pusillus	0.55	2000	4	1		7	7	4	6	
Potamogeton trichoides	0.55	2000	1	1		7	7	7	6	
Potamogeton x zizii	0.55	2000	1	1		7	3	7	6	
Potentilla anglica	0.55	55	4	2		7	7	4	6	
Potentilla anserina	0.55	55	50	2		1	7	4	4	
Potentilla argentea	0.55	55	40	1		1	7	4	4	
Potentilla erecta	0.55	55	32	4		1	7	4	4	
Potentilla palustris	0.55	55	4	4		1	7	4	4	
Potentilla reptans	0.55	55	35	2		1	3	4	4	
Potentilla sterilis	0.55	55	50	1		7	3	4	6	
Potentilla supina	0.55	55	1	1		7	7	4	6	
Potentilla verna	0.55	55	1	1		1	3	7	6	
Primula elatior	0.55	55	1	3		1	7	4	4	
Primula veris	0.55	55	4	4	0.04	1	3	4	4	1
Primula vulgaris	5.50	55	50	4		3	3	4	4	
Prunella vulgaris	0.55	550	5	0	36	1	3	4	4	4
Prunus avium	0.55		1	3		7		4	4	
Prunus padus	0.55		4	10		7		4	6	
Prunus serotina	0.55		3	0		7		4	4	

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Prunus spinosa	0.55		1	7		1		4	4	
Pseudorchis albida	11000.00			3		3			4	
Pseudotsuga menziesii	550.00		4	20		1		4	6	
Pteridium aquilinum	5000.00			3		2			4	
Puccinellia distans subsp. distans				1					6	
Puccinellia fasciculata				1					6	
Puccinellia maritima			4	3				4	4	
Pulicaria dysenterica	550.00		1	4		1		4	4	
Pulmonaria montana		55		1			3		6	
Pulsatilla vulgaris	550.00		1	3		3		4	4	
Pyrola minor	5000.00		1	1		3		4	6	
Pyrola rotundifolia	5000.00		1	1		3		4	6	
Quercus petraea		11000	1	30			3	4	4	
Quercus robur		11000	1	30			3	4	4	
Quercus rubra		11000	1	15			7	7	4	
Radiola linoides	55.00	550	1	1	1.0 5	1	3	4	4	4
Ranunculus acris	0.55	55	1	1	1.9	1	7	4	4	4
Ranunculus aquatilis	0.55	55	50	1		7	7	4	6	
Ranunculus arvensis	55.00	2000	4	1		3	3	4	4	
Ranunculus auricomus	55.00	55	50	2	7	2	3	4	6	4
Ranunculus baudotii	55.00	55	1	1		3	7	7	6	
Ranunculus bulbosus	0.55	55	5	1		1	7	4	4	
Ranunculus circinatus	0.55	55	1	1		7	7	4	6	
Ranunculus ficaria subsp. bulbifer	0.55	55	1	1	7	7	3	7	6	7
Ranunculus flammula	0.55	55	50	2		1	7	4	4	
Ranunculus fluitans	55.00	55	1	1		3	7	7	6	
Ranunculus hederaceus	55.00	55	1	1		3	7	7	6	
Ranunculus lingua	0.55	55	1	3		7	7	4	4	
Ranunculus ololeucos	55.00	55	1	1		3	7	7	6	
Ranunculus peltatus	0.55	55	4	2		7	7	4	6	
Ranunculus polyanthemos subsp. nemorosus	55.00	55	1	1		3	7	7	6	
Ranunculus polyanthemos subsp. polyanthemoides	55.00	55	1	1		3	7	7	6	
Ranunculus repens	0.55	55	50	0	1	1	7	4	4	4
Ranunculus sardous	0.55	55	4	1		7	7	4	4	
Ranunculus sceleratus	0.55	55	50	1		1	7	4	4	
Ranunculus tripartitus	0.55	55	1	1		7	7	7	6	
Raphanus raphanistrum	0.55		5	2		1		4	4	
Reseda lutea	0.55		4	1		1		4	4	
Rhamnus catharticus	0.55	2000	1	6		1	7	4	4	
Rhamnus frangula	0.55	2000	1	10		7	3	7	6	
Rhinanthus alectorolophus	55.00		3	1		3		4	4	
Rhinanthus angustifolius	0.55		1	1		1		4	4	

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Rhinanthus minor	5.50		3	2		1		4	4	
Rhododendron ponticum	5.50		1	5		1		4	4	
Rhynchospora alba	0.55	550	50	1		1	3	4	6	
Rhynchospora fusca	0.55	550	4	1		1	3	4	6	
Ribes nigrum			1	6				4	4	
Ribes rubrum			1	10				4	6	
Ribes uva-crispa			1	11				4	6	
Robinia pseudoacacia	0.55			20		1			6	
Rorippa amphibia			50	3				4	4	
Nasturtium microphyllum	5.50		4	1		1		4	6	
Nasturtium officinale	5.50		4	1		1		4	6	
Rorippa palustris			50	2				4	4	
Rorippa sylvestris			50	1				4	4	
Rosa canina	0.55	2000	4	3		1	7	4	4	
Rosa pimpinellifolia	0.55	2000	1	3		7	7	4	4	
Rosa rubiginosa	0.55	2000	1	3		1	7	4	4	
Rosa rugosa	0.55	2000	1	3		7	7	4	4	
Rosa villosa	0.55	2000	1	10		7	3	7	6	
Rubus caesius	0.55	11000	1	3		1	7	4	4	
Rubus corylifolius	0.55	11000	1	4		7	7	7	6	
Rubus fruticosus	0.55	11000	50	4		7	7	4	6	
Rubus idaeus	0.55	11000	87	2		1	7	4	4	
Rubus saxatilis	0.55	11000	50	1		7	3	4	6	
Rumex acetosa	5.50		5	1		1		4	4	
Rumex acetosella	5.50		5	2		1		4	4	
Rumex conglomeratus	5.50		4	1		7		4	6	
Rumex crispus	5.50		6	1		1		4	4	
Rumex hydrolapathum	5.50		1	3		1		7	4	
Rumex maritimus	5.50		5	1		7		4	4	
Rumex obtusifolius	5.50		5	0		1		4	4	
Rumex palustris	5.50		1	1		7		4	4	
Rumex sanguineus	5.50		5	2		1		4	4	
Rumex thyrsoiflorus	5.50		1	1		1		4	6	
Rumex x pratensis	5.50		1	1		7		7	6	
Ruppia cirrhosa				1					6	
Ruppia maritima			50	1				4	4	
Sagina apetala	5.50		4	2		3		4	4	
Sagina maritima	5.50		50	1		7		4	4	
Sagina nodosa	5.50		50	2		3		4	6	
Sagina procumbens	5.50		46	1		3		4	6	
Sagina subulata	5.50		4	1		3		7	6	
Sagittaria sagittifolia	5.50			1		1			6	
Salicornia europaea	5.50	2000	4	1		7	7	4	4	
Salicornia europaea + Salicornia procumbens	5.50	2000	4	1		1	7	7	7	

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Salicornia procumbens	5.50	2000	4	1		7	7	7	4	
Salicornia pusilla	5.50	2000	4	1		7	3	7	6	
Salix alba	2000.00		50	20		1		4	6	
Salix aurita	550.00		50	10		1		4	6	
Salix caprea	2000.00		50	2		1		4	4	
Salix cinerea	550.00		1	10		1		4	6	
Salix dasyclados	550.00			10		3			6	
Salix fragilis	550.00		1	10		3		4	6	
Salix pentandra	550.00		1	10		1		4	6	
Salix purpurea	550.00		1	10		3		4	6	
Salix repens	550.00		1	3		1		4	6	
Salix triandra	550.00		1	10		3		4	6	
Salix viminalis	550.00		1	10		1		4	6	
Salix x multinervis	550.00		1	10		7		7	6	
Salsola kali subsp. kali	0.55			1		1			6	
Salvia pratensis	0.55	550	50	2		1	3	4	4	
Salvia verbenaca	0.55	550	50	1		7	3	7	6	
Sambucus ebulus	11000.00	2000	100	1		3	7	7	6	
Sambucus nigra	11000.00	2000	160	3		7	3	4	4	
Sambucus nigra cv. 'Laciniata'	11000.00	2000	160	10		7	7	7	6	
Sambucus racemosa	11000.00	2000	100	10		7	7	4	6	
Samolus valerandi			50	1				4	6	
Sanguisorba minor	0.55		50	2		1		4	4	
Sanguisorba officinalis	0.55		1	1		1		4	6	
Sanicula europaea		550	4	7			3	4	4	
Saponaria officinalis	0.55		1	2		1		4	4	
Satureja acinos	0.55			1		1			6	
Saxifraga granulata	5.50		50	1		3		4	4	
Saxifraga tridactylites	5.50		4	1		1		4	4	
Scabiosa columbaria	5.50	550	3	1		1	3	4	4	
Scandix pecten-veneris		2000	1	1			3	4	4	
Scheuchzeria palustris				1					6	
Schoenoplectus pungens		550		1			3		6	
Schoenoplectus triqueter		550		1			3		6	
Schoenus nigricans	0.55		1	3		1		4	4	
Hyacinthoides non-scripta	0.55		1	6		1		4	4	
Scirpus cespitosus	0.55		4	1		1		4	6	
Scirpus lacustris	0.55		1	1		7		4	6	
Scirpus lacustris subsp. lacustris	0.55		1	1		1		7	6	
Scirpus lacustris subsp. tabernaemontani	0.55		1	1		1		7	6	
Scirpus maritimus	0.55		4	1		1		4	6	
Scirpus rufus	0.55		1	1		7		7	6	
Scirpus setaceus	0.55		50	1		1		4	6	
Scirpus sylvaticus	5.50		50	1		1		4	6	

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Scleranthus annuus	0.55		4	2		1		4	4	
Scleranthus perennis	0.55		4	1		1		4	6	
Scorzonera humilis	55.00		1	1		3		4	6	
Scrophularia auriculata	5.50		50	1		1		4	4	
Scrophularia nodosa	5.50		100	1		1		4	4	
Scrophularia umbrosa	5.50		4	1		7		4	6	
Scutellaria galericulata			1	4				4	4	
Scutellaria minor			4	1				4	6	
Secale cereale	0.55		1	1		1		4	4	
Sedum acre	55.00		50	2		1		4	4	
Sedum album	55.00		1	3		1		7	4	
Sedum reflexum	55.00		1	1		1		7	6	
Sedum sexangulare	5.50		50	1		3		4	6	
Sedum telephium	5.50		1	4		7		4	4	
Selinum carvifolia	55.00		1	3		3		4	4	
Senecio aquaticus	55.00		1	3		1		4	4	
Senecio congestus	550.00		4	1		1		4	6	
Senecio erucifolius	550.00		5	1		1		4	4	
Senecio fluviatilis	550.00		1	1		3		7	6	
Senecio inaequidens	550.00		1	3		1		7	4	
Senecio jacobaea	550.00		6	1		1		4	4	
Senecio nemorensis (subsp. fuchsii)	550.00		1	1		1		7	6	
Senecio paludosus	55.00		1	3		1		4	4	
Senecio sylvaticus	550.00		5	2		1		4	4	
Senecio viscosus	550.00		5	1		1		4	4	
Senecio vulgaris	550.00		5	1		1		4	4	
Serratula tinctoria	550.00		1	3		3		4	4	
Setaria viridis	0.55		5	0		1		4	4	
Silaum silaus	55.00		1	1		3		4	4	
Silene conica	5.50		1	1		7		4	4	
Silene dioica	5.50		5	1	0.04	1		4	4	4
Silene gallica	5.50		4	1		3		4	4	
Silene latifolia (subsp. alba)	5.50		1	1		1		7	6	
Silene noctiflora	5.50		5	0	0.23	3		4	4	4
Silene nutans	5.50		4	1	7	1		4	4	4
Silene otites	5.50		4	1		1		4	4	
Silene vulgaris	5.50		6	2		1		4	4	
Sinapis arvensis	0.55		9	2		1		4	4	
Sisymbrium altissimum	0.55	40000	6	2		1	7	4	4	
Sisymbrium officinale	0.55	40000	5	1		1	7	4	4	
Sisymbrium supinum	0.55	40000	5	1		7	3	7	4	
Sium latifolium			1	3				4	4	

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Solanum dulcamara	0.55		6	2		7		4	6	
Solanum nigrum	0.55		5	0		1		4	4	
Solanum tuberosum	0.55		1	1		7		4	6	
Solidago gigantea	550.00		1	1		1		4	6	
Solidago virgaurea	550.00		50	3		1		4	4	
Sonchus arvensis	550.00		6	2		1		4	4	
Sonchus asper	550.00		5	1		1		4	4	
Sonchus oleraceus	550.00		5	0		1		4	4	
Sonchus palustris	550.00		5	1		1		7	6	
Sorbus aucuparia		2000	5	7			3	4	4	
Sparganium angustifolium	0.55		1	1		7		7	6	
Sparganium emersum	0.55		1	4		7		7	4	
Sparganium erectum	0.55		1	4		1		4	4	
Sparganium natans	0.55		1	1		1		7	6	
Spartina maritima				1					6	
Spartina townsendii				1					6	
Spergula arvensis	5.50		8	2		1		4	4	
Spergula morisonii	5.50		1	1		1		4	4	
Spergularia maritima	5.50		50	1		1		7	6	
Spergularia rubra	5.50		50	1		1		4	6	
Spergularia salina	5.50		50	1		1		7	6	
Spiranthes aestivalis	11000.00		1	1		3		7	6	
Spiranthes spiralis	11000.00		1	5		3		4	4	
Spirodela polyrhiza				1					6	
Spirogyra?										
Stachys arvensis	0.55	550	8	2		7	7	4	4	
Stachys officinalis	0.55	550	4	1		7	3	4	6	
Stachys palustris	0.55	550	5	4	360	1	7	4	4	4
Stachys sylvatica	0.55	550	5	4		1	7	4	4	
Stellaria aquatica	0.55		1	1		1		7	6	
Stellaria graminea	0.55		50	2		1		4	6	
Stellaria holostea	55.00		50	4		2		4	4	
Stellaria media	5.50		8	1		1		4	4	
Stellaria nemorum	0.55		1	3		7		4	4	
Stellaria pallida	0.55		1	1		7		7	4	
Stellaria palustris	0.55		50	1		7		4	6	
Stellaria uliginosa	5.50		50	1		1		4	6	
Stratiotes aloides				3					4	
Suaeda maritima	0.55		4	1		1		4	4	
Succisa pratensis	0.55	550	1	0		1	3	4	4	
Symphoricarpos albus			1	10				4	6	
Symphytum officinale	0.55	55	1	2		1	3	4	4	
Tanacetum vulgare	55.00		50	2		1		4	4	
Taraxacum celticum	550.00	55	660	1		3	3	7	6	
Taraxacum laevigatum	550.00	55	660	1		1	7	7	6	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Taraxacum obliquum	550.00	55	660	1		7	7	7	6	
Taraxacum officinale	550.00	55	660	1		1	7	4	6	
Taraxacum palustre	550.00	55	660	1		3	3	7	6	
Taxus baccata			1	15				4	4	
Teesdalia nudicaulis	0.55		50	1		1		4	4	
Teucrium botrys	5.50		50	1		3		4	6	
Teucrium chamaedrys subsp. germanicum	5.50		1	3		3		7	7	
Teucrium montanum	5.50		1	3		3		4	6	
Teucrium scordium	5.50		1	1		3		7	6	
Teucrium scorodonia	0.55		1	0		1		4	4	
Thalictrum flavum	0.55		50	3		1		4	4	
Thalictrum minus	0.55		1	3		1		4	4	
Thelypteris palustris	5000.00			3		3			4	
Thesium humifusum		55		1			3		6	
Thlaspi arvense	0.55		6	1		1		4	4	
Thlaspi perfoliatum	0.55		50	1		7		4	4	
Thymus pulegioides	0.55	550	50	3		1	3	4	4	
Thymus serpyllum	0.55	550	1	3		1	3	4	4	
Tilia cordata	550.00		50	15		1		4	4	
Tilia platyphyllos	550.00		50	15		1		7	4	
Torilis arvensis	0.55	2000	1	1		7	3	7	4	
Torilis japonica	0.55	550	5	1		1	7	4	4	
Torilis nodosa	0.55	550	1	1		7	3	4	4	
Tragopogon porrifolius	550.00		1	1		3		7	4	
Tragopogon pratensis subsp. orientalis	550.00		1	1		3		4	6	
Tragopogon pratensis subsp. pratensis	550.00		1	1		1		7	6	
Trichophorum cespitosum subsp. cespitosum	55.00			1		3			6	
Trichophorum cespitosum subsp. germanicum	55.00					3				
Trifolium arvense	55.00	550	5	2		1	7	4	4	
Trifolium campestre	5.50	550	5	1		1	7	4	4	
Trifolium dubium	0.55	550	5	1		1	7	4	4	
Trifolium fragiferum	0.55	550	1	1		1	7	4	6	
Trifolium hybridum	0.55	550	20	2		1	7	4	6	
Trifolium medium	55.00	550	1	2		3	3	4	6	
Trifolium micranthum	55.00	550	1	1		3	7	7	4	
Trifolium ornithopodioides	0.55	40000	1	8		7	3	7	6	
Trifolium pratense	0.55	550	7	1		1	7	4	4	
Trifolium repens	0.55	550	5	1		1	7	4	4	
Trifolium striatum	55.00	550	5	1		3	7	4	4	
Trifolium subterraneum	0.55	550	4	1		7	7	4	4	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Triglochin maritima	0.55		4	3		1		4	4	
Triglochin palustris	0.55		1	2		1		4	6	
Trisetum flavescens	55.00	550	4	0		1	3	4	4	
Triticum aestivum	0.55		1	0		1		4	4	
Tuberaria guttata	5000.00		4	1		3		4	4	
Tussilago farfara	550.00		4	1	0	1		4	4	1
Typha angustifolia	2000.00		50	3		1		4	4	
Typha latifolia	5000.00		50	4		1		4	4	
Ulex europaeus		55	50	11	0.0 4		3	4	6	4
Ulmus glabra	55.00		1	30		3		4	4	
Ulmus minor	55.00		1	20		3		4	6	
Urtica dioica	0.55		8	1		1		4	4	
Urtica urens	0.55		5	1		1		4	4	
Utricularia intermedia	55.00		1	1		3		1	6	
Utricularia minor	55.00		1	1		3		4	6	
Utricularia ochroleuca	55.00		1	1		3		1	6	
Utricularia vulgaris	55.00		4	1		7		4	6	
Vaccinium myrtillus	0.55	11000	5	3		1	2	4	6	
Vaccinium uliginosum	0.55	5000	50	3		7	3	4	6	
Vaccinium vitis-idaea	0.55	11000	5	5		7	2	4	4	
Valeriana dioica	5.50		4	1		1		4	6	
Valeriana officinalis	550.00		1	2		1		4	4	
Valerianella dentata	55.00	2000	30	1		3	3	4	4	
Valerianella locusta	55.00	2000	4	1		3	7	4	4	
Vaucheria species										
Verbascum nigrum	5.50		50	1		1		4	4	
Verbascum thapsus	0.55		40	2		1		4	4	
Verbena officinalis	0.55		4	0		1		4	4	
Veronica agrestis	0.55	55	10	2		7	7	4	4	
Veronica anagallis-aquatica	5.50	55	4	1		3	7	4	6	
Veronica arvensis	5.50	55	3	1		1	7	4	4	
Veronica austriaca subsp. teucrium	0.55	550	1	1		1	3	4	6	
Veronica beccabunga	5.50	55	50	3		1	7	4	4	
Veronica catenata	0.55	55	4	1		7	7	4	6	
Veronica chamaedrys	0.55	55	50	2		1	7	4	4	
Veronica hederifolia	0.55	55	5	1		1	7	4	4	
Veronica longifolia	0.55	55	50	1		7	7	4	6	
Veronica montana	0.55	55	50	4		7	3	4	4	
Veronica officinalis	0.55	55	100	2		1	7	4	4	
Veronica persica	5.50	55	5	1		1	7	4	4	
Veronica praecox	5.50	550	1	1		3	3	4	4	
Veronica prostrata	5.50	550	4	1		3	3	4	6	
Veronica scutellata	0.55	55	50	2		1	7	4	6	
Veronica serpyllifolia	5.50	55	5	1		3	7	4	4	

Species	Dispersal\Wind\Distance (m)	Dispersal\Animal\Distance (m)	Seedbank\Longevity (y)	Germination\Delay (y)	floating time (days)	Source Dispersal\Wind\Distance	Source Dispersal\Animal\Distance	Source Seedbank\Longevity	Source Germination\Delay	floating time
Veronica triphyllos	5.50	550	1	1		3	3	4	4	
Veronica verna	5.50	550	100	1		3	3	4	4	
Viburnum opulus			1	3				4	4	
Vicia cracca	0.55		5	2	0.2	1		4	4	4
Vicia hirsuta	0.55		5	1		1		4	4	
Vicia lathyroides	0.55		50	1		7		4	4	
Vicia sativa	0.55		35	0		1		4	4	
Vicia sativa subsp. nigra	0.55		1	2		1		4	6	
Vicia sativa subsp. sativa	0.55		1	1		7		7	6	
Vicia sepium	0.55		20	3		1		4	4	
Vicia tenuifolia	0.55		50	1		7		4	6	
Vicia tetrasperma subsp. gracilis	0.55		1	1	7	7		7	6	7
Vicia tetrasperma subsp. tetrasperma	0.55		1	1	7	1		7	6	7
Vinca minor	0.55			3		1			4	
Vincetoxicum hirundinaria	550.00		1	3		3		4	4	
Viola arvensis	0.55	55	8	2		1	3	4	4	
Viola canina	0.55	55	40	1		1	3	4	4	
Viola curtisii	0.55	55	1	1		7	3	7	6	
Viola hirta	0.55	55	4	2		1	3	4	6	
Viola lutea subsp. calaminaria	5.50	55	1	1		3	3	7	6	
Viola odorata	0.55	55	4	2		7	3	4	6	
Viola palustris	0.55	55	4	2		7	3	4	4	
Viola persicifolia	0.55	55	1	1		7	3	4	6	
Viola reichenbachiana	0.55	55	50	1		7	3	4	6	
Viola reichenbachiana + Viola riviniana	0.55	55	1	2		7	7	7	7	
Viola riviniana	0.55	55	1	2		1	2	4	4	
Viola rupestris	0.55	55	4	3		7	3	4	4	
Viola tricolor	0.55	55	11	2		1	3	4	4	
Vulpia myuros	0.55		4	0		1		4	4	
Wahlenbergia hederacea	55.00		50	1		3		4	6	
Wolffia arrhiza				1					6	
Zannichellia palustris			4	1				4	6	
Zannichellia palustris subsp. major		550		1			3		6	
Zannichellia palustris subsp. palustris				1					6	
Zannichellia palustris subsp. pedicellata				1					6	
Zea mays			1	1				4	4	
Zostera marina			1	3				4	4	
Zostera noltii			1	1				4	6	

Annex 4 Estimation of species characteristics for the dispersal model

For species without data in the LEDA database we estimated the characteristics for LDD, seed bank longevity and seed disperser. We first made an estimation based on seed characteristics, following these criteria (for the classes see table below).

Rule	disperser	class
Seed spread by humans	humans	1
Orchid seed	wind	3
Seed dispersed internal by animals	Large mammals	3
Small seeds with an internal fine-meshed bag	wind	4
spores	wind	4
Seed dispersed internal by animals	(forest) birds	5
The seed has hooks or thorns. Value is based on the characteristics per species.	animal	5 or 6
Is dispersed by animals on the outside, but the seed has no special adjustments.	Animal	6
Sticky seeds	Animal	6
The seeds have hairs or plumes, plants are taller than 0.5m and the seeds are small.	wind	6
Seed dispersed internal by animals	Small mammals	6
Ants disperses the seeds	Animal	7
The seed has (small) wings	wind	7
The seed has hairs or plumes but has relative heavy seeds or plants are smaller than 0.5m	wind	7
The seed is dispersed by the wind, but with no special adjustments.	wind	7
Wind-ballistics (Note when the seed has special adjustments, it may be placed in another category, e.g. orchids)	wind	8
Raindrop-ballistics	Rain	8
Self dispersal	other	8

After the classification the results were reviewed by two experts (P.A. Slim and G.W.W. Wamelink, both Alterra) and a final class was given to the species.

The classes are given here below, the first table defines the dispersal classes, the second table gives the dispersal class the disperser, the species or method and the medium the dispersion takes place.

class	LDD
	km
1	>35
2	25 - 35
2	15 - 25
3	7-15
4	3-7
5	1-3
6	0.1-1
7	0.01-0.1
8	0.001-0.01
9	< 0.001

Scientific name	Class	Disperser	Species/method	Medium
Coeloglossum viride	3	wind		air
Dactylorhiza incarnata	3	wind		air
Dactylorhiza maculata	3	wind		air
Dactylorhiza majalis subsp. majalis	3	wind		air
Epipactis palustris	3	wind		air
Goodyera repens	3	wind		air
Gymnadenia conopsea	3	wind		air
Hammarbya paludosa	3	wind		air
Himantoglossum hircinum	3	wind		air
Liparis loeselii	3	wind		air
Listera cordata	3	wind		air
Listera ovata	3	wind		air
Orchis coriophora	3	wind		air
Orchis morio	3	wind		air
Platanthera bifolia	3	wind		air
Pseudorchis albida	3	wind		air
Spiranthes aestivalis	3	wind		air
Spiranthes spiralis	3	wind		air
Blechnum spicant	4	wind		air
Diphasiastrum tristachyum	4	wind		air
Drosera intermedia	4	wind		air
Drosera longifolia	4	wind		air
Drosera rotundifolia	4	wind		air
Equisetum variegatum	4	wind		air
Huperzia selago	4	wind		air
Isoetes echinospora	4	wind		air
Isoetes lacustris	4	wind		air
Lycopodiella inundata	4	wind		air
Lycopodium annotinum	4	wind		air
Lycopodium clavatum	4	wind		air
Monotropa hypopitys	4	wind		air
Orobanche lutea	4	wind		air
Orobanche minor	4	wind		air
Orobanche rapum-genistae	4	wind		air
Orobanche reticulata	4	wind		air
Parnassia palustris	4	wind		air
Pilularia globulifera	4	wind		air
Polypodium interjectum	4	wind		air
Moneses uniflora	4	wind		air
Orthilia secunda	4	wind		air
Polystichum lonchitis	4	wind		air
Polystichum setiferum	4	wind		air
Antennaria dioica	6	wind		air
Arnica montana	6	wind		air
Cirsium dissectum	6	wind		air
Cirsium eriophorum	6	wind		air
Crepis paludosa	6	wind		air
Epilobium palustre	6	wind		air
Eriophorum gracile	6	wind		air
Eriophorum latifolium	6	wind		air
Helichrysum arenarium	6	wind		air
Hieracium murorum	6	wind		air
Hypochaeris maculata	6	wind		air
Inula conyzae	6	wind		air
Inula salicina	6	wind		air
Lactuca saligna	6	wind		air
Picris echioides	6	wind		air

Scientific name	Class	Disperser	Species/method	Medium
<i>Senecio aquaticus</i>	6	wind		air
<i>Serratula tinctoria</i>	6	wind		air
<i>Taraxacum celticum</i>	6	wind		air
<i>Taraxacum palustre</i>	6	wind		air
<i>Tragopogon porrifolius</i>	6	wind		air
<i>Tragopogon pratensis</i> subsp. <i>orientalis</i>	6	wind		air
<i>Centaurea scabiosa</i>	6	wind		air
<i>Cirsium acaule</i>	6	wind		air
<i>Pulsatilla vulgaris</i>	6	wind		air
<i>Valeriana dioica</i>	6	wind		air
<i>Vincetoxicum hirundinaria</i>	6	wind		air
<i>Aconitum vulparia</i>	7	wind		air
<i>Alchemilla filicaulis</i>	7	wind		air
<i>Alchemilla glabra</i>	7	wind		air
<i>Alchemilla micans</i>	7	wind		air
<i>Alchemilla monticola</i>	7	wind		air
<i>Alchemilla subcrenata</i>	7	wind		air
<i>Alchemilla xanthochlora</i>	7	wind		air
<i>Anagallis minima</i>	7	wind		air
<i>Anthyllis vulneraria</i>	7	wind		air
<i>Arabis glabra</i>	7	wind		air
<i>Calamagrostis stricta</i>	7	wind		air
<i>Carex appropinquata</i>	7	wind		air
<i>Carex aquatilis</i>	7	wind		air
<i>Carex brizoides</i>	7	wind		air
<i>Carex buxbaumii</i>	7	wind		air
<i>Carex caryophyllea</i>	7	wind		air
<i>Carex cespitosa</i>	7	wind		air
<i>Carex diandra</i>	7	wind		air
<i>Carex dioica</i>	7	wind		air
<i>Carex divulsa</i>	7	wind		air
<i>Carex ericetorum</i>	7	wind		air
<i>Carex flava</i>	7	wind		air
<i>Carex hostiana</i>	7	wind		air
<i>Carex laevigata</i>	7	wind		air
<i>Carex lasiocarpa</i>	7	wind		air
<i>Carex lepidocarpa</i>	7	wind		air
<i>Carex muricata</i>	7	wind		air
<i>Carex pallescens</i>	7	wind		air
<i>Carex pendula</i>	7	wind		air
<i>Carex praecox</i>	7	wind		air
<i>Carex pulicaris</i>	7	wind		air
<i>Carex strigosa</i>	7	wind		air
<i>Carex tomentosa</i>	7	wind		air
<i>Carex vulpina</i>	7	wind		air
<i>Carum carvi</i>	7	wind		air
<i>Carum verticillatum</i>	7	wind		air
<i>Chenopodium vulvaria</i>	7	wind		air
<i>Cicendia filiformis</i>	7	wind		air
<i>Conopodium majus</i>	7	wind		air
<i>Cynosurus cristatus</i>	7	wind		air
<i>Deschampsia setacea</i>	7	wind		air
<i>Dianthus armeria</i>	7	wind		air
<i>Dianthus carthusianorum</i>	7	wind		air
<i>Dianthus deltoides</i>	7	wind		air
<i>Dianthus superbus</i>	7	wind		air
<i>Erysimum hieracifolium</i>	7	wind		air

Scientific name	Class	Disperser	Species/method	Medium
<i>Festuca ovina</i>	7	wind		air
<i>Filipendula vulgaris</i>	7	wind		air
<i>Gratiola officinalis</i>	7	wind		air
<i>Hierochloe odorata</i>	7	wind		air
<i>Knautia arvensis</i>	7	wind		air
<i>Leontodon hispidus</i>	7	wind		air
<i>Lysimachia nemorum</i>	7	wind		air
<i>Petroselinum segetum</i>	7	wind		air
<i>Peucedanum carvifolia</i>	7	wind		air
<i>Pinguicula vulgaris</i>	7	wind		air
<i>Ranunculus fluitans</i>	7	wind		air
<i>Ranunculus hederaceus</i>	7	wind		air
<i>Ranunculus ololeucus</i>	7	wind		air
<i>Ranunculus polyanthemus</i> subsp. <i>polyanthemoides</i>	7	wind		air
<i>Rhinanthus minor</i>	7	wind		air
<i>Sanguisorba minor</i>	7	wind		air
<i>Scleranthus perennis</i>	7	wind		air
<i>Scorzonera humilis</i>	7	wind		air
<i>Selinum carvifolia</i>	7	wind		air
<i>Silaum silaus</i>	7	wind		air
<i>Solidago virgaurea</i>	7	wind		air
<i>Thalictrum minus</i>	7	wind		air
<i>Trichophorum cespitosum</i> subsp. <i>cespitosum</i>	7	wind		air
<i>Trichophorum cespitosum</i> subsp. <i>germanicum</i>	7	wind		air
<i>Trifolium medium</i>	7	wind		air
<i>Trifolium micranthum</i>	7	wind		air
<i>Trifolium striatum</i>	7	wind		air
<i>Trisetum flavescens</i>	7	wind		air
<i>Utricularia intermedia</i>	7	wind		air
<i>Utricularia minor</i>	7	wind		air
<i>Bromus racemosus</i>	7	wind		air
<i>Ononis repens</i> subsp. <i>spinosa</i>	7	wind		air
<i>Briza media</i>	7	wind		air
<i>Utricularia ochroleuca</i>	7	wind		air
<i>Allium oleraceum</i>	8	wind		air
<i>Allium ursinum</i>	8	wind		air
<i>Althaea officinalis</i>	8	wind		air
<i>Armoracia rusticana</i>	8	wind		air
<i>Artemisia absinthium</i>	8	wind		air
<i>Artemisia campestris</i> subsp. <i>campestris</i>	8	wind		air
<i>Campanula glomerata</i>	8	wind		air
<i>Campanula patula</i>	8	wind		air
<i>Campanula rapunculus</i>	8	wind		air
<i>Cerastium fontanum</i> subsp. <i>holosteoides</i>	8	wind		air
<i>Erica cinerea</i>	8	wind		air
<i>Euphrasia rostkoviana</i>	8	wind		air
<i>Euphrasia stricta</i>	8	wind		air
<i>Filago lutescens</i>	8	wind		air
<i>Filago minima</i>	8	wind		air
<i>Filago pyramidata</i>	8	wind		air
<i>Filago vulgaris</i>	8	wind		air
<i>Genista anglica</i>	8	wind		air
<i>Genista germanica</i>	8	wind		air
<i>Genista pilosa</i>	8	wind		air
<i>Gentiana pneumonanthe</i>	8	wind		air
<i>Gnaphalium sylvaticum</i>	8	wind		air
<i>Gypsophila muralis</i>	8	wind		air

Scientific name	Class	Disperser	Species/method	Medium
<i>Hyoscyamus niger</i>	8	wind		air
<i>Hypericum canadense</i>	8	wind		air
<i>Hypericum elodes</i>	8	wind		air
<i>Hypericum hirsutum</i>	8	wind		air
<i>Hypericum maculatum</i>	8	wind		air
<i>Hypericum montanum</i>	8	wind		air
<i>Hypericum pulchrum</i>	8	wind		air
<i>Juncus alpinoarticulatus</i> subsp. <i>alpinoarticulatus</i>	8	wind		air
<i>Juncus capitatus</i>	8	wind		air
<i>Juncus filiformis</i>	8	wind		air
<i>Juncus pygmaeus</i>	8	wind		air
<i>Juncus tenageia</i>	8	wind		air
<i>Lathraea squamaria</i>	8	wind		air
<i>Linum catharticum</i>	8	wind		air
<i>Lobelia dortmanna</i>	8	wind		air
<i>Luzula sylvatica</i>	8	wind		air
<i>Lythrum hyssopifolia</i>	8	wind		air
<i>Moenchia erecta</i>	8	wind		air
<i>Narthecium ossifragum</i>	8	wind		air
<i>Nepeta cataria</i>	8	wind		air
<i>Odontites vernus</i> subsp. <i>serotinus</i>	8	wind		air
<i>Petrorhagia prolifera</i>	8	wind		air
<i>Phyteuma spicatum</i> subsp. <i>nigrum</i>	8	wind		air
<i>Phyteuma spicatum</i> subsp. <i>spicatum</i>	8	wind		air
<i>Primula veris</i>	8	wind		air
<i>Primula vulgaris</i>	8	wind		air
<i>Sagina subulata</i>	8	wind		air
<i>Salvia verbenaca</i>	8	wind		air
<i>Saxifraga granulata</i>	8	wind		air
<i>Sedum reflexum</i>	8	wind		air
<i>Sedum sexangulare</i>	8	wind		air
<i>Sisymbrium supinum</i>	8	wind		air
<i>Veronica austriaca</i> subsp. <i>teucrium</i>	8	wind		air
<i>Veronica prostrata</i>	8	wind		air
<i>Sisymbrium supinum</i>	8	animal	bird	air
<i>Trifolium ornithopodioides</i>	1	animal	bird	air
<i>Fragaria moschata</i>	3	animal	large mammals	land
<i>Fragaria vesca</i>	3	animal	large mammals	land
<i>Cornus suecica</i>	5	animal	bird	air
<i>Atropa bella-donna</i>	5	animal	bird	air
<i>Cornus mas</i>	5	animal	bird	air
<i>Daphne mezereum</i>	5	animal	bird	air
<i>Juniperus communis</i>	5	animal	bird	air
<i>Paris quadrifolia</i>	5	animal	bird	air
<i>Rosa villosa</i>	5	animal	bird	air
<i>Potamogeton acutifolius</i>	5	animal	bird fish	air
<i>Sambucus ebulus</i>	5	animal	bird	air
<i>Potamogeton compressus</i>	5	animal	bird fish	air
<i>Potamogeton gramineus</i>	5	animal	bird fish	air
<i>Potamogeton obtusifolius</i>	5	animal	bird fish	air
<i>Potamogeton praelongus</i>	5	animal	bird fish	air
<i>Polygonatum verticillatum</i>	5	animal	bird	air
<i>Potamogeton x zizii</i>	5	animal	bird fish	air
<i>Agrimonia eupatoria</i>	5	animal	mammels	land
<i>Agrimonia procera</i>	5	animal	mammels	land

Scientific name	Class	Disperser	Species/method	Medium
Marrubium vulgare	5	animal	mammels	land
Alchemilla filicaulis	5	animal		
Alchemilla glabra	5	animal		
Alchemilla micans	5	animal		
Alchemilla monticola	5	animal		
Alchemilla subcrenata	5	animal		
Alchemilla xanthochlora	5	animal		
Cruciata laevipes	6	animal	bird	air
Cucubalus baccifer	6	animal	bird	air
Lepidium heterophyllum	6	animal	bird mammals	air/land
Artemisia absinthium	6	animal	mammels	land
Artemisia campestris subsp. campestris	6	animal	mammels	land
Blysmus compressus	6	animal	mammels	land
Bromus racemosus	6	animal	mammels	land
Circaea alpina	6	animal	mammels	land
Circaea x intermedia	6	animal	mammels	land
Cynosurus cristatus	6	animal	mammels	land
Cyperus flavescens	6	animal	mammels	land
Drosera intermedia	6	animal	mammels	land
Drosera longifolia	6	animal	mammels	land
Drosera rotundifolia	6	animal	mammels	land
Elatine hexandra	6	animal	mammels	land
Eleocharis ovata	6	animal	mammels	land
Galeopsis pubescens	6	animal	mammels	land
Galium boreale	6	animal	mammels	land
Galium glaucum	6	animal	mammels	land
Galium sylvaticum	6	animal	mammels	land
Geum rivale	6	animal	mammels	land
Hordeum secalinum	6	animal	mammels	land
Juncus alpinoarticulatus subsp. alpinoarticulatus	6	animal	mammels	land
Juncus capitatus	6	animal	mammels	land
Juncus filiformis	6	animal	mammels	land
Juncus pygmaeus	6	animal	mammels	land
Juncus tenageia	6	animal	mammels	land
Leersia oryzoides	6	animal	mammels	land
Linnaea borealis	6	animal	mammels	land
Linum catharticum	6	animal	mammels	land
Littorella uniflora	6	animal	mammels	land
Lobelia dortmanna	6	animal	mammels	land
Mentha pulegium	6	animal	mammels	land
Mentha suaveolens	6	animal	mammels	land
Nardus stricta	6	animal	mammels	land
Radiola linoides	6	animal	mammels	land
Rhynchospora alba	6	animal	mammels	land
Rhynchospora fusca	6	animal	mammels	land
Salvia pratensis	6	animal	mammels	land
Salvia verbenaca	6	animal	mammels	land
Schoenoplectus pungens	6	animal	mammels	land
Schoenoplectus triquetet	6	animal	mammels	land
Stachys officinalis	6	animal	mammels	land
Succisa pratensis	6	animal	mammels	land
Thymus pulegioides	6	animal	mammels	land
Thymus serpyllum	6	animal	mammels	land
Torilis nodosa	6	animal	mammels	land
Trifolium medium	6	animal	mammels	land
Festuca ovina	6	animal	mammels	land
Knautia arvensis	6	animal	mammels	land

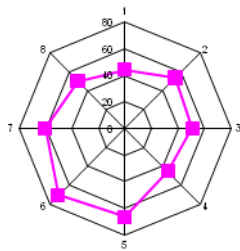
Scientific name	Class	Disperser	Species/method	Medium
<i>Veronica austriaca</i> subsp. <i>teucrium</i>	6	animal	mammels	land
<i>Veronica prostrata</i>	6	animal	mammels	land
<i>Geranium columbinum</i>	6	animal	mammels	land
<i>Trisetum flavescens</i>	6	animal	mammels	land
<i>Sanicula europaea</i>	6	animal	mammels	land
<i>Allium oleraceum</i>	7	animal	ants	land
<i>Allium ursinum</i>	7	animal	ants	land
<i>Cirsium acaule</i>	7	animal	ants	land
<i>Cirsium dissectum</i>	7	animal	ants	land
<i>Cirsium eriophorum</i>	7	animal	ants	land
<i>Colchicum autumnale</i>	7	animal	ants	land
<i>Euphorbia cyparissias</i>	7	animal	ants	land
<i>Euphorbia palustris</i>	7	animal	ants	land
<i>Euphorbia stricta</i>	7	animal	ants	land
<i>Gagea pratensis</i>	7	animal	ants	land
<i>Gagea spathacea</i>	7	animal	ants	land
<i>Helleborus viridis</i>	7	animal	ants	land
<i>Knautia arvensis</i>	7	animal	ants	land
<i>Leucojum aestivum</i>	7	animal	ants	land
<i>Luzula sylvatica</i>	7	animal	ants	land
<i>Narcissus pseudonarcissus</i> subsp. <i>pseudonarcissus</i>	7	animal	ants	land
<i>Pedicularis palustris</i>	7	animal	ants	land
<i>Pedicularis sylvatica</i>	7	animal	ants	land
<i>Polygala serpyllifolia</i>	7	animal	ants	land
<i>Polygala vulgaris</i>	7	animal	ants	land
<i>Potentilla verna</i>	7	animal	ants	land
<i>Primula veris</i>	7	animal	ants	land
<i>Primula vulgaris</i>	7	animal	ants	land
<i>Pulmonaria montana</i>	7	animal	ants	land
<i>Ulex europaeus</i>	7	animal	ants	land
<i>Lathraea squamaria</i>	7	animal	ants	land
<i>Viola canina</i>	7	animal	ants	land
<i>Viola persicifolia</i>	7	animal	ants	land
<i>Taraxacum celticum</i>	7	animal	bird	air
<i>Taraxacum palustre</i>	7	animal	bird	air
<i>Apium graveolens</i>	*	water		water
<i>Apium inundatum</i>	*	water		water
<i>Apium repens</i>	*	water		water
<i>Azolla mexicana</i>	*	water		water
<i>Blysmus compressus</i>	*	water		water
<i>Callitriche cophocarpa</i>	*	water		water
<i>Callitriche hermaphroditica</i>	*	water		water
<i>Callitriche palustris</i>	*	water		water
<i>Caltha palustris</i> subsp. <i>araneosa</i>	*	water		water
<i>Carex appropinquata</i>	*	water		water
<i>Carex aquatilis</i>	*	water		water
<i>Carex brizoides</i>	*	water		water
<i>Carex buxbaumii</i>	*	water		water
<i>Carex caryophyllea</i>	*	water		water
<i>Carex cespitosa</i>	*	water		water
<i>Carex diandra</i>	*	water		water
<i>Carex dioica</i>	*	water		water
<i>Carex divulsa</i>	*	water		water
<i>Carex ericetorum</i>	*	water		water
<i>Carex flava</i>	*	water		water
<i>Carex hostiana</i>	*	water		water
<i>Carex laevigata</i>	*	water		water

Scientific name	Class	Disperser	Species/method	Medium
Carex lasiocarpa	*	water		water
Carex lepidocarpa	*	water		water
Carex muricata	*	water		water
Carex pallescens	*	water		water
Carex pendula	*	water		water
Carex praecox	*	water		water
Carex pulicaris	*	water		water
Carex strigosa	*	water		water
Carex tomentosa	*	water		water
Carex vulpina	*	water		water
Chenopodium vulvaria	*	water		water
Cladium mariscus	*	water		water
Clinopodium vulgare	*	water		water
Cochlearia officinalis subsp. officinalis	*	water		water
Crepis paludosa	*	water		water
Cruciata laevipes	*	water		water
Cuscuta epithymum	*	water		water
Echinodorus ranunculoides	*	water		water
Echinodorus repens	*	water		water
Eleocharis ovata	*	water		water
Eleogiton fluitans	*	water		water
Elodea canadensis	*	water		water
Epilobium palustre	*	water		water
Epipactis palustris	*	water		water
Filipendula vulgaris	*	water		water
Fritillaria meleagris	*	water		water
Hypericum elodes	*	water		water
Isoetes echinospora	*	water		water
Isoetes lacustris	*	water		water
Leersia oryzoides	*	water		water
Leucojum aestivum	*	water		water
Ludwigia palustris	*	water		water
Luronium natans	*	water		water
Lysimachia nemorum	*	water		water
Lythrum hyssopifolia	*	water		water
Myrica gale	*	water		water
Najas minor	*	water		water
Narthecium ossifragum	*	water		water
Oenanthe crocata	*	water		water
Oenanthe pimpinelloides	*	water		water
Oenanthe silaifolia	*	water		water
Pedicularis palustris	*	water		water
Pedicularis sylvatica	*	water		water
Peucedanum carvifolia	*	water		water
Picris echioides	*	water		water
Pinguicula vulgaris	*	water		water
Potamogeton acutifolius	*	water		water
Potamogeton compressus	*	water		water
Potamogeton gramineus	*	water		water
Potamogeton obtusifolius	*	water		water
Potamogeton praelongus	*	water		water
Potamogeton x zizii	*	water		water
Ranunculus fluitans	*	water		water
Ranunculus hederaceus	*	water		water
Ranunculus ololeucos	*	water		water
Ranunculus polyanthemoides subsp. polyanthemoides	*	water		water
Ranunculus tripartitus	*	water		water

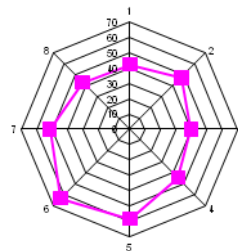
Scientific name	Class	Disperser	Species/method	Medium
Rhinanthus minor	*	water		water
Rhynchospora alba	*	water		water
Rhynchospora fusca	*	water		water
Saxifraga granulata	*	water		water
Schoenoplectus pungens	*	water		water
Schoenoplectus triqueter	*	water		water
Scutellaria minor	*	water		water
Sparganium angustifolium	*	water		water
Sparganium natans	*	water		water
Stellaria nemorum	*	water		water
Stratiotes aloides	*	water		water
Utricularia intermedia	*	water		water
Utricularia minor	*	water		water
Utricularia ochroleuca	*	water		water
Sisymbrium supinum	*	water		water
Althaea officinalis	*	water		water
Valeriana dioica	*	water		water
Anagallis minima	8		Raindrop-ballist	land
Caltha palustris subsp. araneosa	8		Raindrop-ballist	land
Campanula glomerata	8		Rain water	land
Campanula patula	8		Rain water	land
Campanula rapunculoides	8		Rain water	land
Chrysosplenium oppositifolium	8		Raindrop-ballist	land
Euphorbia cyparissias	8		Self-inflicted	land
Euphorbia palustris	8		Self-inflicted	land
Euphorbia stricta	8		Self-inflicted	land
Illecebrum verticillatum	8		Rain water	land
Lepidium heterophyllum	8		Raindrop-ballist	land
Scutellaria minor	8		Raindrop-ballist	land
Sedum reflexum	8		Raindrop-ballist	land
Sedum sexangulare	8		Raindrop-ballist	land
Vicia tenuifolia	8		Self-inflicted	land
Vicia tetrasperma subsp. gracilis	8		Self-inflicted	land
Orobanche reticulata	8		Rain water	land
Orobanche lutea	8		Rain water	land
Parnassia palustris	8		Rain water	land
Sanguisorba minor	8		Rain water	land
Geranium columbinum	8		Self-inflicted	land
Lathyrus linifolius	8		Self-inflicted	land
Lathyrus niger	8		Self-inflicted	land
Lathyrus nissolia	8		Self-inflicted	land
Lathyrus sylvestris	8		Self-inflicted	land
Salvia pratensis	8		Self-inflicted	land
Viola canina	8		Self-inflicted	land
Viola persicifolia	8		Self-inflicted	land
Antennaria dioica	9		stolones	land
Circaea alpina	9		turionen	land
Circaea x intermedia	9		turionen	land
Trifolium subterraneum	9		geocarpie	land

Annex 5 Wind speed for the wind stations in the Netherlands

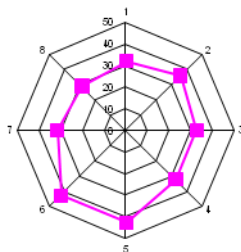
Data were provided by KNMI (www.knmi.nl), direction and strength were based on daily measurements. Given here below are wind strength and direction per station, situated all over the Netherlands. Values are averages per year over the period 1991-2000 and are given in 0.1 m/s.



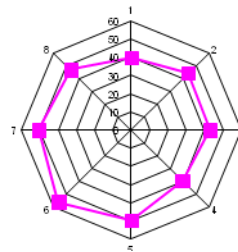
De Kooy



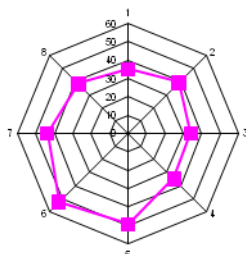
Schiphol



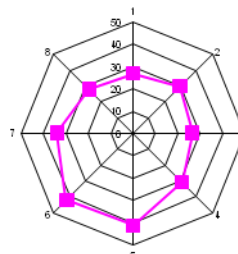
De Bilt



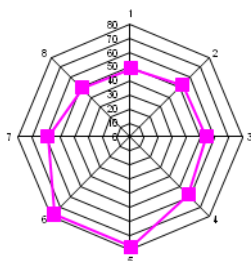
Leeuwarden



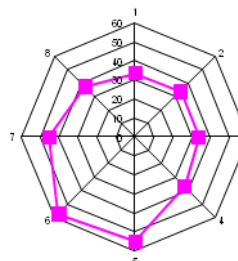
Eelde



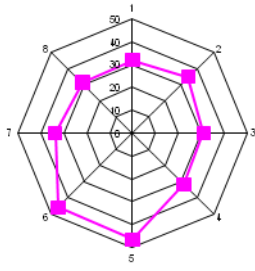
Twenthe



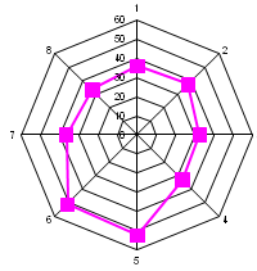
Vlissingen



Rotterdam



Eindhoven



Maastricht (Beek)

Annex 6 Parameter combinations examined in the sensitivity analyses

Each set is designed to examine the sensitivity of the model for one parameter.

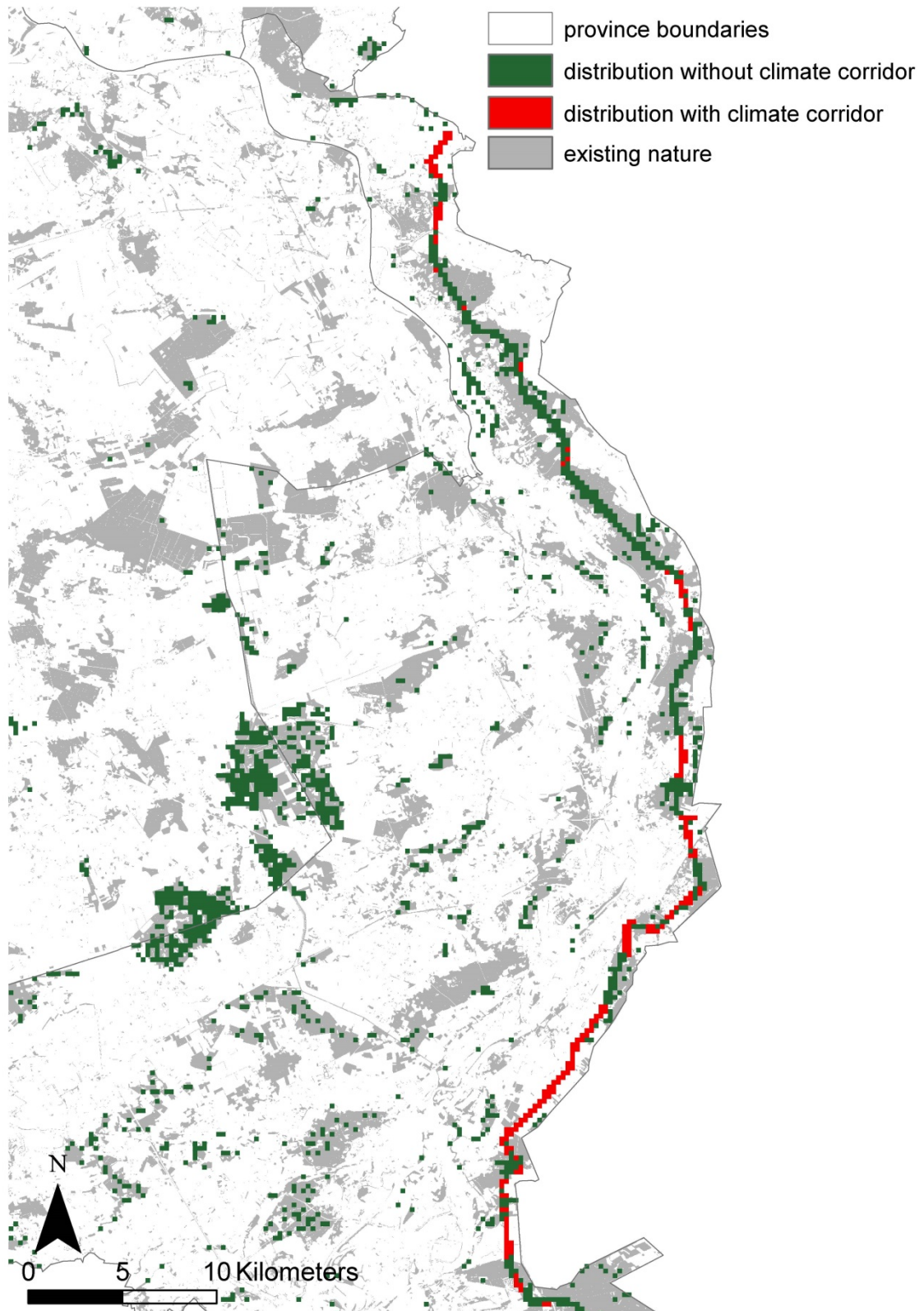
Dispersal distance for wind (m)	Wind force (-)	Dispersal distance for animal (m)	germination delay (y)	Barrier (-)	Grid cell size (m)
set 1 wind dispersal					
0.1	1	0	0	1	250
200	1	0	0	1	250
400	1	0	0	1	250
800	1	0	0	1	250
1600	1	0	0	1	250
set 2 wind force					
1000	1	0	0	1	250
1000	1.5	0	0	1	250
1000	2	0	0	1	250
1000	2.5	0	0	1	250
set 3 animal dispersal					
0	1	0.1	0	1	250
0	1	50	0	1	250
0	1	200	0	1	250
0	1	1000	0	1	250
0	1	10000	0	1	250
set 4 germination delay					
200	1	200	0	1	250
200	1	200	1	1	250
200	1	200	5	1	250
200	1	200	10	1	250
200	1	200	25	1	250
set 5 barrier					
200	1	1000	0	1	250
200	1	1000	0	2	250

Annex 7 Case

Dispersal of *Dactylorhiza maculata* (L.) Soò, *Eriophorum angustifolium* Honckeney, *Maianthemum bifolium* (L.) F.W. Schmidt and *Primula veris* L. in the South of the Netherlands as a result of a planned corridor. The first figure gives the study area in Dutch perspective.



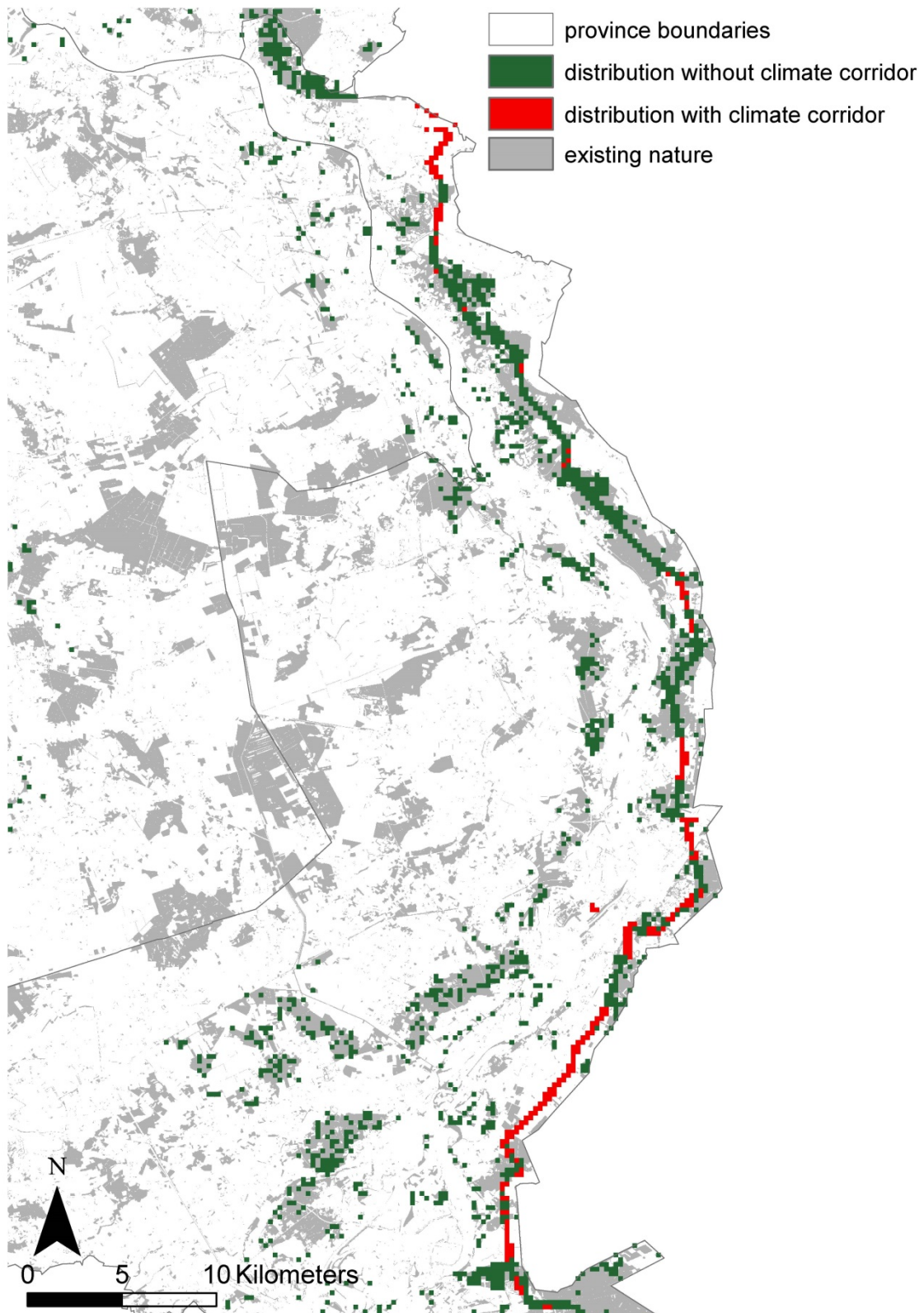
The rectangular gives the study area in the south of the Netherlands.



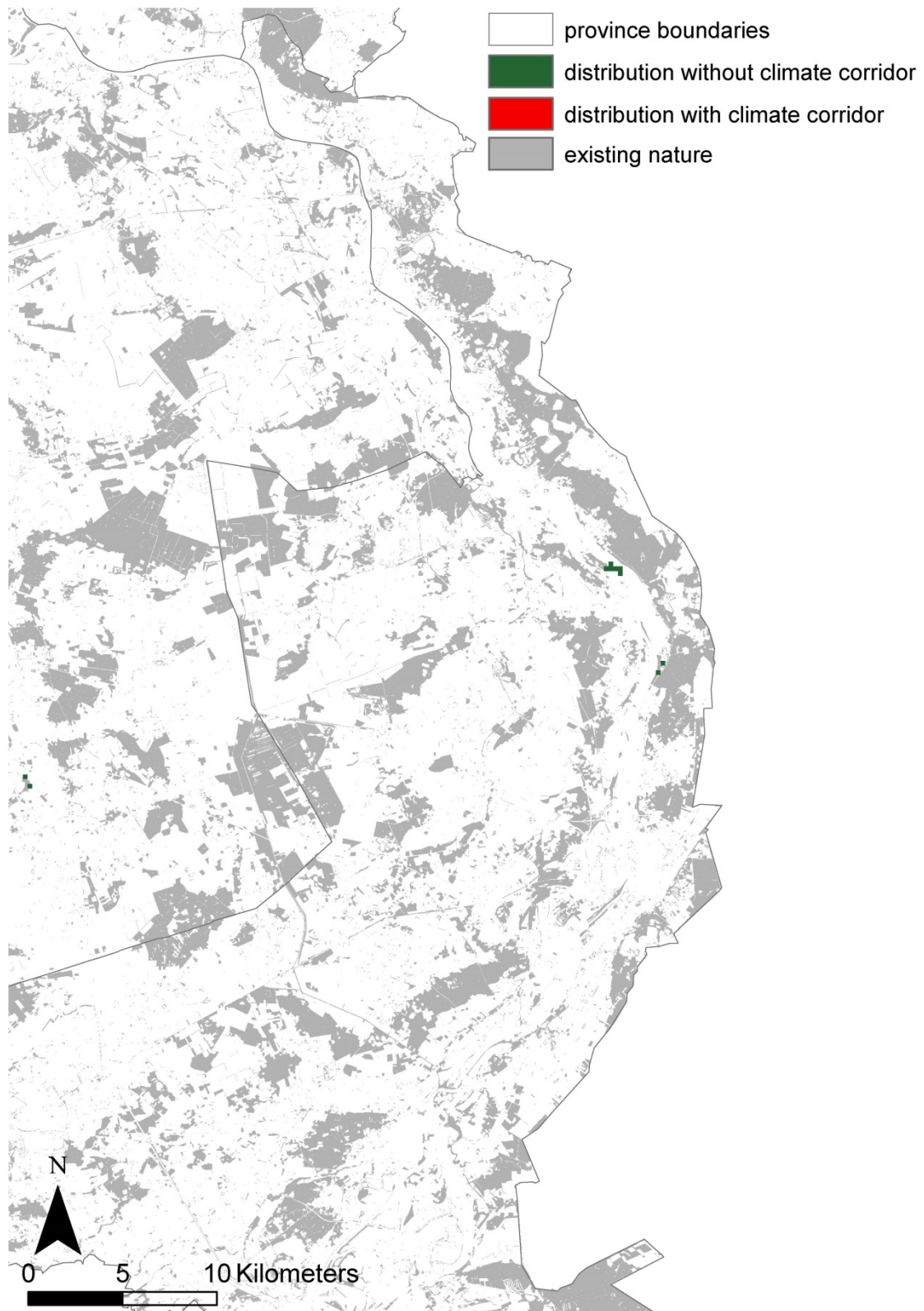
Dactylorhiza maculata (L.) Soó



Eriophorum angustifolium Honckeny



Maianthemum bifolium (L.) F.W. Schmidt



Primula veris L. Note that the climate corridor does not result in extra occupied cells for this species, thus the colour red is missing in the figure.