Description and definitions of treatments applied to subplots of the main experiment on the Jena Experiment field site

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The main experiment on the Jena Experiment field site is designed as a split-plot experiment. There are several subplots, within the large main plots, to which different treatments or combinations of treatments have been applied at different times. These treatments can be used as additional explanatory variables, in addition to the manipulated plant diversity, to explain the data measured in the plots. The different treatments are coded as individual parameters in the data files (only files of the main experiment as there were no additional treatments in other experiments). These parameters identify for each response variable explicitly under what treatment conditions the data has been collected. In the following, all treatments are characterized and explained. The standard treatment on the field site, that equals a control, is shown in bold. This treatment combination (mown twice a year and weeded for all species not sown into the plot, without any addition of fertilizer or other treatments) is applied to the so called "core area" of the main experiment plots and also to all other experiment on the field site of the Jena Experiment.

Treatment: mowing

	The field site of the Jena-Experiment is managed like many European hey meadows and mown twice a year. In some subplots mowing frequency has been manipulated (2006-2009) (Weigelt et al. 2009).
mown0	not mown
mown1	mown once a year in September
mown2	mown twice a year in June and September
mown4	mown four times a year in April, June, end of July, and September

Treatment: weeding

	The field site is weeded twice (since 2009 even three times) a year to maintain sown species composition. Some experiments allow for invasion of unsown species and are thus not weeded. This variable states the treatment in the year of the measurement (Roscher et al. 2009a, Roscher et al. 2009b, Roscher et al. 2009c, Roscher et al. 2013)
weeded0	Not weeded
weededALL	weeding of all species that do not belong to the sown species mixture in a specific plot (e.g. in a monoculture of Alopecurus pratensis all species were weeded that are not Alopecurus pratensis)
weededEXT	weeding of all species that do not belong to the 60 species pool of the Jena Experiment independent of the specific mixture of the plot, internal invaders were not weeded (internal = species is from our species pool; e.g. in a Alopecurus pratensis-monoculture Bellis perennis and Urtica dioica are growing – only Urtica is weeded out because it is not part of the pool of 60 plant species forming the Jena Experiment. Bellis is not weeded because it is part of the species pool.

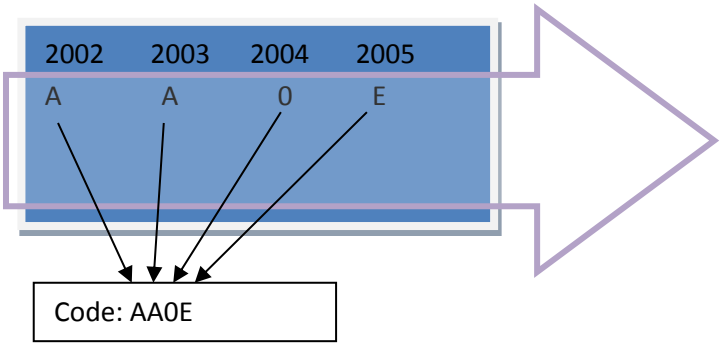
Treatment: weeding history

	As explained above, some experiments allowed for the invasion of new species into subplots. The parameter "treatment: weeding" only codes for the treatment in the current year in which the measurement was taken. Yet, also the history of weeding over the previous years can potentially affect results. Therefore the weeding history is documented by stating for every year since 2002 (the first year of the Jena Experiment) if the subplot has been weeded. This is coded with one symbol per year: A: all species not sown into the plot were weeded; E: all species not belonging to the 60 species pool were weeded; 0: the subplot was not weeded.
A symbol combination	In contrast to the other treatments the weeding history is not coded by a factor including all information but instead for every year that has passed since 2002 the way how this plot was weeded is coded (A=weededALL, E=weededEXT, and 0=weeded0)

Example for a weeding history

The measurements that should be described by the weeding history have been conducted in 2005. Therefore there are four year since the start of the experiment (including the first year 2002 and the year of the measurement 2005). Theoretically, weeding could have differed between all four years. For example:
In 2002 all not sown species have been weeded from the subplot –> A
In 2003 all not sown species have been weeded from the subplot –> A
In 2004 the subplot has not been weeded –> 0
In 2005 only species not part of the Jena Experiment species pool have been weeded from the subplot –> E

These four codes are joint into the code for the weeding history as visualized below.



To make the code easier to read symbols are separated with a „.“ every five years, e.g., AAAAA.A00

Treatment: seed addition

	In this treatment all species were resown in 2005 in small subplots to test for seed limitation as part of an invasion experiment (Roscher et al. 2009b).
seed0	No seed addition
Seed1	Sowing of a mixture of seeds of all 60 species of the Jena Experiment species pool into established plant communities.

Treatment: fertilizing

	The Jena Experiment field site is generally not fertilized except in a "management experiment" (2006-2009) (Weigelt et al. 2009)
fert0	not fertilized
fert100	fertilized with 100kg NO3/NH4-N, 43,6 kg P2O5-P, 83 kg K2O-K /ha/year (= NPK fertilizer given on 2 dates: early spring: 6.4.2006, 15.3.2007, 31.3.2008, 31.3.2009; and after first mowing: 26.6.2006, 27.6.2007, 23.6.2008, 16.6.2009)
fert200	fertilized with 200kg NO3/NH4-N; 87,2 kg P2O5-P; 166 kg K2O-K /ha/year (same dates as above)

Treatment: drought

	An experiment was conducted between 2008 and 2012 to test for the effects of drought on plant community (Vogel et al. 2012, Vogel et al. 2013)
roof0	no roofs added
roof1	roofs over the subplot in summer reducing water input (25.7.-2.9.2008, 18.7.-1.9.2009, 25.7.-3.9.2010, 11.7.-28.8.2011)
roofC	Special control for the effects of roofs without the effect of reducing water availability. In this treatment, roofs where put up over the subplot but the rainwater hitting the roof was collected and added manually underneath the roof after each rain event. (same roof period as above; since 2009)

Treatment: aboveground pesticide

	To test for the effects of aboveground invertebrates their numbers were reduced by spraying pesticide from 2003 to 2009 (Eisenhauer et al. 2009).
agspray0	no application of aboveground pesticide
agspray1	An aqueous solution (0.1%) of 'Perfekthion' (BASF, active substance: 40% dimethoate) was sprayed to reduce aboveground invertebrates in about monthly intervals at about 30ml m^{-2}.

Treatment: belowground pesticide

	To test for the effects of belowground invertebrates their numbers were reduced by applying a belowground pesticide from 2003 to 2009 (Eisenhauer et al. 2009).
bgspray0	no application of belowground pesticide
bgspray1	Subplots were sprayed monthly from April to November with an aqueous solution of the organothiophosphate insecticide chlorpyrifos (2% w/w; 40 g in 1 l water, 125 ml m^{-2}; Celaflor or Hortex, Dow AgroSciences LCC, USA). This insecticide reduced belowground invertebrates (principally Collembolans).

Treatment: molluskicide

	To test for the effects of mollusks their numbers were reduced by applying molluskicide from 2005 to 2009
molgrain0	no application of molluscicide
molgrain1	0.9 g m^{-2} of 'Schneckenkorn' (Spiess-Urania, active substance: 4% methaldehyde) were applied at monthly intervals between April and September to reduce mollusc densities.

Treatment: nematicide

	To test for the effects of nematodes their numbers were reduced by applying a nematicide from 2005 to 2009 (Eisenhauer et al. 2009).
nemgrain0	no application of nematicide
nemgrain1	the nematicide fosthiazate (Syngenta Agro GmbH, Maintal, Germany) was applied to nematode subplots (1×1 m) as granules three times a year using a sieve (3 g m^{-2} mixed with 97 g Jena soil)
nemgrainC	The control subplots received 100 g Jena soil per application to test effects of nutrient addition

Treatment: earthworm exclosure

	Earthworm densities are manipulated since Sep 2003 in two trenched (to 15cm bg and 20 cm ag) subplots of 1x1m (Eisenhauer et al. 2008a, Eisenhauer et al. 2008b).
ewex0	no manipulation of earthworm densities, no trenching
ewexC	Trenched subplot with ambient earthworm densities = without extraction (same subplots as earthworm addition, changed treatment in 2007)
ewex1	Earthworm reduction: Trenched subplot with reduced earthworm densities by electric extraction (two campaigns per year in spring and autumn). A combination of four octet devices (DEKA 4000, Deka Gerätebau, Marsberg, Germany) was used. In each subplot, earthworm extraction was performed for 35 minutes, increasing the voltage from 250 V (10 min) to 300 V (5 min), 400 V (5 min), 500 V (5 min), and 600 V (10 min).
ewex2	Earthworm addition: Trenched subplots received 25 adult individuals of *L. terrestris* (average fresh weight with gut content 4.10 ± 0.61 g) per year (15 individuals in spring and 10 in autumn; 2003 - 2006). The earthworm addition treatment was established since the earthworm density was low after establishment of the Jena Experiment which involved repeated disk cultivation to reduce weed density, a practice which is known to detrimentally affect earthworms

Treatment: phytometers

	The substitutive design of the Jena Experiment does not allow to follow individual species through the diversity gradient. As an approach to investigate species specific effects phytometers have been employed. I.e. individuals of a selected species have been planted into the existing communities of differing diversity. A range of different species have been planted over the years but are not differentiated in the coding of this treatment. The information of the respective species is given in the description of the measured variables. Several studies have been using a phytometer approach in the Jena Experiment (Scherber et al. 2006, Mwangi et al. 2007, Temperton et al. 2007)
phyto0	measurements not done on phytometers
phyto1	measurements have been conducted on phytometers (the species of the phytometer should be specified in the comments field)

Treatment: special

	In case other treatments have been applied than those coded individually above they are coded as treatment: special.
special0	no additional treatment applied
special1	any treatment that is not coded otherwise (what treatment was applied should be specified in the comments field)

Cited literature:

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