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Evolution of growth rates in Pooideae (Poaceae)

Evolusjon av vekstrater i Pooideae

(Poaceae)

Camilla Lorange Lindberg
Master of Science in Ecology

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Abstract

The temperate grasses in the subfamily Pooideae (Poaceae) has a limited distribution range The species are mainly distributed to the Northern Temperate regions and are known to be adapted to the strong seasonality this region possess. To be able to grow in such conditions, the plants have to edapt to the shift between the mild but short growing seasons and the harsh, long winters. In this study, I ask if the distribution of the subfamily is linked to the species growth rate traits. To be able to reproduce before winter returns in Northern temperate regions, it is an advantage to grow fast. The fundamental process of plant growth can be quantified using various growth rate traits, such as Relative Growth Rate (RGR), Standardised Growth Rate (SGR) and Allometric Slope. In order to analyse the evolutionary history of growth rates within Pooideae, a growth experiment were done. Here, traits related to growth were measured. Chloroplast sequences were retrieved from all the 64 populations of 55 species included in the experiment. The acquired datasets consisting of values of growth rate traits connected to chloroplast sequences were used in joint phylogenetic analyses with Ancestral State Reconstruction (ASR). Pooideae species in the Northern temperate lineages allocate more biomass to the shoots than to the roots. The results suggests that the most recent common ancestor (MRCA) of the monophyletic group core Pooideae made a switch in growth rate and Allometric Slope around 34 Ma, during a global cooling event.

Table of content

1. Introduction

1.1. The temperate grasses

The grass family *(Poaceae)* is one of the most important plant families in the world, both economically and ecologically. More than half of the calorie intake in the world comes from this family, and we find many grasses among the top ten important crop species (Hartley 1973). Ecologically, they are the key species in both tropical and temperate grasslands. Furthermore, they are distributed to all biomes and to all continents, even Antarctica (Gbif.org 2016). Poaceae is among the most species rich angiosperm families, comprising nearly 12.000 species were the vast majority of the species are organised in nine subfamilies. In literature, the most recent common ancestor (MRCA) of the Poaceae is thought of as tropical. Earlier studies implied the evolution of grasses to be recent. Dating of the crown group in Poaceae is associated with controversy (Marcussen *et al.* 2014). Eearlier studies implied the evolution of grasses to be recent, while evidence including phytolites from dinosaur coprolites (Prasad *et al.* 2005), and the earliest known grass fossil (Poinar *et al.* 2015), the age of Poaceae is now suggested to be around 100 Ma. The nine subfamilies fall into two major monophyletic clades; the BOP clade, consisting of the subfamilies Bambusoideae, Oryzoideae and Pooideae, and the PACMAD clade, consisting of the subfamilies Panicoideae, Arundinoideae, Chloridoideae, Micrairoideae, Aristidoideae, and Danthonioideae (Aliscioni *et al.* 2012; Soreng *et al*. 2015). Whereas the PACMAD remained adapted to warm and dry climatic conditions, the BOP clade consists of lineages adapted to both tropical and temperate regions (Bouchenak-Khelladi *et al.* 2010). Of the three BOP subfamilies, Pooideae is the only which successfully transitioned into northern temperate regions. Known as the temperate grasses, the Pooideae constitute as much as 90% of the grass flora in the northern temperate zone, whereas this subfamily takes up less than 20% of the grass flora in the tropics (Hartley 1973). Pooideae is a large lineage comprising roughly 4200 species in 15 tribes (Soreng *et al.* 2015). Most of the Pooideae species and tribes belong to the species-rich "core Pooideae" lineage (Soreng *et al.* 2015, Fig. 1). Core Pooideae encompass important cereals like wheat, barley, oats and rye as well as forage grass species like timothy, ryegrass and fescues.

Given the name "temperate grasses" it is easy to presume an even distribution of the Pooideae across the temperate region. However, this is not the case. Northern temperate regions contain mainly core Pooideae species (Hultén & Fries 1986). Only a limited number of species from three genera from the early diverging Pooideae lineages have managed to distribute to these high latitudes, i.e. *Melica nutans* and *Glyceria* in tribe Meliceae and *Nardus stricta* in tribe Nardeae. We also find representatives of other subfamilies, but they are few in number and only two of them are native, *Danthonia decumbens* and *Molinia caerula* (Lid *et al.* 2005).

The transition from tropical to temperate climates requires a coordinated set of physiological changes that are regulated by complex molecular networks, and this may explain the relatively limited number of plant lineages that successfully have made the transition (Donoghue 2008). Adaptations to the colder niches in the northern temperate regions have been demonstrated to involve evolution of stress tolerances (McKeown *et al.* 2016; Sandve *et al.* 2011) and changes in phenology such as adjustment of flowering time (Fjellheim *et al.* 2014). Adjusting growth to adapt to a short and intense growing season may be a crucial adaptation, but has been little explored.

1.2. Growth, how fast is fast enough?

The fundamental process of plant growth can be quantified using different growth rate traits, such as Relative Growth Rate (RGR), Standardised Growth Rate (SGR) and Allometric Slope (Fig. 2). RGR is the most used estimate of growth rate and has the advantage that it is versatile and can be used for a wide range of organisms (Paine *et al.* 2012). However, RGR is not constant, and decreases once the plant has reached a size where exponential growth is no longer possible (Hunt 1982). Furthermore, it has been pointed out that RGR is negatively correlated with seed size and it has been suggested to adjust for this using the standardised growth rate (SGR, Turnbull *et al.* 2012).

From intraspecific studies of the core Pooideae apecies *Dactylis glomerata* (Ryser & Aeschlimann 1999) and temperate butterflies (Gotthard 2004) growth rates in populations collected along latitudinal gradients are increasing and growth rate is thus interpreted to have evolutionary adaptive value. In a broader phylogenetic context, it is thus possible that high growth rate give an evolutionary advantage that could facilitate ecological diversification. I therefore hypothesize that the overrepresentation of core Pooideae species in higher latitudes with its cooler climate and strong seasonality could have been facilitated by the evolution of higher growth rates.

The allocation of resources is fundamental in the life history of an individual (Stearns 1992). Resources allocated to one organ is not available to other organs (Weiner 2004), establishing a trade-off in resorce allocation. However, if the ancestors in the early diverging lines in Pooideae possessed developmental constraints, patterns of altering allocation of biomass between the roots and the shoots in the Pooideae may possibly be the genetic basis targeted by evolution. The allometric coefficient can be modelled to describe the species strategy for allocation of biomass in root:shoot (Kerkhoff & Enquist 2009). The parameters of the allometric equation summarize the covariation of root and shoot biomass, and can be used between populations of individuals at the same age (Robinson *et al.* 2010). This scale dependent relationship can be modelled mathematically with the equation: $y = \alpha + \beta x$ (Huxley 1924; Huxley & Teissier 1936). A linear version of the allometric equation obtained by log-transformation: $\log(\text{root biomass}) = \log(\alpha) + \beta \log(\text{shoot biomass})$ where $\log(\alpha)$ is the intercept and β is the slope, also called the allometric coefficient (Stillwell *et al.* 2016). Elevated slope-value for a species describe more allocation of biomass to the shoot than to the root.

Phylogenetic methods allow researchers to infer relationships among species, typically from a set of DNA sequences. Bayesian approaches (Yang & Rannala 2012) have gained popularity owing to their versatility that allows qualitatively different datasets, such as DNA sequences, fossil data, and any discrete or continuous trait, to be analysed jointly in search for an optimal solution. ASR is a Bayesian inference technique that has increased in popularity, allowing ecologists to apply complex models and adding previous knowledge of the study organism (Ronquist 2004). Accounting for uncertainty in the trees and in the mapping of character states, the Bayesian approach seeks the set of phylogenetic trees that maximises the prior probability of the tree *given* the molecular data, the character states and the model of evolution. The Markov Chain Monte Carlo (MCMC) has been developed to answer evolutionary questions like character mapping of ancestral states, implementing a hill-climbing algorithm that takes into account the data and the priors to estimate prior probability (Huelsenbeck *et al.* 2001a; Ronquist 2004; Yang & Rannala 2012) to infer the character state evolution within the Pooideae.

Here I present analyses of the evolutionary history of growth rates within Pooideae. DNA sequences of three chloroplast regions and growth rates (RGR, SGR and Allometric Slope) were obtained from a growth experiment of 64 accessions of 55 species, for these traits, ancestral states were estimated on the chloroplast phylogeny. The three growth rates were each subject to Ancestral State Reconstruction (ASR) using a Bayesian phylogenetic approach (Huelsenbeck *et al.* 2001a; Ronquist 2004) where phylogeny, divergence times and ancestral states of the traits were inferred simultaneously.

1.3. Research question and hypotheses

In this study, I ask if adaptive evolution of growth rates may have contributed to a range shift from tropical to temperate regions in the grass subfamily Pooideae. Northern temperate regions are highly seasonal environments with long, cold winters and mild summers where fast growth would be an advantage to complete the life cycle within the short growth season. Specifically, I propose that the grasses in the subfamily Pooideae show differentiation in growth rates between the ancestors in the core Pooideae and the early diverging lineages and hypothesize that (1) core Pooideae lineages have evolved higher growth rate (2) core Pooideae lineages allocate relatively more biomass to shoots than to their roots. I expect this study to clarify the evolution of Pooideae grasses and provide data to understand a potential link between evolution of growth rate, changes in climatic preferences and the radiation of grass lineages into new niches.

2. Materials and methods

In order to analyse the evolutionary history of growth rates within Pooideae, a tree step approach were used. First the growth experiment, traits associated with growth were measured. Second, the three chloroplast regions were sequenced, and third the acquired datasets were subject to joint phylogenetic analyses with Ancestral State Reconstruction (ASR).

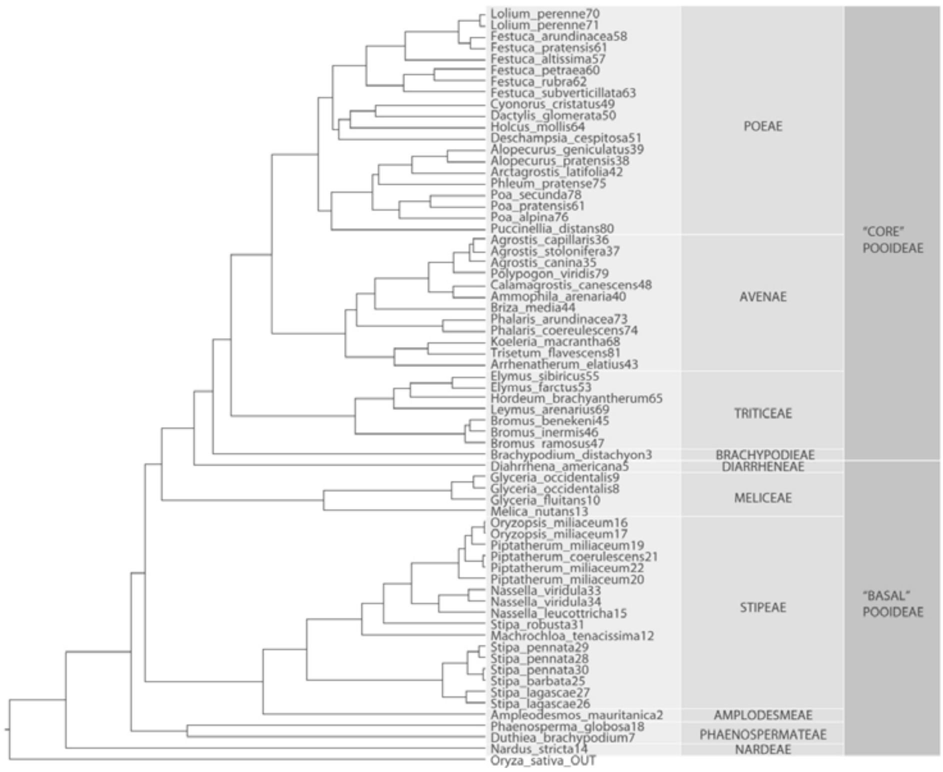

Figure 1. Phylogenetic relationships of the sampled species of subfamily Pooideae. The phylogeny is based on three chloroplastDNA regions. Subdivision into tribes is according to Soreng *et al.* (2015). The "core Pooideae" refer to the clade consisting of tribes Aveneae, Brachypodieae, Poeae, and Triticeae, and the "basal Pooideae" refer collectively to the stem lineages subtendig the "core Pooideae". Numbers following the species names refer to Table 1.

2.1. Taxon sampling

Eighty-one accessions of 71 species were selected so that all the 11 Pooideae tribes identified by Soreng *et al.* (2015) were represented. Seeds were obtained from B&T world seeds, GRIN, IPK Gatersleben, Kew Millennium seed bank and NordGen. Species, accession numbers and seed bank IDs are given in Table 1.

The Pooideae species represent diverse life history traits. Annual grasses have higher growth rates than perennials (Garnier 1992), and to avoid systematic errors by comparing annuals to perennials, only perennial species were selected for the study with one exception, the model species *Brachypodium distachyon*. The genus Brachypodium is a key lineage, sister to the core group. Two perennial species from this lineage were included in the experiment, but failed to germinate.

Table 1. Species included in growth experiment. Accession number and species names of species included in the growth experiment, supplying GeneBank and Seed ID.

Number	Species	SeedID	Source
1	*Achnatherum calamagrostis*	GRA2846	IPK
2	*Ampleodesmos mauritanica*	62975	B&T world seeds
3	*Brachypodium distachyon*	BD21	Research group
4	*Brachypodium pinnatum*	0036898	KEW
5	*Diarrhena americana*	405986	B&T world seeds
6	*Diarrhena americana*	405986	B&T world seeds
7	*Duthiea brachypodium*	23553	Grin
8	*Glyceria occidentalis*	Ames31334	USDA ISU
9	*Glyceria occidentalis*	GLO27	Research group
10	*Glyceria fluitans*	Sand,Hvaler,ØF	Collected in wild
11	*Glyceria striata*	Pl387926	USDA ISU
12	*Machrocloa tenacissima*	239234	Grin
13	*Melica nutans*	442519	Grin
14	*Nardus stricta*	4393	B&T world seeds
15	*Nasella leucotricha*	24255	Grin
16	*Oloptum miliaceum*	ORM8	Research group
17	*Oloptum miliaceum*	ORM26	Research group
18	*Phaenospema globosa*	448347	B&T world seeds
19	*Oloptum miliaceum*	GRA2711	IPK
20	*Oloptum miliaceum*	GRA2700	IPK
21	*Piptatherum coerulescens*	207500	Grin
22	*Oloptum miliaceum*	PIM1	Research group
23	*Schizachne purpurascens*	SCP9	Research group
24	*Schizachne purpurascens*	SCP27	Research group
25	*Stipa barbata*	SCP22	Research group
26	*Stipa lagascae*	225966	Grin
27	*Stipa lagascae*	252059	Grin
28	*Stipa pennata*	314113	Grin
29	*Stipa pennata*	314395	Grin
30	*Stipa pennata*	415828	Grin
31	*Stipa robusta*	234063	KEW
32	*Stipa spartea*	336071	KEW
33	*Nassella viridula*	83616	B&T world seeds
34	*Stipa viridula*	STV17	Research group
35	*Agrostis canina*	4356,3	NGB
36	*Agrostis capillaris*	4209,2	NGB
37	*Agrostis stolonifera*	854,2	NGB
38	*Alopecurus pratensis*	11543	NGB
39	*Alopercurus geniculatus*	0069825	KEW
40	*Ammophila arenaria*	0174581	KEW
41	*Anthoxanthum odoratum*	18257,1	NGB
42	*Arctagrostis latifolia*	0346647	KEW

Number	Species	SeedID	Source
43	*Arrhenatherum elatius*	0052010	KEW
44	*Briza media*	0127532	KEW
45	*Bromus benekeni*	8407	NGB
46	*Bromus inermis*	5420	NGB
47	*Bromus ramosus*	8433	NGB
48	*Calamagrostis canescens*	0135805	KEW
49	*Cynosurus cristatus*	1057,2	NGB
50	*Dactylis glomerata*	7602	NGB
51	*Deschampsia cespitosa*	15980	NGB
52	*Elymus caninus*	90635,1	NGB
53	*Elymus farctus*	0033495	KEW
54	*Elymus repens*	90282,2	NGB
55	*Elymus sibiricus*	90326,1	NGB
56	*Elymus trachycaulus*	90486,1	NGB
57	*Festuca altissima*	0012522	KEW
58	*Festuca arundinacea*	10851	NGB
59	*Festuca ovina*	2174,1	NGB
60	*Festuca petraea*	0008844	KEW
61	*Festuca pratensis*	4273,1	NGB
62	*Festuca rubra*	14264,2	NGB
63	*Festuca subverticillata*	0441841	KEW
64	*Holcus mollis*	6783,2	NGB
65	*Hordeum brachyantherum*	0203247	KEW
66	*Hordeum bulbosum*	14360,3	NGB
67	*Hordeum erectifolium*	6816,2	NGB
68	*Koeleria macrantha*	0201117	KEW
69	*Leymus arenarius*	9983	NGB
70	*Lolium perenne*	4341,2	NGB
71	*Lolium perenne*	33495	KEW
72	*Milium effusum*	0052021	KEW
73	*Phalaris arundinacea*	14017,2	NGB
74	*Phalaris coerulescens*	0024701	KEW
75	*Phleum pratense*	4239	NGB
76	*Poa alpina*	1197,2	NGB
77	*Poa pratensis*	18339,2	NGB
78	*Poa secunda*	0194929	KEW
79	*Polypogon viridis*	0058757	KEW
80	*Puccinellia distans*	0056982	KEW
81	*Trisetum flavescens*	0017181	KEW

2.2. Growth experiment

The growth experiment to estimate growth rates and allocation patterns was run as a common garden experiment in a glasshouse at Vollebekk, Ås, Norway (59°39'44.5"N 10°45'3.7"E) for 57 days between 6 March and 2 May 2015. Plants were established in pots and destructively harvested at 12 time points.

To break dormancy and synchronise germination, seeds were stratified, covered with plastic in humid soil for five days at 4 °C, followed by 24 hours at 25 °C, both treatments were done in the dark. The seeds were transferred to a glasshouse for germination (20°C, long day, 20 hours and germination date recorded for all seeds. The common garden experiment took place in a daylight glasshouse at Vollebekk, Ås, Norway (59°39'44.5"N 10°45'3.7"E) between 6 March and 2 May 2015, for 57 days under long day conditions (20 hours light, 4 hours dark). Extra light were added using metal halide lamps with MASTER HPI-T Plus light bulbs from Philips (400W/645 E40 1SL). After germination, seedlings were carefully washed and prickled out individually to 8 cm square pots containing sand as potting substrate ("Maskinsand", 0-8mm, Franzefoss bruk, Ås, Norway). Weekly, the plants were randomly rotated within and among tables to avoid table effects. The plants were (hand-)watered daily to maintain a non-limiting water supply.

After ten days, the growth had established and fertilised water was added for the remaining experiment. The fertiliser was a mix of 800gr/10L Kristalon with nitrogen, phosphorus, and potassium (NPK) in amount 9-11-30 and 600gr/10L Calcium nitrate (15.5-0-0 + 19% Ca), both produced by Yara, Norway. The electrical conductivity was 1.5 mS/cm.

As expected, the number of germinated seedlings were not identical among the populations. Populations exceeding 26 seedlings were harvested with two replicates. Populations with between 14 and 26 seedlings were harvested with one replicate. Populations with less than 14 seedlings were discarded from the growth experiment. Two specimens from each population were destructively harvested twice a week, and in total every population was harvested at 12 time points. See table over growth data in Appendix I. The roots were carefully and thoroughly washed by hand over a mesh (0.5 mm openings) in running water. The whole plant was put in a pergamin paper bag and dried in an oven (Termaks TS 8136. Serial no. 8-1523, Bergen, Norway), at 70 °C, for 48 hours. After drying, the samples were stored in desiccators. Prior to the experiment, dry weight of seeds was measured for the calculation of SGR for all 81 accessions. To avoid damage of seed, awns were removed only when they released easily. 30 seeds were collectively measured with three repeats. For populations having less than 90 seeds, seeds were randomly sampled with replacement. Seeds, shoots and roots were weighed separately in mg using a Mettler Toledo UMX2 scale (Greinfensee, Switzerland) with an accuracy of 0.1 µg.

2.3. Estimation of growth rate traits

The Relative growth rate (RGR), Size-standardised growth rate (SGR) and allometric relationship between biomass in roots and shoots (Allometric Slope, Binary Allometric Slope), were estimated for each population. These estimates were used in the following Ancestral State Reconstruction. All traits were modelled in R Studio (RStudio, 2015) using the packages *boBy* and *Rmisc*.

Traditional RGR was estimated as the slope of the linear regression of LN transformed total biomass against age (in days). Estimates of all traits given in results, Table 4. Equations used for modelling growth rate traits given in Fig. 2. To determine whether a size correction was required (Paine *et al.* 2012) the relationship between seed weight and RGR was investigated. A negative linear trend between LN (seed biomass) and RGR was found indicating a need to correct for initial size (Diagnostics plot and scatter plot are given in Appendix III). Therefore growth over time was modelled for every population using the exponential model ($y = \alpha e^{\beta x}$).The SGR was estimated as the slope (β) of the growth curve at the day the biomass reached the global median in the following steps: The coefficient in the growth curve ($y = \alpha e^{\beta x}$) was estimated, followed by derivation of the function. The global median biomass was estimated and the derivative in the point intercept with median biomass equals SGR. To investigate strategies for biomass allocation, the Allometric Slope describing the allocation to roots vs. shoots was estimated for each population. Biomass data were fitted to a standardised reduced major axis regression (RMA) to model a scaling relationship for the LN root biomass (X axis) and LN shoot biomass (Y axis). In this case, the RMA is used because it does not assume a causative relationship between root and shoot biomass (Stillwell *et al.* 2016). The binary Allometric Slope is a discrete trait based on the values from the Allometric Slope. In this trait, the score high is given for populations with Allometric Slope value above the mean (1.0323), and low for values below the mean and seed weights are given in Appendix IV.

Relative growth rate	Standardized growth rate	Allometric slope
$RGR = \frac{(\ln W_2 - \ln W_1)}{t_2 - t_1}$	$SGR = \frac{1 dM}{M dt} = \beta M_3^{(\alpha - 1)}$	$\log(\text{root biomass}) = \log(\alpha) + \beta \log(\text{shoot biomass})$

Figure 2. Equations used for modelling growth rate traits.

2.4. DNA isolation, amplification, and sequencing.

For DNA isolation 100 mg fresh leaf material was sampled from a single individual per population. Leaves were stored at -20°C until DNA extraction. The samples were flash-frozen in liquid nitrogen and ground in a TissueLyser II (QIAGEN, Hilden, Germany) for 1 min at 20 Hz, using two 3 mm tungsten carbide beads in each Eppendorf tube. DNA was extracted from the disrupted and homogenised plant material using the DNeasy Plant MiniKit (Qiagen, Valencia, California, USA), following the manufacturer's protocol. The quantity of extracted DNA was measured using a NanoDrop 8000 UV Spectrophotometer (Thermo Fisher Scientific, Waltham, Massachusetts, USA).

Three DNA plastid regions were sequenced (*matK*, *ndhF*, and *rbcL*), two forward and two reverse primers were designed for each region (Invitrogen life technologies). See Table 2 for details on primers. Each region was amplified from one individual per population using polymerase chain reaction (PCR). To determine the optimum annealing temperature, 12 annealing temperatures from 55-67 °C were tested in a gradient PCR. An annealing temperature of 58 °C was chosen for further PCRs. PCR was performed on a Tetrad 2 Thermal Cycler (Bio-Rad, Hercules, CA, USA) and a Mastercycler Gradient Thermal Cycler (Eppendorf, Hamburg, Germany) using JumpStart ™REDTaq ReadyMix (Sigma-Aldrich, St. Louis, MO, USA). The PCR products were purified using Montage SEQ plates from Millipore following the manufacturer's manual. The PCR products were sequenced using the TaqBigDye Terminator Cycle Sequencing kit (Perkin Elmer Applied Biosystems, Foster City, California, USA) and prosessed on a 310ABI DNA sequencer (Perkin Elmer Applied Biosystems, See Appendix II for further details on PCR and sequencing protocol. The sequences were assembled and edited in Sequencher v.4.10.1(GeneCode 1991-2007), and aligned with Clustal X followed by manual refinement in BioEdit (Hall 1999). The final alignments for the three chloroplast regions (*matK, ndhF* and *rbcL*) were 4004 bp long, respectively

Table 2. Primers used for PCR and sequencing.

Cp region	Primer no	Sequence	Protocol	
matK	Primer 1	TGTTCTGACCATATTGCACTATG	PCR	Sequencing
matK	Primer 2	CTATATAACTCTTATGTATCAGAA		Sequencing
matK	Primer 3	GAAGATGGAACATTTTGGGA		Sequencing
matK	Primer 4	GTGGATCACACAGTGAGCGT	PCR	Sequencing
ndhF	Primer 5	CCGATGCTATGGARGGACCC	PCR	Sequencing
ndhF	Primer 6	CCAATGGAGTGGGTCTTGCT	PCR	Sequencing
ndhF	Primer 7	CTGCCTTTTATATGTTTCGGAT		Sequencing
ndhF	Primer 8	TTCAATATCYTTATGGGGAAAAA		Sequencing
rbcL	Primer 9	ACCACAAACAGAAACTAAAGC	PCR	Sequencing
rbcL	Primer 10	GCCAGCTCTGACCGAAATCT	PCR	Sequencing
rbcL	Primer 11	GTCCTTTATTGGGATGTACTAT		Sequencing
rbcL	Primer 12	CGTAAACTCACAACCATTTATG		Sequencing

2.5. Phylogenetic analyses and molecular dating

Chloroplast phylogenies where generated from the sequence data (MrBayes, BEAST), and the phylogenetic signal for each of the traits was estimated by Pagel's Lambda (λ). This statistic is Finally, implementing Bayesian inference (BI), ancestral state reconstruction (ASR) visualised the ancestral states for the traits.

2.5.1. MrBayes phylogeny

Prior to analysis, the chloroplast regions were analysed separately in SplitsTree4 version 4.14.3 (Huson & Bryant 2006) this was done to find homoplasy and possible mislabelled sequences, which were also blasted, and finally omitted if found to be errors.

Reconstruction of the phylogeny for the tree concatinated chloroplast regions (*matK, ndhF* and *rbcL*) was done by Bayesian inference (BI) implemented in MrBayes v. 3.2.5 (Huelsenbeck 2001b). The sequence data were partitioned according to the three regions. Based on the AIC_c score (Appendix IV), each partition was analysed under the GTR + Γ substitution model, proposed by jModel in the R package Phangorn (RStudio 2015). The Γ distribution was approximated with four discrete rate categories. Two independent 20 million generation MCMC runs were performed with five chains. Sampling was done every 10,000 generations. To asses convergence and effective sample sizes (ESS > 200), the log files were checked in Tracer v 1.6.1 (Rambaut *et al.* 2014). The two tree files were combined, discarding the first 10% as burn-in, using LogCombiner v 1.7.4. The combined tree file was summarised into a maximum clade credibility tree using TreeAnnotator v.1.7.4. Both LogCombiner and TreeAnnotator are a part of the BEAST package (Drummond *et al.* 2012). The final phylogram were visualised and edited in Figtree v1.4.2. (bio.ed.ac.uk/software/figtree/).

2.5.2. Dating with BEAUti and BEAST

Whereas a phylogram plot the branch lengths proportional to the number of substitutions between speciation events, a chronogram plot the branch lengths proportional to evolutionary time. Allowing comparison of the phylogram from MrBayes, the dating analysis was set up in BEAUti, a software in the BEAST v. 1.7.4 package (Drummond *et al.* 2012). The beauty of BEAUti is the user-friendly interface, allowing complex models easily built and saved in an XML file for subsequent analysis in BEAST. First, dating were performed for each marker independently in BEAST v. 1.7.4. Second, the same program sas used for analysis of each trait (RGR, SGR, Allometric Slope and Binary Allometric Slope). In this analysis, the sequence data was partitioned by marker (*matK, ndhF* and *rbcL*). Among the partitions, the substitution models were unlinked, and the clock model was linked. *Oryza sativa* (subfamily Oryzoideae) served as outgroup and monophyly of Pooideae was enforced. All data partitions were analysed under the GTR + Γ substitution model. Divergence times were estimated with an uncorrelated, relaxed clock, using a lognormal prior distribution. The tree prior was set to Yule. A secondary calibration approach was used, following Marcussen *et al.* (2014), assigning a normal distributed prior N(44.4,3.53) to the most recent common ancestor (MRCA) of Brachypodium and Poa, i.e. the core Pooideae sensu Soreng *et al.* (2015). Two MCMC chains were run for 20 million generations, with trees sampled every 10,000 generations. The procedure of building the chronogram was equivalent to the procedure building the phylogram in MrBayes.

2.5.3. Pagel's lambda

Pagel's Lambda (λ) (Pagel 1999) were estimated for Allometric Slope, RGR and SGR on the MrBayes phylogram and on the BEAST chronogram. λ is a measure of phylogenetic correlation in comparative studies, indicating the extent to which the tip values of a trait correlates with the underlying tree according to a Brownian model of evolution. λ has a scale from 0 and 1, where 0 indicates no phylogenetic signal and 1 imply perfect phylogenetic signal. Considering the property of the phylogram, λ values might differ between the two phylogenies because they have different branch lengths. In this analysis, λ correlates with substitution rate in the phylogram, and with evolutionary time in the chronogram. The R package *Phytools* was used to estimate Pagel's lambda, implementing a variance-covariance matrix in the calculations.

2.5.4. Ancestral state reconstruction (ASR)

Ancestral state reconstruction (ASR) techniques are used for reconstructing the evolution of a trait on the species phylogeny. Ancestral states were reconstructed for one discrete (binary Allometric Slope), and three continuous traits (Allometric Slope, RGR and SGR). The XML file was prepared in BEAUti and run in BEAST with the same priors as in the previous analysis. In addition, the trait was imported as a new data partition and all partitions analysed under the same clock (linked clock). All continuous traits were assigned to a homogeneous Brownian evolution model. The Binary Allometric Slope was assigned an asymmetric substitution model. All ASR chronograms were produced following the same procedure as described above. In order to plot the distribution of all three continuous traits on the same phylogeny, a plot was generated in the R package *ape*.

3. Results

3.1. MrBayes phylogeny

Overall, the individual plastid markers generated phylogenies with high topological congruence allowing combining of the matrixes from tree regions (*matK, ndhF* and *rbcL)* as data partitions in the further analysis. The Bayesian phylogram (Fig. 3) recovered high support for all clades. The core Pooideae (posterior probability ≥ 0.98) is displayed as a monophyletic group. Within the "basal" Pooideae the lines in the early diverging tribes Nardeae and Phaenospermatae received strong support (pp = 1.0). Pronounced differences in branch length were observed in the "basal" lineages. Both *Nardus* and *Brachypodium* show long branches. For species belonging to the tribe Stipae monophyly (pp = 1.0) was recovered. The Stipeae comrised two subclades, Stipeae 1 (*Stipa lagascae- Stipa barbata*) and Stipeae 2 (including *Oloptum* and *Nassella* species), with considerabely longer branches in the latter, indicating higher substitution rates than in Stipeae 1. In the core Pooideae long branches were recovered deep in the tree all of them showing high support (pp = 1.0). Near the tips of the phylogeny, the clades show divergent rate heterogeneity, whereas Triticeae have short branches, both Aveneae and Pooeae display longer branches. Within Poeae, the differences in the number of substitution rates are distinct. Here, the phenogram demonstrates a lower substitution rate in the the narrow-leafed Loliinae (*Festuca subverticullata – F. petrea*). Long branching in the clade consisting of the broad-leafed festuces (*F. altissima - Lolium perenne*), receiving high support (pp = 1.0). The same pattern of distinct rates was found in Aveneae, where the clade consisting of the species *Arrhenatherum elatius, Trisetum flavescens* and *Koeleria machranta* show remarkably longer branches.

3.2. Dating with BEAUti and BEAST

Comparison between the combined cpDNA cladogram in the dating analysis (Fig. 4) and the phylogram derived with MrBayes (Fig. 3) showed high levels of similarity. The crown age of the Pooideae was estimated at 65.62 Ma with a broad 95% highest credibility interval (CI 102-63 Ma, see Appendix VI). Parallel divergence within the major clades is dated to Early Miocene (Ca. 23 Ma) suggeting an extensive radiation in this period. In general, credibility intervals increased towards the base of the tree.

3.3. Pagel's lambda (λ)

Overall, the statistic Pagel's Lambda score high, with very low p-values ($p < 0.0001$) indicating that the λ is significantly different from zero. For Pagel's Lambda details, see Table 3. The phylogram > chronogram for in all tests. In both the phylogram and the chronogram, the Allometric Slope character received the value closest to 1. This suggests that under Brownian motion, the tip values correspond well to the underlying phylogeny.

Table 3. Results Pagel's Lambda (λ).

Continuous trait	MrBayes phylogram	
	Lambda	P-value
Allometric Slope	0.803912	0.000151437
RGR	0.638305	0.000174967
SGR	0.497998	0.000141852
	BEAST chronogram	
Allometric Slope	0.7813892	0.000113171
RGR	0.6124501	0.000161453
SGR	0.4910519	0.000144730

3.4. Ancestral state reconstruction (ASR)

Figures 5-8 show Bayesian ASR results from the four traits. In general, due to additional informative data in form of trait values, the uncertainty is lower on the ASR chronograms than on the dating analysis chronogram.

Both the chronogram constructed for trait Allometric Slope (Fig. 7) and for binary Allometric Slope (Fig. 8) suggests that the ancestor of the core Pooideae had a lower Allometric Slope. ASR results for Allometric Slope (Fig.7) indicate that the habit of elevated Allometric Slope seems to have evolved in the period Early to Middle Eocene, 51-34 Ma, after the divergence of Stipeae. Meliceae species are included in the monophyletic group with high Allometric Slope, showing the same pattern of growth as the core Pooideae. As expected, the broad-leafed Loliinae commercially grown as fodder grasses all show high values of this trait, both. In the early diverging lineages, the Allometric Slope values are estimated to be lower than in the core Pooideae. Present Allometric Slope values show all the deeper nodes with high branch support.) However, the two Stipeae clades show different states. In Stipeae 1, all species show an Allometric Slope among the lowest in the phylogeny. More diversity is found in Stipeae 2, showing both high and low Allometric Slope.

The modelled trait Binary Allometric Slope (Fig. 8) manage to puzzle out the shift from low to high Allometric Slope. the ASR chronogram display high estimated slope values after the divergence of *Diarrhena americana*, leading into the core Pooideae The shift happened before the *Brachypodium* split, 47.06 Ma (pp= 0.99). The cladogram visualise high Binary Allometric Slope among the core Pooideae. There are some exceptions due to the nature of modelling a binary trait from continuous data, however all the low Binary Allometric Slope occurred at the tip of the lineages. Interestingly, the cladogram visualise a slowdown in the fescue clade (pp= 0.99). However, the broad leafed festuces show a high Binary Allometric Slope. Again, the early diverging lines show low Allometric Slope. The genus *Glyceria* (Meliceae) show high rates (pp= 0.99) as well as Stipeae 2 (pp= 0.99), but this shift has happened independent of the core group. The species *Phaenosperma globosa* is a puzzle. BEAST have estimated trait values for this species, since the population got discarded from the growth experiment due to few germinated seedlings.

The ASR chronogram for the trait Relative Growth rate (RGR, Fig. 5) show somewhat similar results as the Allometric Slope. Here, the shift from low to elevated RGR is indicated to have happened in the same period as the former trait, in the Early to Mid Eocene (52 - 40 Ma) with pp values for the included nodes ≥ 0.91. The tendency for high RGR is present in the core group, showing both Aveneae and Poeae with elevated RGR. However, the Triticeae present low RGR.

All early diverging lineages display low RGR, with the genus Oloptum (Stipeae 2) as acceptance (pp=1). A rough picture is printed in Fig. 6, presenting the ASR chronogram for the trait Standardised Growth rate (SGR). Here, it is difficult to detect a pattern, but still the phylogeny is well supported (pp $\geq$ 0.91) This trait is dependent on the seed size. The measured seed weights did not show any resemblance within or among tribes or large clades. For visualisation of the tree continuous traits onto the same phylogenetic three, see Fig. 9.

Table 4. Modelled values of the traits Allometric Slope, RGR and SGR. Valuesfor all 64 populations included in the experiment. *Diarrhena americana* was not included in the growth experiment due to failed germination.

Species with population number	AllomSlope	RGR	SGR
Agrostis_canina35	0.96	0.19	14.28
Agrostis_capillaris36	1.05	0.17	12.78
Agrostis_stolonifera37	1.03	0.17	15.05
Alopecurus_geniculatus39	1.09	0.16	12.42
Alopecurus_pratensis38	1.12	0.14	10.80
Ammophila_arenaria40	0.94	0.11	12.52
Ampelodesmos_mauritanicus2	0.80	0.10	9.28
Arctagrostis_latifolia42	0.98	0.14	14.64
Arrhenatherum_elatius43	1.18	0.11	12.06
Brachypodium_distachyon3	1.16	0.12	15.63
Briza_media44	1.03	0.12	10.31
Bromus_benekeni45	1.03	0.12	10.39
Bromus_inermis46	0.95	0.13	9.23
Bromus_ramosus47	1.09	0.13	10.93
Calamagrostis_canescens48	0.96	0.14	8.29
Cynosurus_cristatus49	1.02	0.14	8.32
Dactylis_glomerata50	1.12	0.14	7.57
Deschampsia_cespitosa51	1.14	0.13	10.05
Diarrhena_americana5	N/A	N/A	N/A
Duthiea_brachypodium7	0.85	0.07	6.40
Elymus_farctus53	0.96	0.07	6.55
Elymus_sibiricus55	1.20	0.13	9.24
Festuca_altissima57	1.01	0.10	14.34
Festuca_arundinacea58	1.01	0.13	11.31
Festuca_petraea60	0.62	0.12	10.53
Festuca_pratensis61	1.05	0.14	10.94
Festuca_rubra62	1.08	0.13	21.11
Festuca_subverticillata63	0.95	0.11	12.62
Glyceria_fluitans10	1.09	0.15	9.74
Glyceria_occidentalis8	1.23	0.14	10.29
Glyceria_occidentalis9	1.28	0.15	10.02
Holcus_mollis64	1.12	0.19	10.67
Hordeum_brachyantherum65	0.93	0.10	10.85
Koeleria_macrantha68	0.78	0.09	12.71
Leymus_arenarius69	1.08	0.13	9.05
Lolium_perenne70	1.04	0.14	12.92
Lolium_perenne71	1.11	0.13	7.24
Stipa_tenacissima12	1.06	0.13	11.46
Melica_nutans13	0.99	0.13	18.15
Nardus_stricta14	0.97	0.09	0.63
Nassella_leucotricha15	0.85	0.12	22.48

Species with population number	AllomSlope	RGR	SGR
Oloptum_miliaceum16	0.88	0.18	9.49
Oloptum_miliaceum17	0.87	0.18	9.49
Phaenosperma_globosa18	1.02	0.13	13.26
Phalaris_arundinacea73	1.07	0.17	9.64
Phalaris_coereulescens74	1.34	0.16	8.52
Phleum_pratense75	1.26	0.16	10.39
Oloptum_miliaceum19	1.00	0.11	13.23
Oloptum_miliaceum20	0.88	0.17	11.70
Oloptum_miliaceum22	0.92	0.19	16.68
Oloptum_miliaceum21	0.93	0.18	14.96
Poa_alpina76	1.20	0.16	10.91
Poa_pratensis61	1.10	0.15	10.94
Poa_secunda78	0.99	0.09	14.58
Polypogon_viridis79	1.06	0.16	12.72
Puccinellia_distans80	1.22	0.14	8.80
Stipa_barbata25	0.83	0.11	8.70
Stipa_lagascae26	0.80	0.08	8.35
Stipa_lagascae27	0.83	0.08	12.74
Stipa_pennata28	0.93	0.07	19.53
Stipa_pennata29	0.84	0.09	9.97
Stipa_pennata30	0.88	0.09	7.56
Stipa_robusta31	1.06	0.07	7.56
Nassella_viridula33	1.02	0.1	16.97
Nassella_viridula34	0.96	0.11	11.55
Trisetum_flavescens81	1.03	0.13	6.14

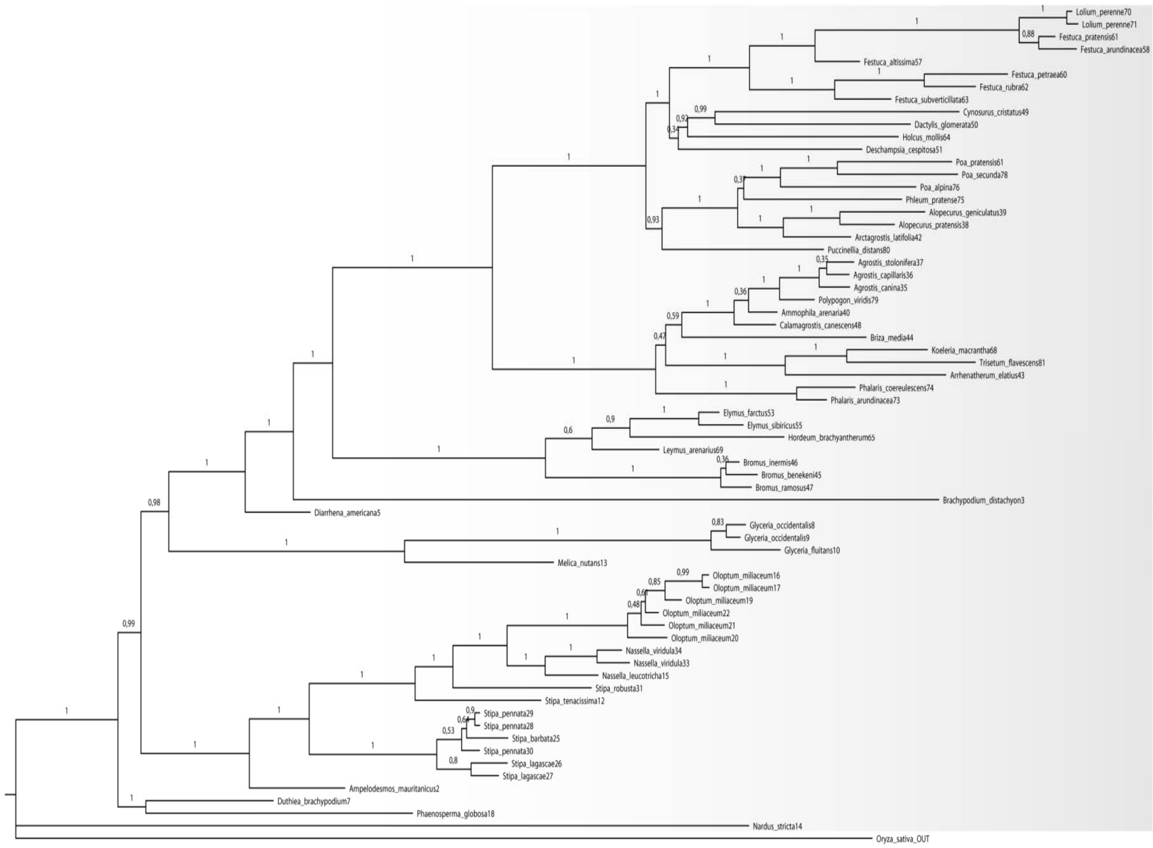

Figure 3. Bayesian phylogram for 75 Pooideae species constructed from chloroplast DNA (*matK, ndhF* and *rbcL*) in MrBayes. The phylogram infer the differences among the subfamily expressed as evolutionary distance. Posterior probabilities are indicated above branches. *Oryza sativa* is used as outgroup. Numbers following the species names refer to Table 1.

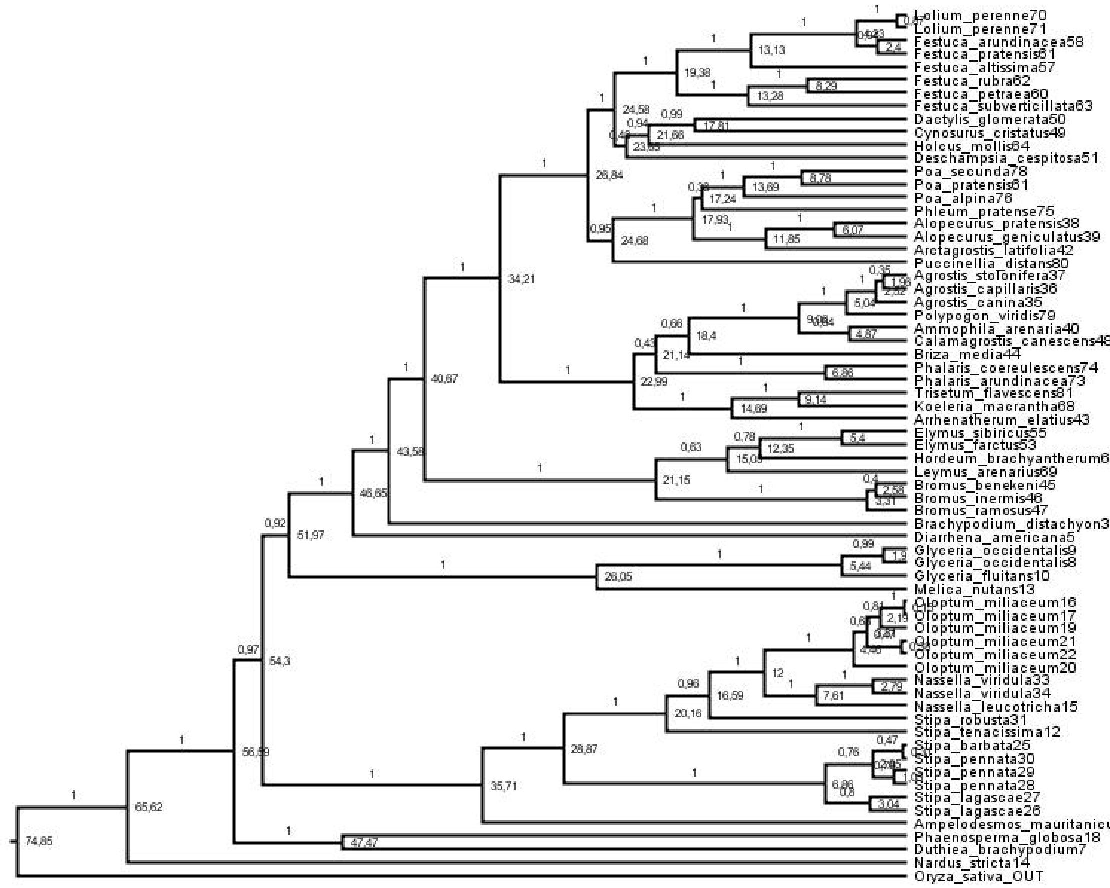

Figure 4. Dated Bayesian chronogram of the subfamily Pooideae, inferred from tree chloroplast regions (*matK, ndhF* and *rbcL*) generated in BEAST. Node ages are indicated on nodes and posterior probability (pp) above branches. *Oryza sativa* is used as outgroup and time is Ma. Numbers following the species names refer to Table 1.

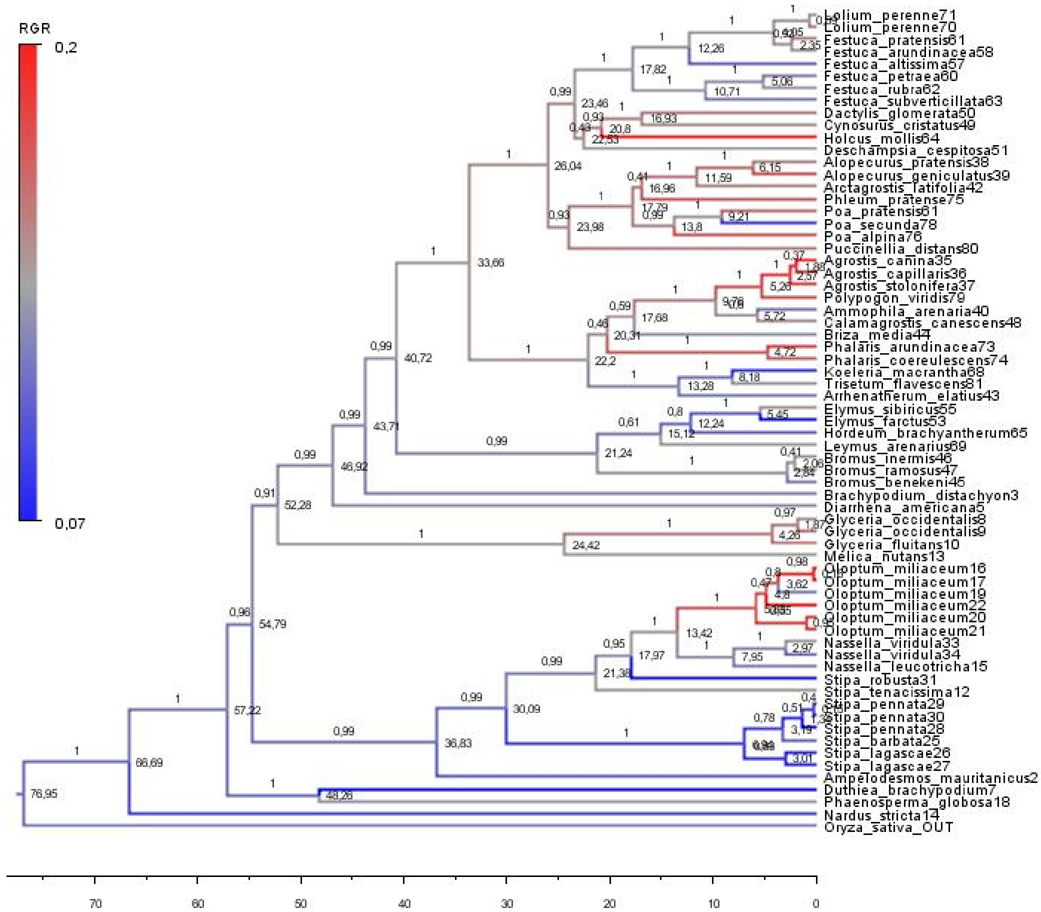

Figure 5. Ancestral state reconstruction (ASR) for the trait relative growth rate (RGR). The colour on the branches is scaled for RGR values, reaching from blue (low values) to red (high values). Posterior probability (pp) is given on the branches, and the age (Ma) is given on the nodes. Numbers following the species names refer to Table 1.

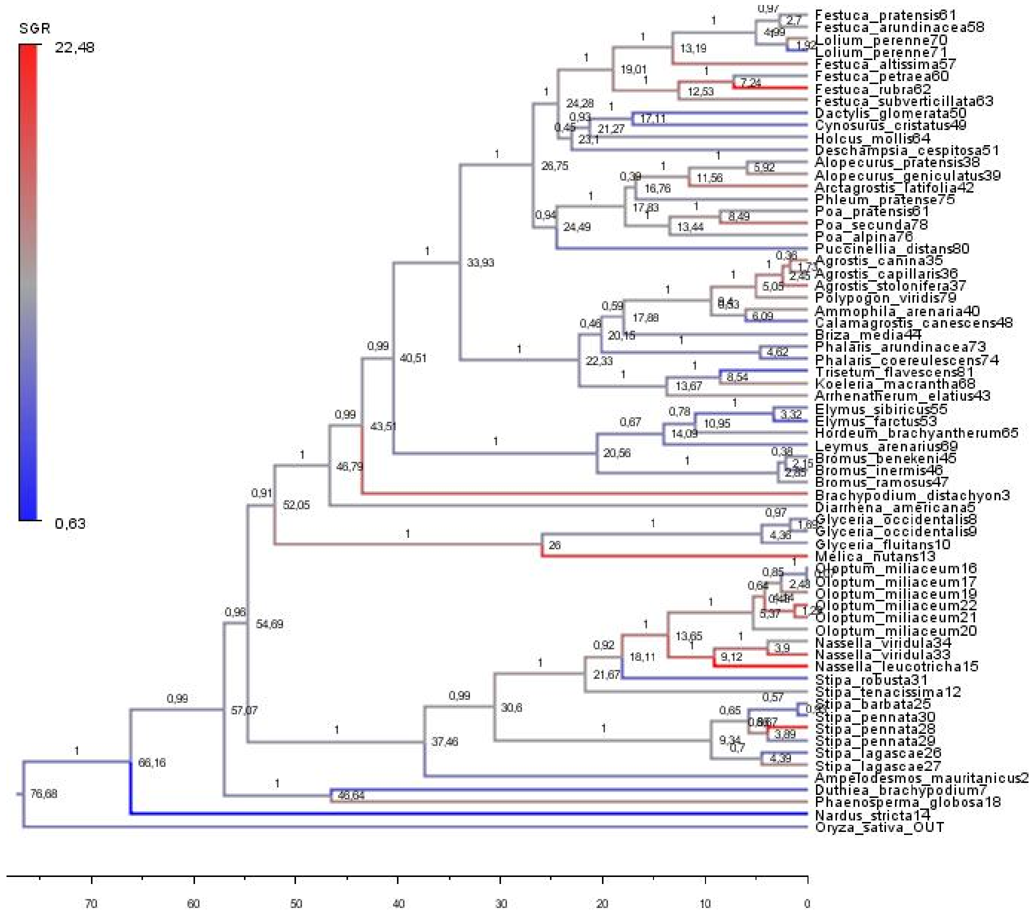

Figure 6. Ancestral state reconstruction (ASR) for the trait standardized growth rate (SGR). The colour on the branches is scaled for SGR values, reaching from blue (low values) to red (high values). Posterior probability (pp) is given on the branches, and the age (Ma) is given on the nodes. Numbers following the species names refer to Table 1.

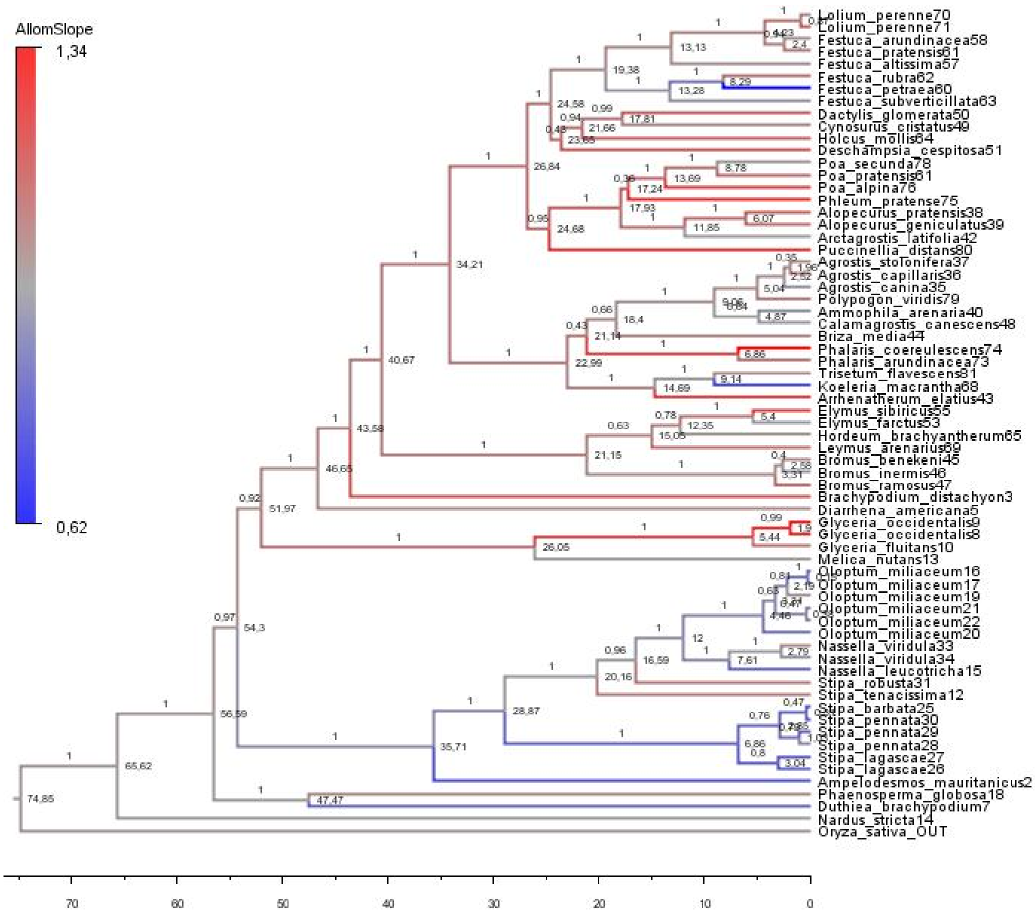

Figure 7. Ancestral state reconstruction (ASR) for the trait Allometric Slope. The colour on the branches is scaled for Allometric Slope values, reaching from blue (low values) to red (high values). Posterior probability (pp) is given on the branches, and the age (Ma) is given on the nodes. Numbers following the species names refer to Table 1.

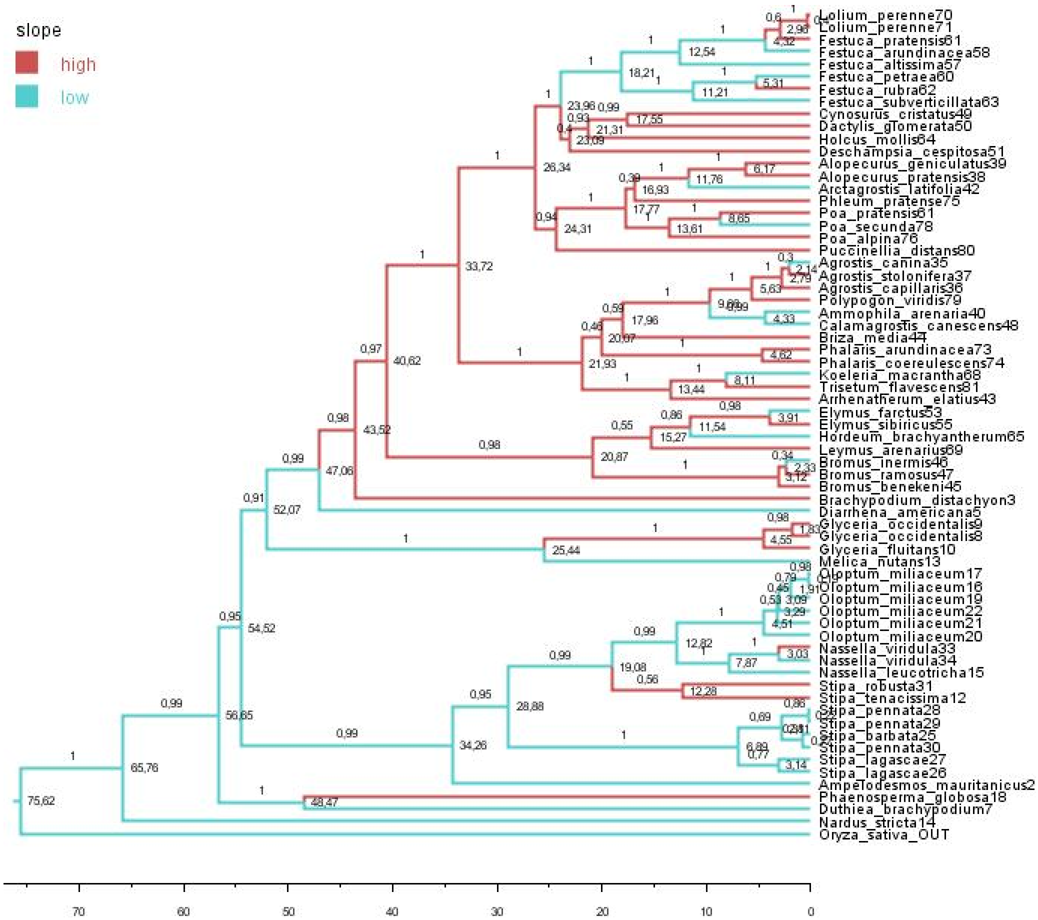

Figure 8. Ancestral state reconstruction (ASR) of the trait Binary Allometric Slope. The colour on the branches is binary for slope values where blue indicate low values and red high values. Posterior probability (pp) is given on the branches, and the age (Ma) is given on the nodes. Numbers following the species names refer to Table 1.

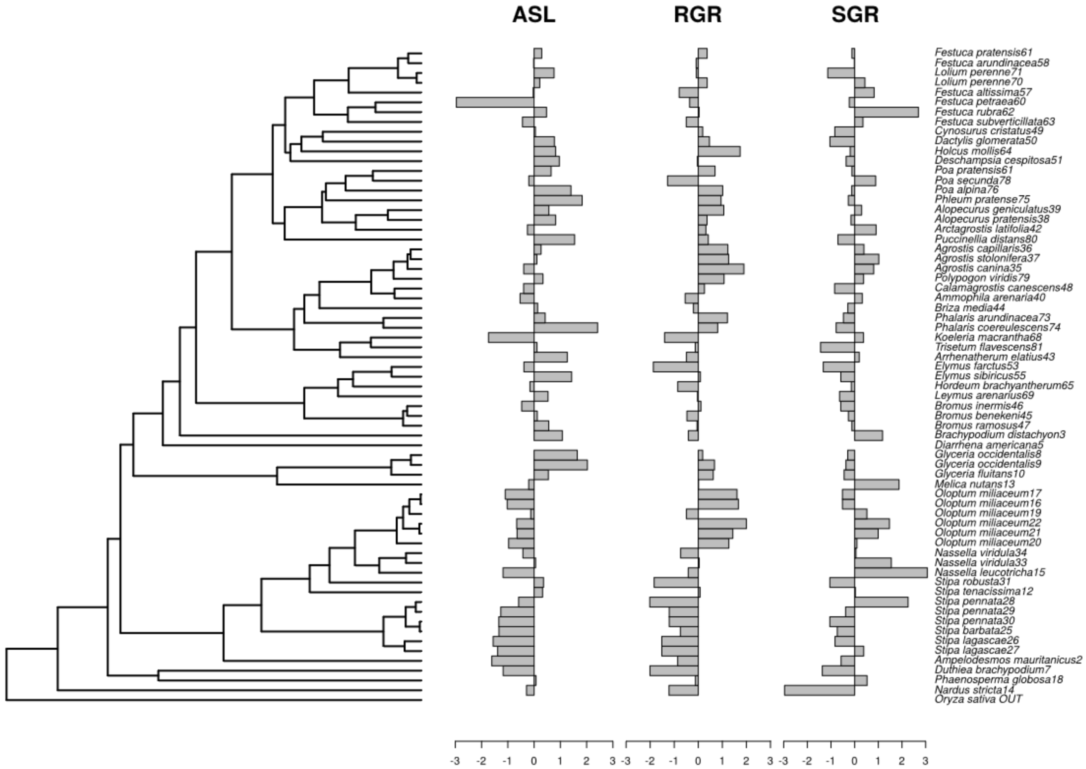

Figure 9. Barplot of three traits Allometric Slope, relative growth rate, and standardized growth rate plotted on the same chronogram. Trait values are normalized by subtracting the mean values from each species and dividing the sum by the standard deviation. Numbers following the species names refer to Table 1.

4. Discussion

4.1. Evolution of growth rate traits is suggested to have coincided by niche shift.

The growth rates differ in a phylogenetically structured manner across the Pooideae subfamily. This is evident by the posterior probability values in the ancestral state reconstruction chronograms (Fig.5-8), and by values significantly different from zero of the statistic Pagel's Lambda (λ). The northern temperate region is characterised by strong seasonality with cold winters, mild summers and a short growing season. In the most northern temperate regions the core Pooideae species dominate the grass flora (Lid *et al.* 2005). In evolutionary time, core Pooideae species have shifted from the Mediterranean forests, woodlands, and scrub biome into the Northern temperate climate. My results suggest that low growth rate in the early diverging Pooideae lineages is an adaptation a Mediterranean climate characterised by dry summers and rainy winters. Further, the results indicate that a high growth rate may be advantageous in the Northern temperate environment to fulfil the life cycle and set seeds in the short growing seasons. Hence, it is tempting to speculate that the distribution of species in the Pooideae is directly linked to the species growth rate traits, the traits acts acting as a driver for the distribution of lineages integrating climate, physiology and phylogeny. There are a few occurrences of elevated growth rates among the early diverging lineages, but they are isolated (Fig. 5-6). Between the two growth rate traits RGR and SGR, RGR has the stronger phylogenetic signal in my data (Table 3; $\lambda = 0.63$ and $p << 0.001$ in the phylogram; $\lambda = 0.61$, $p << 0.001$ in the chronogram). In literature, the correlation between RGR and seed mass is reported to be negative on species level. (Marañón & Grubb 1993; Paine *et al.* 2012; Turnbull *et al.* 2012). To correct for this, SGR has been suggested as a better measure (Turnbull *et al.* 2012). In my results λ (RGR) > λ (SGR). This is surprising because SGR is considered a better measure because it corrects for seed size while RGR does not. However SGR is mainly used within species (Turnbull *et al.* 2012), and may be inadequate for phylogenetically old and diverse lineages This may be an explanation of the weaker phylogenetic signal for SGR (Table 3). Nevertheless, even though SGR has weaker results in the ASR analysis, a phylogenetic signal for SGR is present and supports the evolution of higher growth rates at the base of the core Pooideae ($\lambda = 0.49$, $p << 0.001$ and $\lambda = 0.50$, $p << 0.001$ in the Mr Bayes phylogram and ASR chronogram, respectively).

4.2. If high growth rates are advantageous, why have they not evolved also in Mediterranean lineages?

The dating analysis (Fig. 4) implies that the core Pooideae tribes originated during a period of global cooling which climaxed ca. 34 Mya on the transition from Eocene to Oligocene (E-O, Zachos *et al.* 2001). Recent studies however, suggest a split around 39 Mya (Marcussen *et al.* unpublished), but my dating is affected by the fact that I only used one age prior, by sampling bias and by the high rate heterogeneity among Pooideae lineages (cf. Fig. 3). The E-O transition coincides with the onset of radiation for most temperate angiosperms lineages (Kerkhoff *et al.* 2014). The results from the ancestral state reconstruction of growth rates (Fig. 5, 6) indicate that the MRCA of the core Pooideae possessed the ability of faster growth compared to the other Pooideae lineages. It has been demonstrated that intraspecific intrinsic growth rates increase in populations sampled along a latitudinal gradient (Gotthard 2004). This supports that higher growth rate gives the core Pooideae species an advantage while expanding into higher latitudes and exposure to cooler climates and stronger seasonality. Following the E-O transition the Pooideae shifted into the most Northern temperate regions accompanied by species diversification. Thus, pre-dating the E-O transition, the higher growth rate of the core Pooideae ancestor might have contributed to facilitating this range shift.

The results for the trait Allometric Slope (Fig. 7) are even more noticeable than the traditional growth rates and show that a shift in allocation of biomass evolved along the branch subtending the core Pooideae (λ = 0.8 and λ = 0.78 in the phylogram and the dated chronogram, respectively). The higher trait values in the core Pooideae show that they allocate relatively more biomass to above-ground shoots than to roots, whereas species in the early diverging lineages generally allocate more biomass to the root than to the shoot. Thus, Pooideae species show a refined ability to adjust their allocation of biomass between roots and shoots according to prevailing conditions of climate and habitat. Allometry is an evolved strategy of biomass partitioning among organs in response to environmental variables. Over evolutionary time, the grass species have adopted a trade-off in investment in root or shoot biomass that adapts them to a particular climatic niche, from warmer, dryer habitats in the ancestors for the early diverging Pooideae lineages, to cool, temperate regions with strong seasonality for the ancestors of core Pooideae. It can be argued that grass species from basal lineages specialising in the warm, dry climate need larger root system relative to their shoot mass for two reasons. First, to cope with drought stress, it is an advantage to have a root system to ensure sufficient water uptake in the dry summer months. Second, a lesser surface on leaves will reduce evaporation when water availability is scarce. The cold adapted species in the core Pooideae need to invest in large shoot systems to obtain their possibilities to complete their life cycles before winter sets. Also, the continuous access of water during the growing season in the Northern temperate regions depress the need for roots to be massive and long reaching, and the evaporation from the leaves is a minor problem in this cool climate.

There are some deviation from the trend of higher Allometric Slope in the core Pooideae. In the tribe Pooeae, the narrow-leaved fescues (Alekseev 1975) distributed to dryer habitats show lower Allometric Slope than the broad-leaved ones. Narrow-leaved fescues include the species *Festuca rubra - Festuca subverticillata*. The fact that the broad leaved festuces possess a high Allometric Slope is not surprising, as this clade include species used as forage grasses. In particular, the two most extreme exceptions from the high Allometric Slope values in core Pooideae are found in *Festuca petraea* and *Koeleria macrantha.* Beeing endemic to the Azores. *F. petraea* appears in rocky habitats strongly exposed to the sea. *K. macrantha* is distributed in sandy, dry habitats (Gbif.org 2016). There are also exceptions in two clades in the basal lineages. In Stipeae 2, *Stipa robusta* and *Stipa tenacissima* display somewhat higher values. Second, in the tribe Meliceae, the *Glyceria* species *G. fluitans* and *G. occidentalis* are adapted to the Boreal and Northern temperate regions.

4.3. Life history strategies in Pooideae species

The question of which life history strategies most likely will prosper in different kinds of environments has been the focus of attention for a long time. Relative adaptation to disturbance, competition or stress can be seen as defining the first three axes of a multidimensional ordination of the ecology of species (Grime 1973; MacArthur 1972). In the case of Pooideae, the competitor axis and the ruderal axis would be the most important in the core Pooideae, displaying traits like high RGR, early onset of flowering and heavy allocation to aboveground biomass. The stress axis would be more significant for description of the original Pooideae ancestor, as well as the extant early diverging Pooideae species, with their slower growth and late onset of reproduction (S. Fjellheim & T. Marcussen, pers. comm.).

In long-lived, polycarpic perennials, investment in reproduction is typically not attempted until the requirements of survival (growth, storage and defence) have been met (Obeso 2002). For annual plants growing in relatively predictable seasonal environments, the optimal strategy is to put all effort into growth, and then switch and put all subsequent effort into reproduction (King & Roughgarden 1982; Paltridge & Denholm 1974). This is the so-called "bang-bang" model of reproductive investment. In terms of fitness, the core Pooideae species appear to have two great advantages; (i) they reproduce early, so they have the potential for very high intrinsic rates of increase; and (ii) they can survive adverse conditions as dormant seeds in the soil. The same characteristic can be used on annual plants. Intriguingly, with a few exceptions in Stipeae 2, we find annual species only in the core Pooideae, and this coincides with the shift in allocation of energy from the roots to the shoots. An interesting area for further research will be to establish if the change in the allocation of biomass is an enabling trait that facilitates the repeated transition to the annual habit.

4.4. Limitations to the study

The growth experiment was based on a temperature of 20°C and 20 hour daylight. The species used in the experiment cover large geographic diversity, hence there is large variation in natural growing conditions. I don’t claim to cover the natural growing conditions for all species and I chose conditions that I believed fit most of them. The conditions chosen would be equivalent to summer for most species, and the results were interpreted in light of this. However, choosing other conditions may have given other results. For instance has it been shown that high latitude populations of *Lolium perenne* and *Dactylis glomerata* grow faster than Mediterranean populations at 20°C (Thomas & Stoddart 1995). Contrasting this, high elevation species usually have slower growth than low elevation species (Atkin *et al.* 1996; Körner & Woodward 1987). It is difficult to predict how other growth conditions would have impacted the growth traits, but the strong phylogenetic signal in the different growth traits indicate profoundly differences in growth strategies. Also, the growth experiment was based on seedlings growing exponentially. The result might be different with adult plants. To have an impression of the intraspecific variation I included several populations for some of the species (*Oloptum miliaceum, Glyceria occidentalis, Stipa pennata, Stipa lagascae,* and *Lolium perenne*) and the measurements were consistent within species. During the growth experiment, on the 26. March 2015, we experienced a heavy snowfall. The snow packed on the roof of the glasshouse, and both the temperature and the amount of light in the glasshouse dropped. This resulted in a halt in the growth curves for all populations, and these datapoints were excluded from calculation of the growth rate traits. Furthermore, the seedlings were attacked by aphids. To avoid a drop in the growth curve, chemicals were not applied. Instead, pine-sol were applied daily and parasitoid wasps were released in the glass house. This treatment was successful. The effect of missing species in the experiment cannot be under estimated. Soreng 2015 describe 15 tribes in Pooideae. All tribes were included at the starting point, but failed germination in several species resulted in 10 tribes included in the experiment. Finally, the phylogenetic analyses are based on chloroplast phylogenies instead of species phylogenies, hence the true species relationship may not have been revealed. However, recent studies show congruent topologies between phylogenies from nuclear low copy genes and chloroplast regions (Christin & Osborne 2014).

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Appendix

Appendix I. Measured biomass for shoots and roots. Measured biomass for populations included in the growth experiment, data from 12 time points of harvest.

Number	Species	Germ date	Day	Rep	Biom shoot(g)	Biom root(g)
1	*Achnatherum calamagrostis*	02.03.2015	11	1	0,0012	0,0001
1	*Achnatherum calamagrostis*	02.03.2015	11	2	0,0013	0,0003
1	*Achnatherum calamagrostis*	02.03.2015	17	1	0,0021	0,002
1	*Achnatherum calamagrostis*	02.03.2015	17	2	0,0012	0,0022
1	*Achnatherum calamagrostis*	02.03.2015	22	1	0,0015	0,001
1	*Achnatherum calamagrostis*	02.03.2015	22	2	0,0042	0,0067
1	*Achnatherum calamagrostis*	02.03.2015	27	1	0,007	0,0101
1	*Achnatherum calamagrostis*	02.03.2015	27	2	0,0065	0,0044
1	*Achnatherum calamagrostis*	02.03.2015	30	1	0,0158	0,011
1	*Achnatherum calamagrostis*	02.03.2015	30	2	0,0187	0,015
1	*Achnatherum calamagrostis*	02.03.2015	33	1	0,0246	0,0111
1	*Achnatherum calamagrostis*	02.03.2015	33	2	0,0278	0,0129
1	*Achnatherum calamagrostis*	02.03.2015	37	1	0,0464	0,019
1	*Achnatherum calamagrostis*	02.03.2015	37	2	0,0466	0,0209
1	*Achnatherum calamagrostis*	02.03.2015	41	1	0,0429	0,0164
1	*Achnatherum calamagrostis*	02.03.2015	41	2	0,1285	0,0744
1	*Achnatherum calamagrostis*	02.03.2015	44	1	0,1704	0,0934
1	*Achnatherum calamagrostis*	02.03.2015	44	2	0,0918	0,0498
1	*Achnatherum calamagrostis*	02.03.2015	49	1	0,1318	0,0605
1	*Achnatherum calamagrostis*	02.03.2015	49	2	0,1442	0,0603
1	*Achnatherum calamagrostis*	02.03.2015	52	1	0,1742	0,1122
1	*Achnatherum calamagrostis*	02.03.2015	52	2	0,2265	0,1436
1	*Achnatherum calamagrostis*	02.03.2015	54	1	0,5294	0,2307
1	*Achnatherum calamagrostis*	02.03.2015	54	2	0,4708	0,214
1	*Achnatherum calamagrostis*	02.03.2015	61	1	0,8717	0.3753
1	*Achnatherum calamagrostis*	02.03.2015	61	2	0,8538	0.3662
2	*Ampelodesmos mauritanicus*	06.03.2015	16	1	0,0009	0,0001
2	*Ampelodesmos mauritanicus*	06.03.2015	16	2	0,001	0,0001
2	*Ampelodesmos mauritanicus*	06.03.2015	23	1	0,0022	0,0015
2	*Ampelodesmos mauritanicus*	06.03.2015	23	2	0,0019	0,0007
2	*Ampelodesmos mauritanicus*	06.03.2015	26	1	0,0027	0,0002
2	*Ampelodesmos mauritanicus*	06.03.2015	26	2	0,0017	0,0006
2	*Ampelodesmos mauritanicus*	06.03.2015	29	1	0,0032	0,0012
2	*Ampelodesmos mauritanicus*	06.03.2015	29	2	0,0054	0,0015
2	*Ampelodesmos mauritanicus*	06.03.2015	33	1	0,0037	0,0014
2	*Ampelodesmos mauritanicus*	06.03.2015	33	2	0,0095	0,0082
2	*Ampelodesmos mauritanicus*	06.03.2015	37	1	0,0106	0,0062

2	*Ampelodesmos mauritanicus*	06.03.2015	37	2	0,0185	0,013
2	*Ampelodesmos mauritanicus*	06.03.2015	40	1	0,0069	0,0022
2	*Ampelodesmos mauritanicus*	06.03.2015	40	2	0,0086	0,0027
2	*Ampelodesmos mauritanicus*	06.03.2015	45	1	0,0273	0,0074
2	*Ampelodesmos mauritanicus*	06.03.2015	45	2	0,025	0,0146
2	*Ampelodesmos mauritanicus*	06.03.2015	48	1	0,0315	0,0147
2	*Ampelodesmos mauritanicus*	06.03.2015	48	2	0,0566	0,0243
2	*Ampelodesmos mauritanicus*	06.03.2015	50	1	0,0562	0,0138
2	*Ampelodesmos mauritanicus*	06.03.2015	50	2	0,0221	0,0106
2	*Ampelodesmos mauritanicus*	06.03.2015	53	1	0,0292	0,0158
2	*Ampelodesmos mauritanicus*	06.03.2015	53	2	0,0268	0,0095
2	*Ampelodesmos mauritanicus*	06.03.2015	57	1	0,0718	0,0214
2	*Ampelodesmos mauritanicus*	06.03.2015	57	2	0,0768	0,0326
3	*Brachypodium distachyon*	27.02.2015	7	1	0,0027	0,0017
3	*Brachypodium distachyon*	27.02.2015	7	2	0,0025	0,001
3	*Brachypodium distachyon*	27.02.2015	13	1	0,0061	0,0049
3	*Brachypodium distachyon*	27.02.2015	13	2	0,0082	0,0058
3	*Brachypodium distachyon*	27.02.2015	20	1	0,0112	0,0076
3	*Brachypodium distachyon*	27.02.2015	20	2	0,0077	0,0051
3	*Brachypodium distachyon*	27.02.2015	25	1	0,0148	0,0086
3	*Brachypodium distachyon*	27.02.2015	25	2	0,0181	0,0121
3	*Brachypodium distachyon*	27.02.2015	30	1	0,0232	0,0105
3	*Brachypodium distachyon*	27.02.2015	30	2	0,0227	0,0076
3	*Brachypodium distachyon*	27.02.2015	33	1	0,069	0,021
3	*Brachypodium distachyon*	27.02.2015	33	2	0,0474	0,0181
3	*Brachypodium distachyon*	27.02.2015	36	1	0,0484	0,0234
3	*Brachypodium distachyon*	27.02.2015	36	2	0,0766	0,0291
3	*Brachypodium distachyon*	27.02.2015	40	1	0,1178	0,0424
3	*Brachypodium distachyon*	27.02.2015	40	2	0,0993	0,0172
3	*Brachypodium distachyon*	27.02.2015	44	1	0,2167	0,0702
3	*Brachypodium distachyon*	27.02.2015	44	2	0,1598	0,0638
3	*Brachypodium distachyon*	27.02.2015	47	1	0,3794	0,1418
3	*Brachypodium distachyon*	27.02.2015	47	2	0,5691	0,2069
3	*Brachypodium distachyon*	27.02.2015	52	1	0,7594	0,048
3	*Brachypodium distachyon*	27.02.2015	52	2	0,7557	0,1425
3	*Brachypodium distachyon*	27.02.2015	55	1	0,9699	0,3253
3	*Brachypodium distachyon*	27.02.2015	55	2	1,1225	0,4515
3	*Brachypodium distachyon*	27.02.2015	57	1	1,7682	0,4941
3	*Brachypodium distachyon*	27.02.2015	57	2	1,3383	0,4771
7	*Duthiea brachypodium*	02.03.2015	11	1	0,0058	0,0023
7	*Duthiea brachypodium*	02.03.2015	11	2	0,0053	0,0017
7	*Duthiea brachypodium*	02.03.2015	17	1	0,0059	0,0011
7	*Duthiea brachypodium*	02.03.2015	17	2	0,0073	0,0033
7	*Duthiea brachypodium*	02.03.2015	22	1	0,0142	0,0057

7	*Duthiea brachypodium*	02.03.2015	22	2	0,0093	0,0035
7	*Duthiea brachypodium*	02.03.2015	27	1	0,026	0,0163
7	*Duthiea brachypodium*	02.03.2015	27	2	0,0279	0,0143
7	*Duthiea brachypodium*	02.03.2015	30	1	0,0187	0,0072
7	*Duthiea brachypodium*	02.03.2015	30	2	0,0256	0,0129
7	*Duthiea brachypodium*	02.03.2015	33	1	0,051	0,0375
7	*Duthiea brachypodium*	02.03.2015	33	2	0,0206	0,0071
7	*Duthiea brachypodium*	02.03.2015	37	1	0,0311	0,0107
7	*Duthiea brachypodium*	02.03.2015	37	2	0,0426	0,0294
7	*Duthiea brachypodium*	02.03.2015	41	1	0,0369	0,0164
7	*Duthiea brachypodium*	02.03.2015	41	2	0,0628	0,0284
7	*Duthiea brachypodium*	02.03.2015	44	1	0,0746	0,0378
7	*Duthiea brachypodium*	02.03.2015	44	2	0,0222	0,0075
7	*Duthiea brachypodium*	02.03.2015	49	1	0,1048	0,0409
7	*Duthiea brachypodium*	02.03.2015	49	2	0,0999	0,0302
7	*Duthiea brachypodium*	02.03.2015	52	1	0,1027	0,0416
7	*Duthiea brachypodium*	02.03.2015	52	2	0,1178	0,0724
7	*Duthiea brachypodium*	02.03.2015	54	1	0,0833	0,0288
7	*Duthiea brachypodium*	02.03.2015	54	2	0,0968	0,0632
8	*Glyceria occidentalis*	27.02.2015	7	1	0,0017	0,0004
8	*Glyceria occidentalis*	27.02.2015	7	2	0,0016	0,0006
8	*Glyceria occidentalis*	27.02.2015	13	1	0,003	0,0038
8	*Glyceria occidentalis*	27.02.2015	13	2	0,004	0,0057
8	*Glyceria occidentalis*	27.02.2015	20	1	0,0057	0,0092
8	*Glyceria occidentalis*	27.02.2015	20	2	0,0034	0,0047
8	*Glyceria occidentalis*	27.02.2015	25	1	0,0155	0,0158
8	*Glyceria occidentalis*	27.02.2015	25	2	0,0152	0,0061
8	*Glyceria occidentalis*	27.02.2015	30	1	0,052	0,02
8	*Glyceria occidentalis*	27.02.2015	30	2	0,0465	0,0143
8	*Glyceria occidentalis*	27.02.2015	33	1	0,0996	0,0333
8	*Glyceria occidentalis*	27.02.2015	33	2	0,0435	0,0141
8	*Glyceria occidentalis*	27.02.2015	36	1	0,1301	0,0401
8	*Glyceria occidentalis*	27.02.2015	36	2	0,1174	0,0333
8	*Glyceria occidentalis*	27.02.2015	40	1	0,3126	0,0935
8	*Glyceria occidentalis*	27.02.2015	40	2	0,1597	0,0532
8	*Glyceria occidentalis*	27.02.2015	44	1	0,6084	0,1457
8	*Glyceria occidentalis*	27.02.2015	44	2	0,5078	0,1287
8	*Glyceria occidentalis*	27.02.2015	47	1	0,2883	0,0566
8	*Glyceria occidentalis*	27.02.2015	47	2	1,0208	0,2406
8	*Glyceria occidentalis*	27.02.2015	52	1	1,6348	0,4013
8	*Glyceria occidentalis*	27.02.2015	52	2	1,3996	0,3261
8	*Glyceria occidentalis*	27.02.2015	55	1	1,6814	0,2844
8	*Glyceria occidentalis*	27.02.2015	55	2	1,0889	0,2678
8	*Glyceria occidentalis*	27.02.2015	57	1	1,8546	0,333

8	*Glyceria occidentalis*	27.02.2015	57	2	1,6893	0,2724
9	*Glyceria occidentalis*	27.02.2015	7	1	0,0012	0.0009
9	*Glyceria occidentalis*	27.02.2015	7	2	0.0010	0.0013
9	*Glyceria occidentalis*	27.02.2015	13	1	0.0046	0.0046
9	*Glyceria occidentalis*	27.02.2015	13	2	0.0020	0.0034
9	*Glyceria occidentalis*	27.02.2015	20	1	0.0056	0.0028
9	*Glyceria occidentalis*	27.02.2015	20	2	0.0063	0.0044
9	*Glyceria occidentalis*	27.02.2015	25	1	0.0101	0.0107
9	*Glyceria occidentalis*	27.02.2015	25	2	0.0093	0.0073
9	*Glyceria occidentalis*	27.02.2015	30	1	0.0735	0.0174
9	*Glyceria occidentalis*	27.02.2015	30	2	0.0447	0.0187
9	*Glyceria occidentalis*	27.02.2015	33	1	0.1260	0.0354
9	*Glyceria occidentalis*	27.02.2015	33	2	0.1335	0.0364
9	*Glyceria occidentalis*	27.02.2015	36	1	0.2051	0.0628
9	*Glyceria occidentalis*	27.02.2015	36	2	0.1926	0.0627
9	*Glyceria occidentalis*	27.02.2015	40	1	0.4950	0.1752
9	*Glyceria occidentalis*	27.02.2015	40	2	0.2968	0.0793
9	*Glyceria occidentalis*	27.02.2015	44	1	0.6348	0.1929
9	*Glyceria occidentalis*	27.02.2015	44	2	0.9130	0.2704
9	*Glyceria occidentalis*	27.02.2015	47	1	1,2685	0,3058
9	*Glyceria occidentalis*	27.02.2015	47	2	1,2863	0,2872
9	*Glyceria occidentalis*	27.02.2015	52	1	2,1233	0,3942
9	*Glyceria occidentalis*	27.02.2015	52	2	2,0924	0,4305
9	*Glyceria occidentalis*	27.02.2015	55	1	3,2993	0,5055
9	*Glyceria occidentalis*	27.02.2015	55	2	2,0567	0,4923
9	*Glyceria occidentalis*	27.02.2015	57	1	2,497	0,4801
9	*Glyceria occidentalis*	27.02.2015	57	2	2,4369	0,489
10	*Glyceria fluitans*	02.03.2015	4	1	0.0007	0.0004
10	*Glyceria fluitans*	02.03.2015	4	2	0.0015	0.0005
10	*Glyceria fluitans*	02.03.2015	11	1	0.0018	0.0017
10	*Glyceria fluitans*	02.03.2015	11	2	0.0035	0.0045
10	*Glyceria fluitans*	02.03.2015	17	1	0.0045	0.0038
10	*Glyceria fluitans*	02.03.2015	17	2	0.0046	0.0081
10	*Glyceria fluitans*	02.03.2015	22	1	0.0118	0.0065
10	*Glyceria fluitans*	02.03.2015	22	2	0.0172	0.0138
10	*Glyceria fluitans*	02.03.2015	27	1	0.0585	0.0294
10	*Glyceria fluitans*	02.03.2015	27	2	0.0800	0.0257
10	*Glyceria fluitans*	02.03.2015	30	1	0.0963	0.0329
10	*Glyceria fluitans*	02.03.2015	30	2	0.0487	0.0186
10	*Glyceria fluitans*	02.03.2015	33	1	0.3064	0.1790
10	*Glyceria fluitans*	02.03.2015	33	2	0.2798	0.1311
10	*Glyceria fluitans*	02.03.2015	37	1	0.3033	0.1247
10	*Glyceria fluitans*	02.03.2015	37	2	0.6428	0.2377
10	*Glyceria fluitans*	02.03.2015	41	1	0.4207	0.1491

10	*Glyceria fluitans*	02.03.2015	41	2	0.4695	0.2017
10	*Glyceria fluitans*	02.03.2015	44	1	0,764	0,1572
10	*Glyceria fluitans*	02.03.2015	44	2	0,8964	0,2184
10	*Glyceria fluitans*	02.03.2015	49	1	1,4707	0,8568
10	*Glyceria fluitans*	02.03.2015	49	2	1,4902	0,7647
10	*Glyceria fluitans*	02.03.2015	52	1	1,6705	0,6844
10	*Glyceria fluitans*	02.03.2015	52	2	0,9721	0,6491
10	*Glyceria fluitans*	02.03.2015	54	1	1,6124	0,8956
10	*Glyceria fluitans*	02.03.2015	54	2	1,8526	0,6799
12	*Macrochloa tenacissima*	27.02.2015	7	1	0.0007	0.0001
12	*Macrochloa tenacissima*	27.02.2015	7	2	0.0010	0.0007
12	*Macrochloa tenacissima*	27.02.2015	13	1	0.0037	0.0014
12	*Macrochloa tenacissima*	27.02.2015	13	2	0.0057	0.0024
12	*Macrochloa tenacissima*	27.02.2015	20	1	0.0094	0.0037
12	*Macrochloa tenacissima*	27.02.2015	30	2	0.0083	0.0033
12	*Macrochloa tenacissima*	27.02.2015	25	1	0.0129	0.0047
12	*Macrochloa tenacissima*	27.02.2015	25	2	0.0184	0.0040
12	*Macrochloa tenacissima*	27.02.2015	30	1	0.0335	0.0115
12	*Macrochloa tenacissima*	27.02.2015	30	2	0.0332	0.0069
12	*Macrochloa tenacissima*	27.02.2015	33	1	0.0520	0.0135
12	*Macrochloa tenacissima*	27.02.2015	33	2	0.0648	0.0178
12	*Macrochloa tenacissima*	27.02.2015	36	1	0.0882	0.0488
12	*Macrochloa tenacissima*	27.02.2015	36	2	0.0798	0.0391
12	*Macrochloa tenacissima*	27.02.2015	40	1	0.2285	0.0793
12	*Macrochloa tenacissima*	27.02.2015	40	2	0.1322	0.0450
12	*Macrochloa tenacissima*	27.02.2015	44	1	0.3019	0.0887
12	*Macrochloa tenacissima*	27.02.2015	44	2	0.2568	0.0621
12	*Macrochloa tenacissima*	27.02.2015	47	1	0,2802	0,0648
12	*Macrochloa tenacissima*	27.02.2015	47	2	0,2268	0,0742
12	*Macrochloa tenacissima*	27.02.2015	52	1	1,2483	0,2501
12	*Macrochloa tenacissima*	27.02.2015	52	2	0,5608	0,1102
12	*Macrochloa tenacissima*	27.02.2015	55	1	0,8313	0,2801
12	*Macrochloa tenacissima*	27.02.2015	55	2	1,2986	0,207
12	*Macrochloa tenacissima*	27.02.2015	57	1	1,0817	0,2016
12	*Macrochloa tenacissima*	27.02.2015	57	2	1,0763	0,2236
13	*Melica nutans*	03.03.2015	10	1	0.0004	0.0001
13	*Melica nutans*	03.03.2015	10	2	0.0004	0.0001
13	*Melica nutans*	03.03.2015	16	1	0.0065	0.0038
13	*Melica nutans*	03.03.2015	16	2	0.0040	0.0023
13	*Melica nutans*	03.03.2015	21	1	0.0061	0.0057
13	*Melica nutans*	03.03.2015	21	2	0.0081	0.0047
13	*Melica nutans*	03.03.2015	26	1	0.0201	0.0059
13	*Melica nutans*	03.03.2015	26	2	0.0167	0.0081
13	*Melica nutans*	03.03.2015	29	1	0.0205	0.0070

13	*Melica nutans*	03.03.2015	29	2	0.0162	0.0093
13	*Melica nutans*	03.03.2015	32	1	0.0284	0.0148
13	*Melica nutans*	03.03.2015	32	2	0.0338	0.0136
13	*Melica nutans*	03.03.2015	36	1	0.0595	0.0125
13	*Melica nutans*	03.03.2015	36	2	0.0383	0.0266
13	*Melica nutans*	03.03.2015	40	1	0.0545	0.0203
13	*Melica nutans*	03.03.2015	40	2	0.1148	0.0428
13	*Melica nutans*	03.03.2015	43	1	0.0932	0.0453
13	*Melica nutans*	03.03.2015	43	2	0.1386	0.0408
13	*Melica nutans*	03.03.2015	48	1	0,1064	0,0639
13	*Melica nutans*	03.03.2015	48	2	0,0917	0,0389
13	*Melica nutans*	03.03.2015	51	1	0,2653	0,1363
13	*Melica nutans*	03.03.2015	51	2	0,2797	0,1021
13	*Melica nutans*	03.03.2015	53	1	0,5136	0,1907
13	*Melica nutans*	03.03.2015	53	2	0,6809	0,1722
14	*Nardus stricta*	02.03.2015	20	1	0.0005	0.0002
14	*Nardus stricta*	02.03.2015	20	2	0.0006	0.0000
14	*Nardus stricta*	02.03.2015	27	1	0.0018	0.0010
14	*Nardus stricta*	02.03.2015	27	2	0.0027	0.0011
14	*Nardus stricta*	02.03.2015	30	1	0.0020	0.0014
14	*Nardus stricta*	02.03.2015	30	2	0.0025	0.0011
14	*Nardus stricta*	02.03.2015	33	1	0.0029	0.0011
14	*Nardus stricta*	02.03.2015	33	2	0.0028	0.0013
14	*Nardus stricta*	02.03.2015	37	1	0.0039	0.0012
14	*Nardus stricta*	02.03.2015	37	2	0.0027	0.0012
14	*Nardus stricta*	02.03.2015	41	1	0.0126	0.0060
14	*Nardus stricta*	02.03.2015	41	2	0.0061	0.0034
14	*Nardus stricta*	02.03.2015	44	1	0.0118	0.0067
14	*Nardus stricta*	02.03.2015	44	2	0.0109	0.0041
14	*Nardus stricta*	02.03.2015	49	1	0.0091	0.0032
14	*Nardus stricta*	02.03.2015	49	2	0.0134	0.0059
14	*Nardus stricta*	02.03.2015	52	1	0.0217	0.0071
14	*Nardus stricta*	02.03.2015	52	2	0.0176	0.0082
14	*Nardus stricta*	02.03.2015	54	1	0,0092	0,0046
14	*Nardus stricta*	02.03.2015	54	2	0,0072	0,0026
14	*Nardus stricta*	02.03.2015	61	1	0,0407	0,015
14	*Nardus stricta*	02.03.2015	61	2	0.0416	0.021
14	*Nardus stricta*	02.03.2015	65	1	0.0816	0,0251
14	*Nardus stricta*	02.03.2015	65	2	0.1031	0,0322
15	*Nasella leucotricha*	03.03.2015	14	1	0.0020	0.0004
15	*Nasella leucotricha*	03.03.2015	14	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	21	1	0.0052	0.0010
15	*Nasella leucotricha*	03.03.2015	21	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	26	1	0.0246	0.0087

15	*Nasella leucotricha*	03.03.2015	26	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	31	1	0.0048	0.0017
15	*Nasella leucotricha*	03.03.2015	31	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	35	1	0.0187	0.0073
15	*Nasella leucotricha*	03.03.2015	35	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	39	1	0.0590	0.0229
15	*Nasella leucotricha*	03.03.2015	39	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	42	1	0.0324	0.0178
15	*Nasella leucotricha*	03.03.2015	42	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	47	1	0.1096	0.0574
15	*Nasella leucotricha*	03.03.2015	47	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	50	1	0.1097	0.0458
15	*Nasella leucotricha*	03.03.2015	50	2	NA	NA
15	*Nasella leucotricha*	03.03.2015	52	1	0.3088	0.1168
15	*Nasella leucotricha*	03.03.2015	52	2	NA	NA
16	*Okoptum miliaceum*	13.03.2015	9	1	0.0017	0.0001
16	*Okoptum miliaceum*	13.03.2015	9	2	0.0010	0.0000
16	*Okoptum miliaceum*	13.03.2015	16	1	0.0019	0.0000
16	*Okoptum miliaceum*	13.03.2015	16	2	0.0024	0.0006
16	*Okoptum miliaceum*	13.03.2015	18	1	0.0021	0.0008
16	*Okoptum miliaceum*	13.03.2015	18	2	0.0021	0.0010
16	*Okoptum miliaceum*	13.03.2015	21	1	0.0054	0.0024
16	*Okoptum miliaceum*	13.03.2015	21	2	0.0033	0.0006
16	*Okoptum miliaceum*	13.03.2015	25	1	0.0137	0.0059
16	*Okoptum miliaceum*	13.03.2015	25	2	0.0136	0.0076
16	*Okoptum miliaceum*	13.03.2015	29	1	0.0809	0.0320
16	*Okoptum miliaceum*	13.03.2015	29	2	0.0705	0.0290
16	*Okoptum miliaceum*	13.03.2015	32	1	0.0785	0.0273
16	*Okoptum miliaceum*	13.03.2015	32	2	0.0617	0.0374
16	*Okoptum miliaceum*	13.03.2015	37	1	0.1605	0.0645
16	*Okoptum miliaceum*	13.03.2015	37	2	0.1072	0.0471
16	*Okoptum miliaceum*	13.03.2015	40	1	0.3721	0.1516
16	*Okoptum miliaceum*	13.03.2015	40	2	0.5716	0.1939
16	*Okoptum miliaceum*	13.03.2015	42	1	0.2900	0.1124
16	*Okoptum miliaceum*	13.03.2015	42	2	0.2762	0.1365
16	*Okoptum miliaceum*	13.03.2015	45	1	0.6335	0.2167
16	*Okoptum miliaceum*	13.03.2015	45	2	1.2645	0.3149
16	*Okoptum miliaceum*	13.03.2015	49	1	0.5593	0.2156
16	*Okoptum miliaceum*	13.03.2015	49	2	0.4523	0.1216
17	*Okoptum miliaceum*	03.03.2015	14	1	0.0038	0.0014
17	*Okoptum miliaceum*	03.03.2015	14	2	0.0052	0.0014
17	*Okoptum miliaceum*	03.03.2015	21	1	0,0104	0.0061
17	*Okoptum miliaceum*	03.03.2015	21	2	0,0077	0.0050
17	*Okoptum miliaceum*	03.03.2015	26	1	0.0311	0.0118

17	*Okoptum miliaceum*	03.03.2015	26	2	0.0253	0.0087
17	*Okoptum miliaceum*	03.03.2015	31	1	0.0255	0.0097
17	*Okoptum miliaceum*	03.03.2015	31	2	0.0152	0.0049
17	*Okoptum miliaceum*	03.03.2015	35	1	0.1118	0.0437
17	*Okoptum miliaceum*	03.03.2015	35	2	0.0868	0.0307
17	*Okoptum miliaceum*	03.03.2015	39	1	0.1160	0.0446
17	*Okoptum miliaceum*	03.03.2015	39	2	0.1341	0.0419
17	*Okoptum miliaceum*	03.03.2015	42	1	0.3189	0.1009
17	*Okoptum miliaceum*	03.03.2015	42	2	0.3752	0.1348
17	*Okoptum miliaceum*	03.03.2015	47	1	0.1255	0.0450
17	*Okoptum miliaceum*	03.03.2015	47	2	0.2702	0.1284
17	*Okoptum miliaceum*	03.03.2015	50	1	0.1823	0.0802
17	*Okoptum miliaceum*	03.03.2015	50	2	0.3552	0.0453
17	*Okoptum miliaceum*	03.03.2015	52	1	1.1179	0.4100
17	*Okoptum miliaceum*	03.03.2015	52	2	0.6313	0.2941
17	*Okoptum miliaceum*	03.03.2015	55	1	1.2513	0.4470
17	*Okoptum miliaceum*	03.03.2015	55	2	1.6578	0.3779
17	*Okoptum miliaceum*	03.03.2015	58	1	1.3277	0.5434
17	*Okoptum miliaceum*	03.03.2015	58	2	1.3223	0.4694
18	*Phaenospema globosa*	05.03.2015	10	1	0.0041	0.0010
18	*Phaenospema globosa*	05.03.2015	10	2	0.0038	0.0010
18	*Phaenospema globosa*	05.03.2015	19	1	0.0104	0.0052
18	*Phaenospema globosa*	05.03.2015	19	2	0.0124	0.0071
18	*Phaenospema globosa*	05.03.2015	24	1	0.0206	0.0071
18	*Phaenospema globosa*	05.03.2015	24	2	0.0140	0.0045
18	*Phaenospema globosa*	05.03.2015	26	1	0.0327	0.0081
18	*Phaenospema globosa*	05.03.2015	26	2	0.0399	0.0112
18	*Phaenospema globosa*	05.03.2015	29	1	0.0549	0.0207
18	*Phaenospema globosa*	05.03.2015	29	2	0.0310	0.0082
18	*Phaenospema globosa*	05.03.2015	33	1	0.0431	0.0097
18	*Phaenospema globosa*	05.03.2015	33	2	0.0881	0.0242
18	*Phaenospema globosa*	05.03.2015	37	1	0.1400	0.0472
18	*Phaenospema globosa*	05.03.2015	37	2	0.1076	0.0355
18	*Phaenospema globosa*	05.03.2015	40	1	0.1761	0.0569
18	*Phaenospema globosa*	05.03.2015	40	2	0.1634	0.0519
18	*Phaenospema globosa*	05.03.2015	45	1	0.2065	0.0614
18	*Phaenospema globosa*	05.03.2015	45	2	0.3540	0.1186
18	*Phaenospema globosa*	05.03.2015	48	1	0.2514	0.0749
18	*Phaenospema globosa*	05.03.2015	48	2	0.3308	0.0767
18	*Phaenospema globosa*	05.03.2015	50	1	0.4763	0.1489
18	*Phaenospema globosa*	05.03.2015	50	2	0.5823	0.1871
18	*Phaenospema globosa*	05.03.2015	53	1	0.7022	0.2544
18	*Phaenospema globosa*	05.03.2015	53	2	0.7403	0.2146
19	*Pipatherum miliaceum*	02.03.2015	15	1	0.0034	0.0005

19	*Pipatherum miliaceum*	02.03.2015	15	2	0.0022	0.0009
19	*Pipatherum miliaceum*	02.03.2015	22	1	0.0434	0.0332
19	*Pipatherum miliaceum*	02.03.2015	22	2	0.0157	0.0103
19	*Pipatherum miliaceum*	02.03.2015	27	1	0.0356	0.0118
19	*Oloptum miliaceum*	02.03.2015	27	2	0.0140	0.0061
19	*Oloptum miliaceum*	02.03.2015	30	1	0.1156	0.0357
19	*Oloptum miliaceum*	02.03.2015	30	2	NA	NA
19	*Oloptum miliaceum*	02.03.2015	33	1	0.0861	0.0332
19	*Oloptum miliaceum*	02.03.2015	33	2	NA	NA
19	*Oloptum miliaceum*	02.03.2015	37	1	0.2594	0.0923
19	*Oloptum miliaceum*	02.03.2015	37	2	NA	NA
19	*Oloptum miliaceum*	02.03.2015	41	1	0.1942	0.1254
19	*Oloptum miliaceum*	02.03.2015	41	2	NA	NA
20	*Oloptum miliaceum*	06.03.2015	11	1	0.0008	0.0000
20	*Oloptum miliaceum*	06.03.2015	11	2	0.0023	0.0000
20	*Oloptum miliaceum*	06.03.2015	18	1	0.0016	0.0008
20	*Oloptum miliaceum*	06.03.2015	18	2	0.0020	0.0002
20	*Oloptum miliaceum*	06.03.2015	23	1	0.0238	0.0161
20	*Oloptum miliaceum*	06.03.2015	23	2	0.0128	0.0107
20	*Oloptum miliaceum*	06.03.2015	25	1	0.0366	0.0184
20	*Oloptum miliaceum*	06.03.2015	25	2	0.0082	0.0031
20	*Oloptum miliaceum*	06.03.2015	28	1	0.0746	0.0394
20	*Oloptum miliaceum*	06.03.2015	28	2	0.0369	0.0209
20	*Oloptum miliaceum*	06.03.2015	32	1	0.0665	0.0221
20	*Oloptum miliaceum*	06.03.2015	32	2	0.0440	0.0282
20	*Oloptum miliaceum*	06.03.2015	36	1	0.0531	0.0246
20	*Oloptum miliaceum*	06.03.2015	36	2	0.0472	0.0222
20	*Oloptum miliaceum*	06.03.2015	39	1	0.0438	0.0267
20	*Oloptum miliaceum*	06.03.2015	39	2	0.1763	0.1187
20	*Oloptum miliaceum*	06.03.2015	44	1	0.7537	0.3009
20	*Oloptum miliaceum*	06.03.2015	44	2	0.5741	0.2674
20	*Oloptum miliaceum*	06.03.2015	47	1	0.7647	0.3417
20	*Oloptum miliaceum*	06.03.2015	47	2	NA	NA
20	*Oloptum miliaceum*	06.03.2015	49	1	0.8561	0.2818
20	*Oloptum miliaceum*	06.03.2015	49	2	NA	NA
22	*Oloptum miliaceum*	13.03.2015	9	1	0.0000	0.0000
22	*Oloptum miliaceum*	13.03.2015	9	2	0.0001	0.0000
22	*Oloptum miliaceum*	13.03.2015	16	1	0.0022	0.0014
22	*Oloptum miliaceum*	13.03.2015	16	2	0.0015	0.0013
22	*Oloptum miliaceum*	13.03.2015	18	1	0.0045	0.0011
22	*Oloptum miliaceum*	13.03.2015	18	2	0.0036	0.0010
22	*Oloptum miliaceum*	13.03.2015	21	1	0.0035	0.0017
22	*Oloptum miliaceum*	13.03.2015	21	2	0.0031	0.0028
22	*Oloptum miliaceum*	13.03.2015	25	1	0.0104	0.0087

22	*Oloptum miliaceum*	13.03.2015	25	2	0.0164	0.0127
22	*Oloptum miliaceum*	13.03.2015	29	1	0.0434	0.0248
22	*Oloptum miliaceum*	13.03.2015	29	2	0.0344	0.0207
22	*Oloptum miliaceum*	13.03.2015	32	1	0.0326	0.0095
22	*Oloptum miliaceum*	13.03.2015	32	2	0.0392	0.0163
22	*Oloptum miliaceum*	13.03.2015	37	1	0.0268	0.0193
22	*Oloptum miliaceum*	13.03.2015	37	2	0.0545	0.0341
22	*Oloptum miliaceum*	13.03.2015	40	1	0.1552	0.1019
22	*Oloptum miliaceum*	13.03.2015	40	2	0.1565	0.0856
22	*Oloptum miliaceum*	13.03.2015	42	1	0.3378	0.1073
22	*Oloptum miliaceum*	13.03.2015	42	2	0.2620	0.1592
22	*Oloptum miliaceum*	13.03.2015	45	1	0.5668	0.3510
22	*Oloptum miliaceum*	13.03.2015	45	2	0.7996	0.4190
22	*Oloptum miliaceum*	13.03.2015	49	1	1.2064	0.5454
22	*Oloptum miliaceum*	13.03.2015	49	2	0.6174	0.2552
25	*Stipa barbata*	02.03.2015	11	1	0.0050	0.0016
25	*Stipa barbata*	02.03.2015	11	2	NA	NA
25	*Stipa barbata*	02.03.2015	17	1	0.0093	0.0020
25	*Stipa barbata*	02.03.2015	17	2	NA	NA
25	*Stipa barbata*	02.03.2015	20	1	0.0129	0.0083
25	*Stipa barbata*	02.03.2015	20	2	NA	NA
25	*Stipa barbata*	02.03.2015	22	1	0.0451	0.0256
25	*Stipa barbata*	02.03.2015	22	2	NA	NA
25	*Stipa barbata*	02.03.2015	27	1	0.0247	0.0137
25	*Stipa barbata*	02.03.2015	27	2	NA	NA
25	*Stipa barbata*	02.03.2015	30	1	0.0751	0.0774
25	*Stipa barbata*	02.03.2015	30	2	NA	NA
25	*Stipa barbata*	02.03.2015	33	1	0.0593	0.0356
25	*Stipa barbata*	02.03.2015	33	2	NA	NA
25	*Stipa barbata*	02.03.2015	37	1	0.1065	0.0620
25	*Stipa barbata*	02.03.2015	37	2	NA	NA
25	*Stipa barbata*	02.03.2015	41	1	0.1662	0.1238
25	*Stipa barbata*	02.03.2015	41	2	NA	NA
25	*Stipa barbata*	02.03.2015	44	1	0.2490	0.1568
25	*Stipa barbata*	02.03.2015	44	2	NA	NA
25	*Stipa barbata*	02.03.2015	49	1	0.3543	0.1746
25	*Stipa barbata*	02.03.2015	49	2	NA	NA
25	*Stipa barbata*	02.03.2015	52	1	0.3550	0.2658
25	*Stipa barbata*	02.03.2015	52	2	NA	NA
26	*Stipa lagascae*	27.02.2015	8	1	0.0030	0.0027
26	*Stipa lagascae*	27.02.2015	8	2	0.0046	0.0025
26	*Stipa lagascae*	27.02.2015	13	1	0.0069	0.0035
26	*Stipa lagascae*	27.02.2015	13	2	0.0083	0.0031
26	*Stipa lagascae*	27.02.2015	20	1	0.0077	0.0034

26	*Stipa lagascae*	27.02.2015	20	2	0.0093	0.0028
26	*Stipa lagascae*	27.02.2015	25	1	0.0135	0.0030
26	*Stipa lagascae*	27.02.2015	25	2	0.0189	0.0020
26	*Stipa lagascae*	27.02.2015	30	1	0.0126	0.0034
26	*Stipa lagascae*	27.02.2015	30	2	0.0274	0.0109
26	*Stipa lagascae*	27.02.2015	33	1	0.0262	0.0123
26	*Stipa lagascae*	27.02.2015	33	2	0.0287	0.0136
26	*Stipa lagascae*	27.02.2015	36	1	0.0376	0.0148
26	*Stipa lagascae*	27.02.2015	36	2	0.0290	0.0140
26	*Stipa lagascae*	27.02.2015	40	1	0.0345	0.0216
26	*Stipa lagascae*	27.02.2015	40	2	0.0749	0.0170
26	*Stipa lagascae*	27.02.2015	44	1	0.1103	0.0419
26	*Stipa lagascae*	27.02.2015	44	2	0.0968	0.0282
26	*Stipa lagascae*	27.02.2015	47	1	0.1806	0.1054
26	*Stipa lagascae*	27.02.2015	47	2	0.1597	0.1576
26	*Stipa lagascae*	27.02.2015	52	1	0.1051	0.0392
26	*Stipa lagascae*	27.02.2015	52	2	0.1277	0.0456
26	*Stipa lagascae*	27.02.2015	55	1	0.2440	0.1828
26	*Stipa lagascae*	27.02.2015	55	2	0.2294	0.1488
26	*Stipa lagascae*	27.02.2015	57	1	0.1891	0.1370
26	*Stipa lagascae*	27.02.2015	57	2	0.2084	0.1350
27	*Stipa lagascae*	27.02.2015	8	1	0.0065	0.0050
27	*Stipa lagascae*	27.02.2015	8	2	0.0073	0.0036
27	*Stipa lagascae*	27.02.2015	13	1	0.0128	0.0076
27	*Stipa lagascae*	27.02.2015	13	2	0.0150	0.0136
27	*Stipa lagascae*	27.02.2015	20	1	0.0172	0.0137
27	*Stipa lagascae*	27.02.2015	20	2	0.0191	0.0146
27	*Stipa lagascae*	27.02.2015	25	1	0.0193	0.0144
27	*Stipa lagascae*	27.02.2015	25	2	0.0180	0.0137
27	*Stipa lagascae*	27.02.2015	30	1	0.0323	0.0245
27	*Stipa lagascae*	27.02.2015	30	2	0.0274	0.0145
27	*Stipa lagascae*	27.02.2015	33	1	0.0316	0.0214
27	*Stipa lagascae*	27.02.2015	33	2	0.0407	0.0373
27	*Stipa lagascae*	27.02.2015	36	1	0.0516	0.0385
27	*Stipa lagascae*	27.02.2015	36	2	0.0438	0.0369
27	*Stipa lagascae*	27.02.2015	40	1	0.0874	0.0873
27	*Stipa lagascae*	27.02.2015	40	2	0.0284	0.0169
27	*Stipa lagascae*	27.02.2015	44	1	0.0727	0.0512
27	*Stipa lagascae*	27.02.2015	44	2	0.0639	0.0520
27	*Stipa lagascae*	27.02.2015	47	1	0.0292	0.0156
27	*Stipa lagascae*	27.02.2015	47	2	0.0261	0.0079
27	*Stipa lagascae*	27.02.2015	52	1	0.0996	0.0856
27	*Stipa lagascae*	27.02.2015	52	2	0.0433	0.0148
27	*Stipa lagascae*	27.02.2015	55	1	0.0757	0.1185

27	*Stipa lagascae*	27.02.2015	55	2	0.0910	0.0852
27	*Stipa lagascae*	27.02.2015	57	1	0.2276	0.2115
27	*Stipa lagascae*	27.02.2015	57	2	0.2623	0.2705
28	*Stipa pennata*	27.02.2015	8	1	0.0055	0.0013
28	*Stipa pennata*	27.02.2015	8	2	0.0040	0.0013
28	*Stipa pennata*	27.02.2015	13	1	0.0109	0.0036
28	*Stipa pennata*	27.02.2015	13	2	0.0111	0.0035
28	*Stipa pennata*	27.02.2015	20	1	0.0060	0.0066
28	*Stipa pennata*	27.02.2015	20	2	0.0127	0.0076
28	*Stipa pennata*	27.02.2015	25	1	0.0191	0.0105
28	*Stipa pennata*	27.02.2015	25	2	0.0209	0.0171
28	*Stipa pennata*	27.02.2015	30	1	0.0289	0.0193
28	*Stipa pennata*	27.02.2015	30	2	0.0160	0.0088
28	*Stipa pennata*	27.02.2015	33	1	0.0255	0.0235
28	*Stipa pennata*	27.02.2015	33	2	0.0490	0.0236
28	*Stipa pennata*	27.02.2015	36	1	0.0473	0.0396
28	*Stipa pennata*	27.02.2015	36	2	0.0604	0.0307
28	*Stipa pennata*	27.02.2015	40	1	0.0194	0.0089
28	*Stipa pennata*	27.02.2015	40	2	0.0705	0.0420
28	*Stipa pennata*	27.02.2015	44	1	0.0214	0.0107
28	*Stipa pennata*	27.02.2015	44	2	0.0361	0.0197
28	*Stipa pennata*	27.02.2015	47	1	0.0223	0.0062
28	*Stipa pennata*	27.02.2015	47	2	0.0432	0.0103
28	*Stipa pennata*	27.02.2015	52	1	0.0251	0.0200
28	*Stipa pennata*	27.02.2015	52	2	0.1005	0.0337
28	*Stipa pennata*	27.02.2015	55	1	0.4481	0.2051
28	*Stipa pennata*	27.02.2015	55	2	0.4231	0.1941
28	*Stipa pennata*	27.02.2015	57	1	0.2905	0.1376
28	*Stipa pennata*	27.02.2015	57	2	0.3704	0.2148
29	*Stipa pennata*	27.02.2015	11	1	0.0056	0.0019
29	*Stipa pennata*	27.02.2015	11	2	0.0049	0.0017
29	*Stipa pennata*	27.02.2015	20	1	0.0079	0.0009
29	*Stipa pennata*	27.02.2015	20	2	0.0120	0.0037
29	*Stipa pennata*	27.02.2015	30	1	0.0202	0.0107
29	*Stipa pennata*	27.02.2015	30	2	0.0150	0.0129
29	*Stipa pennata*	27.02.2015	33	1	0.0405	0.0270
29	*Stipa pennata*	27.02.2015	33	2	NA	NA
29	*Stipa pennata*	27.02.2015	35	1	0.0341	0.0187
29	*Stipa pennata*	27.02.2015	35	2	NA	NA
29	*Stipa pennata*	27.02.2015	36	1	0.0404	0.0215
29	*Stipa pennata*	27.02.2015	36	2	NA	NA
29	*Stipa pennata*	27.02.2015	40	1	0.0668	0.0392
29	*Stipa pennata*	27.02.2015	40	2	NA	NA
29	*Stipa pennata*	27.02.2015	44	1	0.1086	0.0783

29	*Stipa pennata*	27.02.2015	44	2	NA	NA
29	*Stipa pennata*	27.02.2015	47	1	0.1818	0.0921
29	*Stipa pennata*	27.02.2015	47	2	NA	NA
29	*Stipa pennata*	27.02.2015	52	1	0.1304	0.0756
29	*Stipa pennata*	27.02.2015	52	2	NA	NA
29	*Stipa pennata*	27.02.2015	55	1	0.2464	0.1331
29	*Stipa pennata*	27.02.2015	55	2	NA	NA
29	*Stipa pennata*	27.02.2015	57	1	0.3989	0.2155
29	*Stipa pennata*	27.02.2015	57	2	NA	NA
29	*Stipa pennata*	27.02.2015	60	1	0.4447	0.2057
29	*Stipa pennata*	27.02.2015	60	2	NA	NA
31	*Stipa robusta*	27.02.2015	11	1	0.0064	0.0011
31	*Stipa robusta*	27.02.2015	11	2	0.0062	0.0014
31	*Stipa robusta*	27.02.2015	20	1	0.0224	0.0096
31	*Stipa robusta*	27.02.2015	20	2	0.0180	0.0113
31	*Stipa robusta*	27.02.2015	25	1	0.0302	0.0213
31	*Stipa robusta*	27.02.2015	25	2	0.0279	0.0113
31	*Stipa robusta*	27.02.2015	30	1	0.0484	0.0152
31	*Stipa robusta*	27.02.2015	30	2	0.0633	0.0204
31	*Stipa robusta*	27.02.2015	35	1	0.0859	0.0284
31	*Stipa robusta*	27.02.2015	35	2	0.0520	0.0187
31	*Stipa robusta*	27.02.2015	36	1	0.0934	0.0199
31	*Stipa robusta*	27.02.2015	35	2	0.1141	0.0254
31	*Stipa robusta*	27.02.2015	40	1	0.1423	0.0419
31	*Stipa robusta*	27.02.2015	40	2	0.2022	0.0583
31	*Stipa robusta*	27.02.2015	44	1	0.2333	0.0693
31	*Stipa robusta*	27.02.2015	44	2	0.2352	0.0526
31	*Stipa robusta*	27.02.2015	47	1	0.0340	0.0172
31	*Stipa robusta*	27.02.2015	47	2	0.0983	0.0121
31	*Stipa robusta*	27.02.2015	52	1	0.1641	0.0216
31	*Stipa robusta*	27.02.2015	52	2	0.2190	0.0173
31	*Stipa robusta*	27.02.2015	55	1	0.2621	0.0236
31	*Stipa robusta*	27.02.2015	55	2	0.4509	0.1392
31	*Stipa robusta*	27.02.2015	57	1	0.4347	0.0353
31	*Stipa robusta*	27.02.2015	57	2	0.8420	0.3034
31	*Stipa robusta*	27.02.2015	60	1	0.2406	0.0109
31	*Stipa robusta*	27.02.2015	60	2	0.5458	0.1598
33	*Nassella viridula*	27.02.2015	11	1	0.0019	0.0008
33	*Nassella viridula*	27.02.2015	11	2	0.0014	0.0008
33	*Nassella viridula*	27.02.2015	20	1	0.0037	0.0010
33	*Nassella viridula*	27.02.2015	20	2	0.0042	0.0011
33	*Nassella viridula*	27.02.2015	30	1	0.0052	0.0025
33	*Nassella viridula*	27.02.2015	30	2	0.0101	0.0046
33	*Nassella viridula*	27.02.2015	33	1	0.0257	0.0128

33	*Nassella viridula*	27.02.2015	33	2	0.0115	0.0059
33	*Nassella viridula*	27.02.2015	35	1	0.0252	0.0110
33	*Nassella viridula*	27.02.2015	35	2	0.0377	0.0165
33	*Nassella viridula*	27.02.2015	36	1	0.1127	0.0492
33	*Nassella viridula*	27.02.2015	36	2	0.0537	0.0245
33	*Nassella viridula*	27.02.2015	40	1	0.0742	0.0288
33	*Nassella viridula*	27.02.2015	40	2	0.0805	0.0319
33	*Nassella viridula*	27.02.2015	44	1	0.1392	0.0502
33	*Nassella viridula*	27.02.2015	44	2	0.0666	0.0178
33	*Nassella viridula*	27.02.2015	47	2	0.2658	0.0914
33	*Nassella viridula*	27.02.2015	47	1	0.1791	0.0530
33	*Nassella viridula*	27.02.2015	52	2	0.3162	0.1115
33	*Nassella viridula*	27.02.2015	52	1	0.0826	0.0249
33	*Nassella viridula*	27.02.2015	55	2	0.6290	0.2331
33	*Nassella viridula*	27.02.2015	55	1	0.9307	0.3654
33	*Nassella viridula*	27.02.2015	57	2	0.6912	0.2315
33	*Nassella viridula*	27.02.2015	57	2	0.8754	0.3293
34	*Nassella viridula*	27.02.2015	11	1	0.0045	0.0011
34	*Nassella viridula*	27.02.2015	11	2	0.0043	0.0013
34	*Nassella viridula*	27.02.2015	20	1	0.0106	0.0036
34	*Nassella viridula*	27.02.2015	20	2	0.0132	0.0064
34	*Nassella viridula*	27.02.2015	25	1	0.0215	0.0112
34	*Nassella viridula*	27.02.2015	25	2	0.0140	0.0068
34	*Nassella viridula*	27.02.2015	30	2	0.0389	0.0146
34	*Nassella viridula*	27.02.2015	30	1	0.0330	0.0149
34	*Nassella viridula*	27.02.2015	35	2	0.0588	0.0265
34	*Nassella viridula*	27.02.2015	35	1	0.0372	0.0165
34	*Nassella viridula*	27.02.2015	36	2	0.0914	0.0324
34	*Nassella viridula*	27.02.2015	35	1	0.0787	0.0293
34	*Nassella viridula*	27.02.2015	40	2	0.1583	0.0494
34	*Nassella viridula*	27.02.2015	40	2	0.1209	0.0534
34	*Nassella viridula*	27.02.2015	44	1	0.2301	0.1154
34	*Nassella viridula*	27.02.2015	44	2	0.1459	0.0648
34	*Nassella viridula*	27.02.2015	47	1	0.1723	0.0764
34	*Nassella viridula*	27.02.2015	47	2	0.2015	0.0798
34	*Nassella viridula*	27.02.2015	52	1	0.2503	0.0783
34	*Nassella viridula*	27.02.2015	52	2	0.4224	0.1600
34	*Nassella viridula*	27.02.2015	55	2	0.7652	0.2970
34	*Nassella viridula*	27.02.2015	55	1	0.5354	0.2564
34	*Nassella viridula*	27.02.2015	57	2	0.8877	0.3766
34	*Nassella viridula*	27.02.2015	57	1	NA	NA
34	*Nassella viridula*	27.02.2015	60	2	0.8354	0.3999
34	*Nassella viridula*	27.02.2015	60	1	NA	NA
35	*Agrostis canina*	27.02.2015	11	2	0.0000	0.0000

35	*Agrostis canina*	27.02.2015	11	2	0.0001	0.0000
35	*Agrostis canina*	27.02.2015	20	1	0.0018	0.0029
35	*Agrostis canina*	27.02.2015	20	2	0.0007	0.0001
35	*Agrostis canina*	27.02.2015	25	1	0.0062	0.0031
35	*Agrostis canina*	27.02.2015	25	2	0.0044	0.0082
35	*Agrostis canina*	27.02.2015	30	1	0.0065	0.0047
35	*Agrostis canina*	27.02.2015	30	2	0.0273	0.0126
35	*Agrostis canina*	27.02.2015	35	2	0.0285	0.0270
35	*Agrostis canina*	27.02.2015	35	1	0.0147	0.0149
35	*Agrostis canina*	27.02.2015	36	2	0.0252	0.0185
35	*Agrostis canina*	27.02.2015	35	1	0.0313	0.0269
35	*Agrostis canina*	27.02.2015	40	2	0.1316	0.0739
35	*Agrostis canina*	27.02.2015	40	1	0.1543	0.0619
35	*Agrostis canina*	27.02.2015	44	2	0.2048	0.0740
35	*Agrostis canina*	27.02.2015	44	2	0.1773	0.1195
35	*Agrostis canina*	27.02.2015	47	1	0.8532	0.7020
35	*Agrostis canina*	27.02.2015	47	2	0.4494	0.1678
35	*Agrostis canina*	27.02.2015	52	1	0.3956	0.2429
35	*Agrostis canina*	27.02.2015	52	2	0.7887	0.2414
35	*Agrostis canina*	27.02.2015	55	1	0.8492	0.3867
35	*Agrostis canina*	27.02.2015	55	2	1.1351	0.3608
35	*Agrostis canina*	27.02.2015	57	2	1.3628	0.4485
35	*Agrostis canina*	27.02.2015	57	1	2.0809	0.7044
36	*Agrostis capillaris*	27.02.2015	13	2	0.0011	0.0002
36	*Agrostis capillaris*	27.02.2015	13	1	0.0016	0.0009
36	*Agrostis capillaris*	27.02.2015	20	2	0,0038	0,0036
36	*Agrostis capillaris*	27.02.2015	20	1	0,0033	0,0041
36	*Agrostis capillaris*	27.02.2015	25	2	0.0114	0.0094
36	*Agrostis capillaris*	27.02.2015	25	2	0.0090	0.0086
36	*Agrostis capillaris*	27.02.2015	30	1	0.0107	0.0083
36	*Agrostis capillaris*	27.02.2015	30	2	0.0247	0.0132
36	*Agrostis capillaris*	27.02.2015	35	1	0.0350	0.0275
36	*Agrostis capillaris*	27.02.2015	35	2	0.0670	0.0476
36	*Agrostis capillaris*	27.02.2015	36	1	0.0787	0.0365
36	*Agrostis capillaris*	27.02.2015	36	2	0.2292	0.0947
36	*Agrostis capillaris*	27.02.2015	40	2	0.6350	0.2599
36	*Agrostis capillaris*	27.02.2015	40	1	0.2836	0.0667
36	*Agrostis capillaris*	27.02.2015	44	2	0.3122	0.0927
36	*Agrostis capillaris*	27.02.2015	44	1	0.5180	0.2249
36	*Agrostis capillaris*	27.02.2015	47	2	1.0738	0.5154
36	*Agrostis capillaris*	27.02.2015	47	1	0.5769	0.2888
36	*Agrostis capillaris*	27.02.2015	52	2	1.6653	0.6567
36	*Agrostis capillaris*	27.02.2015	52	2	0.8862	0.6052
36	*Agrostis capillaris*	27.02.2015	55	1	2.0834	0.7829

36	*Agrostis capillaris*	27.02.2015	55	2	1.1459	0.5695
36	*Agrostis capillaris*	27.02.2015	57	1	2.5277	1.0550
36	*Agrostis capillaris*	27.02.2015	57	2	2.2858	1.0632
37	*Agrostis stolonifera*	27.02.2015	13	1	0.0005	0.0002
37	*Agrostis stolonifera*	27.02.2015	13	2	0.0004	0.0001
37	*Agrostis stolonifera*	27.02.2015	20	2	0.0016	0.0023
37	*Agrostis stolonifera*	27.02.2015	20	1	0.0015	0.0008
37	*Agrostis stolonifera*	27.02.2015	25	2	0.0072	0.0073
37	*Agrostis stolonifera*	27.02.2015	25	1	0.0015	0.0041
37	*Agrostis stolonifera*	27.02.2015	30	2	0.0072	0.0035
37	*Agrostis stolonifera*	27.02.2015	30	1	0.0101	0.0074
37	*Agrostis stolonifera*	27.02.2015	35	2	0.0129	0.0117
37	*Agrostis stolonifera*	27.02.2015	35	2	0.0171	0.0145
37	*Agrostis stolonifera*	27.02.2015	36	1	0.0267	0.0295
37	*Agrostis stolonifera*	27.02.2015	36	2	0.0418	0.0352
37	*Agrostis stolonifera*	27.02.2015	40	1	0.0488	0.0295
37	*Agrostis stolonifera*	27.02.2015	40	2	0.1968	0.1193
37	*Agrostis stolonifera*	27.02.2015	44	1	0.1037	0.0952
37	*Agrostis stolonifera*	27.02.2015	44	2	0.0678	0.0373
37	*Agrostis stolonifera*	27.02.2015	47	2	0.2688	0.2492
37	*Agrostis stolonifera*	27.02.2015	47	1	0.1953	0.1061
37	*Agrostis stolonifera*	27.02.2015	52	2	0.4652	0.3430
37	*Agrostis stolonifera*	27.02.2015	52	1	0.6696	0.3466
37	*Agrostis stolonifera*	27.02.2015	55	2	0.7194	0.2449
37	*Agrostis stolonifera*	27.02.2015	55	1	0.6160	0.2209
37	*Agrostis stolonifera*	27.02.2015	57	2	1.2745	0.5604
37	*Agrostis stolonifera*	27.02.2015	57	2	0.9713	0.3943
38	*Alopecurus pratensis*	27.02.2015	8	1	0.0014	0.0002
38	*Alopecurus pratensis*	27.02.2015	8	2	0.0025	0.0004
38	*Alopecurus pratensis*	27.02.2015	13	1	0.0042	0.0034
38	*Alopecurus pratensis*	27.02.2015	13	2	0.0042	0.0034
38	*Alopecurus pratensis*	27.02.2015	20	1	0.0079	0.0061
38	*Alopecurus pratensis*	27.02.2015	20	2	0.0093	0.0103
38	*Alopecurus pratensis*	27.02.2015	25	2	0.0141	0.0094
38	*Alopecurus pratensis*	27.02.2015	25	1	0.0132	0.0092
38	*Alopecurus pratensis*	27.02.2015	30	2	0.0399	0.0222
38	*Alopecurus pratensis*	27.02.2015	30	1	0.0315	0.0146
38	*Alopecurus pratensis*	27.02.2015	33	2	0.1177	0.0514
38	*Alopecurus pratensis*	27.02.2015	33	1	0.0665	0.0266
38	*Alopecurus pratensis*	27.02.2015	36	2	0.0762	0.0253
38	*Alopecurus pratensis*	27.02.2015	36	2	0.2149	0.0746
38	*Alopecurus pratensis*	27.02.2015	40	1	0.2442	0.0889
38	*Alopecurus pratensis*	27.02.2015	40	2	0.4101	0.1094
38	*Alopecurus pratensis*	27.02.2015	44	1	0.6437	0.2297

38	*Alopecurus pratensis*	27.02.2015	44	2	0.2914	0.1224
38	*Alopecurus pratensis*	27.02.2015	47	1	0.6604	0.2154
38	*Alopecurus pratensis*	27.02.2015	47	2	1.0360	0.4869
38	*Alopecurus pratensis*	27.02.2015	52	2	0.9021	0.3596
38	*Alopecurus pratensis*	27.02.2015	52	1	1.0860	0.3898
38	*Alopecurus pratensis*	27.02.2015	55	2	1.0236	0.8384
38	*Alopecurus pratensis*	27.02.2015	55	1	1.3394	0.7101
39	*Alopercurus geniculatus*	27.02.2015	11	2	0.0014	0.0003
39	*Alopercurus geniculatus*	27.02.2015	11	1	0.0011	0.0002
39	*Alopercurus geniculatus*	27.02.2015	20	2	0.0075	0.0091
39	*Alopercurus geniculatus*	27.02.2015	20	2	0.0059	0.0116
39	*Alopercurus geniculatus*	27.02.2015	25	1	0.0112	0.0110
39	*Alopercurus geniculatus*	27.02.2015	25	2	0.0138	0.0122
39	*Alopercurus geniculatus*	27.02.2015	30	1	0.0186	0.0080
39	*Alopercurus geniculatus*	27.02.2015	30	2	0.0472	0.0194
39	*Alopercurus geniculatus*	27.02.2015	35	1	0.1089	0.0525
39	*Alopercurus geniculatus*	27.02.2015	35	2	0.0461	0.0232
39	*Alopercurus geniculatus*	27.02.2015	36	2	0.1529	0.0659
39	*Alopercurus geniculatus*	27.02.2015	35	1	0.3399	0.1272
39	*Alopercurus geniculatus*	27.02.2015	40	2	0.4533	0.1038
39	*Alopercurus geniculatus*	27.02.2015	40	1	0.3076	0.0803
39	*Alopercurus geniculatus*	27.02.2015	44	2	1.3260	0.3008
39	*Alopercurus geniculatus*	27.02.2015	44	1	0.9924	0.2774
39	*Alopercurus geniculatus*	27.02.2015	47	2	1.5701	0.4244
39	*Alopercurus geniculatus*	27.02.2015	47	2	1.8107	0.4755
39	*Alopercurus geniculatus*	27.02.2015	52	1	1.0453	0.3916
39	*Alopercurus geniculatus*	27.02.2015	52	2	1.9826	0.5232
39	*Alopercurus geniculatus*	27.02.2015	55	1	1.0840	0.3137
39	*Alopercurus geniculatus*	27.02.2015	55	2	1.7333	0.4076
39	*Alopercurus geniculatus*	27.02.2015	57	1	4.4238	1.5229
39	*Alopercurus geniculatus*	27.02.2015	57	2	3.5161	0.8943
40	*Ammophila arenaria*	05.03.2015	10	2	0.0034	0.0004
40	*Ammophila arenaria*	05.03.2015	10	1	0.0020	0.0010
40	*Ammophila arenaria*	05.03.2015	19	2	0.0032	0.0010
40	*Ammophila arenaria*	05.03.2015	19	1	0.0048	0.0015
40	*Ammophila arenaria*	05.03.2015	24	2	0.0043	0.0007
40	*Ammophila arenaria*	05.03.2015	24	1	0.0052	0.0001
40	*Ammophila arenaria*	05.03.2015	28	2	0.0091	0.0037
40	*Ammophila arenaria*	05.03.2015	28	2	0.0111	0.0028
40	*Ammophila arenaria*	05.03.2015	33	1	0.0240	0.0041
40	*Ammophila arenaria*	05.03.2015	33	2	0.0122	0.0023
40	*Ammophila arenaria*	05.03.2015	37	1	0.0996	0.0188
40	*Ammophila arenaria*	05.03.2015	37	2	0.0554	0.0159
40	*Ammophila arenaria*	05.03.2015	40	1	0.0839	0.0127

40	*Ammophila arenaria*	05.03.2015	40	2	0.1005	0.0129
40	*Ammophila arenaria*	05.03.2015	45	2	0.1374	0.0229
40	*Ammophila arenaria*	05.03.2015	45	1	0.1156	0.0209
40	*Ammophila arenaria*	05.03.2015	48	2	0.1491	0.0174
40	*Ammophila arenaria*	05.03.2015	48	1	0.1973	0.0469
40	*Ammophila arenaria*	05.03.2015	50	2	0.1576	0.0324
40	*Ammophila arenaria*	05.03.2015	50	1	0.1320	0.0205
40	*Ammophila arenaria*	05.03.2015	53	2	0.1488	0.0665
40	*Ammophila arenaria*	05.03.2015	53	2	0.2982	0.0268
40	*Ammophila arenaria*	05.03.2015	57	1	0.4345	0.0992
40	*Ammophila arenaria*	05.03.2015	57	2	0.4458	0.1123
42	*Arctagrostis latifolia*	02.03.2015	11	1	0.0016	0.0007
42	*Arctagrostis latifolia*	02.03.2015	11	2	0.0010	0.0003
42	*Arctagrostis latifolia*	02.03.2015	17	1	0.0026	0.0019
42	*Arctagrostis latifolia*	02.03.2015	17	2	0.0031	0.0031
42	*Arctagrostis latifolia*	02.03.2015	22	2	0.0041	0.0026
42	*Arctagrostis latifolia*	02.03.2015	22	1	0.0037	0.0032
42	*Arctagrostis latifolia*	02.03.2015	27	2	0.0089	0.0042
42	*Arctagrostis latifolia*	02.03.2015	27	1	0.0151	0.0094
42	*Arctagrostis latifolia*	02.03.2015	31	2	0.0365	0.0201
42	*Arctagrostis latifolia*	02.03.2015	31	1	0.0317	0.0255
42	*Arctagrostis latifolia*	02.03.2015	36	2	0.0781	0.0637
42	*Arctagrostis latifolia*	02.03.2015	36	2	0.0603	0.0424
42	*Arctagrostis latifolia*	02.03.2015	40	1	0.0850	0.0338
42	*Arctagrostis latifolia*	02.03.2015	40	2	0.2216	0.1154
42	*Arctagrostis latifolia*	02.03.2015	43	1	0.1550	0.0575
42	*Arctagrostis latifolia*	02.03.2015	43	2	0.1819	0.1332
42	*Arctagrostis latifolia*	02.03.2015	48	1	0.1137	0.0390
42	*Arctagrostis latifolia*	02.03.2015	48	2	0.2994	0.0965
42	*Arctagrostis latifolia*	02.03.2015	51	2	0.5253	0.5314
42	*Arctagrostis latifolia*	02.03.2015	51	1	0.4913	0.2062
42	*Arctagrostis latifolia*	02.03.2015	53	2	0.3452	0.3350
42	*Arctagrostis latifolia*	02.03.2015	53	1	0.3867	0.2158
42	*Arctagrostis latifolia*	02.03.2015	56	2	0.6539	0.4340
42	*Arctagrostis latifolia*	02.03.2015	56	1	1.0331	0.6074
43	*Arrhenatherum elatius*	02.03.2015	5	2	0.0057	0.0025
43	*Arrhenatherum elatius*	02.03.2015	5	2	0.0046	0.0024
43	*Arrhenatherum elatius*	02.03.2015	11	1	0.0102	0.0098
43	*Arrhenatherum elatius*	02.03.2015	11	2	0.0163	0.0070
43	*Arrhenatherum elatius*	02.03.2015	17	1	0.0246	0.0245
43	*Arrhenatherum elatius*	02.03.2015	17	2	0.0286	0.0197
43	*Arrhenatherum elatius*	02.03.2015	22	1	0.0195	0.0223
43	*Arrhenatherum elatius*	02.03.2015	22	2	0.0347	0.0395
43	*Arrhenatherum elatius*	02.03.2015	27	2	0.0485	0.0436

43	*Arrhenatherum elatius*	02.03.2015	27	1	0.0456	0.0191
43	*Arrhenatherum elatius*	02.03.2015	32	2	0.1298	0.0652
43	*Arrhenatherum elatius*	02.03.2015	32	1	0.1410	0.0773
43	*Arrhenatherum elatius*	02.03.2015	37	2	0.4763	0.1473
43	*Arrhenatherum elatius*	02.03.2015	37	1	0.4988	0.1368
43	*Arrhenatherum elatius*	02.03.2015	41	2	0.8127	0.2654
43	*Arrhenatherum elatius*	02.03.2015	41	2	0.7618	0.1883
43	*Arrhenatherum elatius*	02.03.2015	44	1	0.5897	0.2426
43	*Arrhenatherum elatius*	02.03.2015	44	2	0.2860	0.0746
43	*Arrhenatherum elatius*	02.03.2015	49	1	0.8106	0.3350
43	*Arrhenatherum elatius*	02.03.2015	49	2	1.4794	0.6600
43	*Arrhenatherum elatius*	02.03.2015	52	1	1.9325	0.8811
43	*Arrhenatherum elatius*	02.03.2015	52	2	2.0873	0.4787
43	*Arrhenatherum elatius*	02.03.2015	54	2	2.6386	0.6986
43	*Arrhenatherum elatius*	02.03.2015	54	1	2.1757	0.4066
44	*Briza media*	02.03.2015	15	2	0.0026	0.0012
44	*Briza media*	02.03.2015	15	1	0.0036	0.0014
44	*Briza media*	02.03.2015	22	2	0.0028	0.0016
44	*Briza media*	02.03.2015	22	1	0.0028	0.0014
44	*Briza media*	02.03.2015	27	2	0.0071	0.0029
44	*Briza media*	02.03.2015	27	2	0.0074	0.0029
44	*Briza media*	02.03.2015	32	1	0.0117	0.0077
44	*Briza media*	02.03.2015	32	2	0.0139	0.0081
44	*Briza media*	02.03.2015	37	1	0.0415	0.0111
44	*Briza media*	02.03.2015	37	2	0.0388	0.0214
44	*Briza media*	02.03.2015	41	1	0.1339	0.0523
44	*Briza media*	02.03.2015	41	2	0.0721	0.0391
44	*Briza media*	02.03.2015	44	2	0.0867	0.0395
44	*Briza media*	02.03.2015	44	1	0.0412	0.0220
44	*Briza media*	02.03.2015	49	2	0.1307	0.0676
44	*Briza media*	02.03.2015	49	1	0.1323	0.0522
44	*Briza media*	02.03.2015	52	2	0.3678	0.1964
44	*Briza media*	02.03.2015	52	1	0.1946	0.0734
44	*Briza media*	02.03.2015	54	2	0.4086	0.2174
44	*Briza media*	02.03.2015	54	2	0.3600	0.1148
44	*Briza media*	02.03.2015	61	1	0.6734	0.2791
44	*Briza media*	02.03.2015	61	2	0.5443	0.1298
45	*Bromus benekeni*	05.03.2015	7	1	0.0026	0.0002
45	*Bromus benekeni*	05.03.2015	7	2	0.0030	0.0013
45	*Bromus benekeni*	05.03.2015	14	1	0.0109	0.0066
45	*Bromus benekeni*	05.03.2015	14	2	NA	NA
45	*Bromus benekeni*	05.03.2015	19	2	0.0148	0.0091
45	*Bromus benekeni*	05.03.2015	19	1	NA	NA
45	*Bromus benekeni*	05.03.2015	24	2	0.0330	0.0159

45	*Bromus benekeni*	05.03.2015	24	1	NA	NA
45	*Bromus benekeni*	05.03.2015	28	2	0.0389	0.0231
45	*Bromus benekeni*	05.03.2015	28	1	NA	NA
45	*Bromus benekeni*	05.03.2015	33	2	0.0895	0.0422
45	*Bromus benekeni*	05.03.2015	33	2	NA	NA
45	*Bromus benekeni*	05.03.2015	37	1	0.1417	0.0667
45	*Bromus benekeni*	05.03.2015	37	2	NA	NA
45	*Bromus benekeni*	05.03.2015	40	1	0.1693	0.0767
45	*Bromus benekeni*	05.03.2015	40	2	NA	NA
45	*Bromus benekeni*	05.03.2015	45	1	0.3476	0.1376
45	*Bromus benekeni*	05.03.2015	45	2	NA	NA
45	*Bromus benekeni*	05.03.2015	48	2	0.5064	0.2225
45	*Bromus benekeni*	05.03.2015	48	1	NA	NA
45	*Bromus benekeni*	05.03.2015	50	2	0.5059	0.2203
45	*Bromus benekeni*	05.03.2015	50	1	NA	NA
45	*Bromus benekeni*	05.03.2015	53	2	0.6433	0.3410
45	*Bromus benekeni*	05.03.2015	53	1	NA	NA
46	*Bromus inermis*	27.02.2015	8	2	0.0075	0.0024
46	*Bromus inermis*	27.02.2015	8	2	0.0060	0.0026
46	*Bromus inermis*	27.02.2015	13	1	0.0140	0.0105
46	*Bromus inermis*	27.02.2015	13	2	0.0157	0.0099
46	*Bromus inermis*	27.02.2015	20	1	0.0150	0.0174
46	*Bromus inermis*	27.02.2015	20	2	0.0162	0.0116
46	*Bromus inermis*	27.02.2015	25	1	0.0431	0.0276
46	*Bromus inermis*	27.02.2015	25	2	0.0209	0.0145
46	*Bromus inermis*	27.02.2015	30	2	0.0600	0.0417
46	*Bromus inermis*	27.02.2015	30	1	0.0188	0.0085
46	*Bromus inermis*	27.02.2015	33	2	0.0934	0.0676
46	*Bromus inermis*	27.02.2015	33	1	0.1315	0.0902
46	*Bromus inermis*	27.02.2015	36	2	0.4314	0.3203
46	*Bromus inermis*	27.02.2015	36	1	0.3575	0.3068
46	*Bromus inermis*	27.02.2015	40	2	0.6628	0.3028
46	*Bromus inermis*	27.02.2015	40	2	0.8699	0.5700
46	*Bromus inermis*	27.02.2015	44	1	0.7086	0.4112
46	*Bromus inermis*	27.02.2015	44	2	0.7955	0.5075
46	*Bromus inermis*	27.02.2015	47	1	1.6687	1.3731
46	*Bromus inermis*	27.02.2015	47	2	1.5563	1.3521
46	*Bromus inermis*	27.02.2015	52	1	1.8163	1.1237
46	*Bromus inermis*	27.02.2015	52	2	1.6630	1.1380
46	*Bromus inermis*	27.02.2015	55	2	2.4299	1.7372
46	*Bromus inermis*	27.02.2015	55	1	1.5871	1.4357
47	*Bromus ramosus*	19.03.2015	3	2	0.0047	0.0016
47	*Bromus ramosus*	19.03.2015	3	1	0.0056	0.0021
47	*Bromus ramosus*	19.03.2015	10	2	0.0065	0.0041

47	*Bromus ramosus*	19.03.2015	10	1	0.0062	0.0046
47	*Bromus ramosus*	19.03.2015	14	2	0.0112	0.0131
47	*Bromus ramosus*	19.03.2015	14	2	0.0136	0.0098
47	*Bromus ramosus*	19.03.2015	19	1	0.0501	0.0304
47	*Bromus ramosus*	19.03.2015	19	2	0.0624	0.0247
47	*Bromus ramosus*	19.03.2015	23	1	0.0559	0.0282
47	*Bromus ramosus*	19.03.2015	23	2	0.0337	0.0182
47	*Bromus ramosus*	19.03.2015	26	1	0.0705	0.0331
47	*Bromus ramosus*	19.03.2015	26	2	0.0431	0.0132
47	*Bromus ramosus*	19.03.2015	31	2	0.2405	0.0807
47	*Bromus ramosus*	19.03.2015	31	1	0.2379	0.0773
47	*Bromus ramosus*	19.03.2015	34	2	0.1773	0.0642
47	*Bromus ramosus*	19.03.2015	34	1	0.1768	0.0673
47	*Bromus ramosus*	19.03.2015	36	2	0.3118	0.0818
47	*Bromus ramosus*	19.03.2015	36	1	0.7164	0.2900
47	*Bromus ramosus*	19.03.2015	39	2	0.4338	0.2543
47	*Bromus ramosus*	19.03.2015	39	2	0.5633	0.2345
47	*Bromus ramosus*	19.03.2015	43	1	1.1626	0.4655
47	*Bromus ramosus*	19.03.2015	43	2	1.3784	0.4312
47	*Bromus ramosus*	19.03.2015	47	1	1.4092	0.4898
47	*Bromus ramosus*	19.03.2015	47	2	0.9230	0.3000
48	*Calamagrostis canescens*	05.03.2015	19	1	0.0042	0.0011
48	*Calamagrostis canescens*	05.03.2015	19	2	0.0027	0.0008
48	*Calamagrostis canescens*	05.03.2015	28	2	0.0145	0.0104
48	*Calamagrostis canescens*	05.03.2015	28	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	37	2	0.0925	0.0315
48	*Calamagrostis canescens*	05.03.2015	37	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	40	2	0.0200	0.0122
48	*Calamagrostis canescens*	05.03.2015	40	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	45	2	0.1344	0.0453
48	*Calamagrostis canescens*	05.03.2015	45	2	NA	NA
48	*Calamagrostis canescens*	05.03.2015	48	1	0.2233	0.0872
48	*Calamagrostis canescens*	05.03.2015	48	2	NA	NA
48	*Calamagrostis canescens*	05.03.2015	50	1	0.5709	0.1900
48	*Calamagrostis canescens*	05.03.2015	50	2	NA	NA
48	*Calamagrostis canescens*	05.03.2015	53	1	0.6616	0.2047
48	*Calamagrostis canescens*	05.03.2015	53	2	NA	NA
48	*Calamagrostis canescens*	05.03.2015	57	2	1.0904	0.4865
48	*Calamagrostis canescens*	05.03.2015	57	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	61	2	2.0977	1.1289
48	*Calamagrostis canescens*	05.03.2015	61	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	64	2	1.7622	1.0197
48	*Calamagrostis canescens*	05.03.2015	64	1	NA	NA
48	*Calamagrostis canescens*	05.03.2015	68	2	1.9117	0.7815

48	*Calamagrostis canescens*	05.03.2015	68	2	NA	NA
49	*Cynosurus cristatus*	02.03.2015	10	1	0.0008	0.0000
49	*Cynosurus cristatus*	02.03.2015	10	2	0.0010	0.0004
49	*Cynosurus cristatus*	02.03.2015	17	1	0.0046	0.0060
49	*Cynosurus cristatus*	02.03.2015	17	2	0.0026	0.0024
49	*Cynosurus cristatus*	02.03.2015	22	1	0.0155	0.0109
49	*Cynosurus cristatus*	02.03.2015	22	2	0.0069	0.0041
49	*Cynosurus cristatus*	02.03.2015	27	2	0.0080	0.0065
49	*Cynosurus cristatus*	02.03.2015	27	1	0.0392	0.0266
49	*Cynosurus cristatus*	02.03.2015	32	2	0.0288	0.0200
49	*Cynosurus cristatus*	02.03.2015	32	1	0.0206	0.0134
49	*Cynosurus cristatus*	02.03.2015	37	2	0.1036	0.0592
49	*Cynosurus cristatus*	02.03.2015	37	1	0.1017	0.0556
49	*Cynosurus cristatus*	02.03.2015	41	2	0.1152	0.0622
49	*Cynosurus cristatus*	02.03.2015	41	2	0.1405	0.0653
49	*Cynosurus cristatus*	02.03.2015	44	1	0.0639	0.0463
49	*Cynosurus cristatus*	02.03.2015	44	2	0.2297	0.1611
49	*Cynosurus cristatus*	02.03.2015	49	1	0.4938	0.2014
49	*Cynosurus cristatus*	02.03.2015	49	2	0.2086	0.1073
49	*Cynosurus cristatus*	02.03.2015	52	1	0.7572	0.4446
49	*Cynosurus cristatus*	02.03.2015	52	2	0.7942	0.5914
49	*Cynosurus cristatus*	02.03.2015	54	2	0.5892	0.4896
49	*Cynosurus cristatus*	02.03.2015	54	1	1.0081	0.7733
49	*Cynosurus cristatus*	02.03.2015	61	2	0.9672	0.5446
49	*Cynosurus cristatus*	02.03.2015	61	1	0.9410	0.4585
50	*Dactylis glomerata*	02.03.2015	10	2	0.0016	0.0001
50	*Dactylis glomerata*	02.03.2015	10	1	0.0013	0.0003
50	*Dactylis glomerata*	02.03.2015	17	2	0.0082	0.0083
50	*Dactylis glomerata*	02.03.2015	17	2	0.0109	0.0121
50	*Dactylis glomerata*	02.03.2015	22	1	0.0185	0.0112
50	*Dactylis glomerata*	02.03.2015	22	2	0.0354	0.0186
50	*Dactylis glomerata*	02.03.2015	27	1	0.0985	0.0344
50	*Dactylis glomerata*	02.03.2015	27	2	0.1186	0.0616
50	*Dactylis glomerata*	02.03.2015	32	1	0.1835	0.0930
50	*Dactylis glomerata*	02.03.2015	32	2	0.1184	0.0587
50	*Dactylis glomerata*	02.03.2015	37	2	0.5646	0.2500
50	*Dactylis glomerata*	02.03.2015	37	1	0.2487	0.0979
50	*Dactylis glomerata*	02.03.2015	41	2	0.4201	0.1563
50	*Dactylis glomerata*	02.03.2015	41	1	0.3841	0.2780
50	*Dactylis glomerata*	02.03.2015	44	2	0.8193	0.5651
50	*Dactylis glomerata*	02.03.2015	44	1	0.6321	0.4332
50	*Dactylis glomerata*	02.03.2015	49	2	2.9120	0.9640
50	*Dactylis glomerata*	02.03.2015	49	2	2.0601	1.2884
50	*Dactylis glomerata*	02.03.2015	52	1	2.2930	0.9522

50	*Dactylis glomerata*	02.03.2015	52	2	2.1392	0.6444
50	*Dactylis glomerata*	02.03.2015	54	1	2.0459	1.0760
50	*Dactylis glomerata*	02.03.2015	54	2	2.3546	1.0200
50	*Dactylis glomerata*	02.03.2015	61	1	3.5724	1.4100
50	*Dactylis glomerata*	02.03.2015	61	2	3.3718	0.7921
51	*Deschampsia cespitosa*	02.03.2015	10	2	0.0010	0.0012
51	*Deschampsia cespitosa*	02.03.2015	10	1	0.0018	0.0006
51	*Deschampsia cespitosa*	02.03.2015	17	2	0.0051	0.0037
51	*Deschampsia cespitosa*	02.03.2015	17	1	0.0034	0.0045
51	*Deschampsia cespitosa*	02.03.2015	22	2	0.0091	0.0062
51	*Deschampsia cespitosa*	02.03.2015	22	1	0.0044	0.0024
51	*Deschampsia cespitosa*	02.03.2015	27	2	0.0192	0.0076
51	*Deschampsia cespitosa*	02.03.2015	27	2	0.0093	0.0073
51	*Deschampsia cespitosa*	02.03.2015	32	1	0.0133	0.0114
51	*Deschampsia cespitosa*	02.03.2015	32	2	0.0147	0.0128
51	*Deschampsia cespitosa*	02.03.2015	37	1	0.1383	0.0665
51	*Deschampsia cespitosa*	02.03.2015	37	2	0.1343	0.0763
51	*Deschampsia cespitosa*	02.03.2015	41	1	0.2906	0.1207
51	*Deschampsia cespitosa*	02.03.2015	41	2	0.0670	0.0247
51	*Deschampsia cespitosa*	02.03.2015	44	2	0.0741	0.0277
51	*Deschampsia cespitosa*	02.03.2015	44	1	0.1712	0.0576
51	*Deschampsia cespitosa*	02.03.2015	49	2	0.3934	0.1395
51	*Deschampsia cespitosa*	02.03.2015	49	1	0.3271	0.1118
51	*Deschampsia cespitosa*	02.03.2015	52	2	0.5349	0.2060
51	*Deschampsia cespitosa*	02.03.2015	52	1	0.5627	0.1877
51	*Deschampsia cespitosa*	02.03.2015	54	2	1.1370	0.4424
51	*Deschampsia cespitosa*	02.03.2015	54	2	0.7052	0.2151
51	*Deschampsia cespitosa*	02.03.2015	61	1	1.1030	0.3046
51	*Deschampsia cespitosa*	02.03.2015	61	2	1.2712	0.6071
53	*Elymus farctus*	02.03.2015	8	1	0.0094	0.0031
53	*Elymus farctus*	02.03.2015	8	2	0.0096	0.0023
53	*Elymus farctus*	02.03.2015	11	1	0.0318	0.0055
53	*Elymus farctus*	02.03.2015	11	2	0.0373	0.0069
53	*Elymus farctus*	02.03.2015	17	2	0.0247	0.0076
53	*Elymus farctus*	02.03.2015	17	1	0.0255	0.0120
53	*Elymus farctus*	02.03.2015	22	2	0.0439	0.0179
53	*Elymus farctus*	02.03.2015	22	1	0.0357	0.0225
53	*Elymus farctus*	02.03.2015	27	2	0.0511	0.0207
53	*Elymus farctus*	02.03.2015	27	1	0.0652	0.0223
53	*Elymus farctus*	02.03.2015	32	2	0.1063	0.0405
53	*Elymus farctus*	02.03.2015	32	2	0.0570	0.0127
53	*Elymus farctus*	02.03.2015	37	1	0.1246	0.0301
53	*Elymus farctus*	02.03.2015	37	2	0.1636	0.0592
53	*Elymus farctus*	02.03.2015	41	1	0.2169	0.0706

53	*Elymus farctus*	02.03.2015	41	2	0.2108	0.0991
53	*Elymus farctus*	02.03.2015	44	1	0.2249	0.0598
53	*Elymus farctus*	02.03.2015	44	2	0.3297	0.1516
53	*Elymus farctus*	02.03.2015	49	2	0.3751	0.1553
53	*Elymus farctus*	02.03.2015	49	1	0.3372	0.1112
53	*Elymus farctus*	02.03.2015	52	2	0.3360	0.0847
53	*Elymus farctus*	02.03.2015	52	1	0.6731	0.2291
53	*Elymus farctus*	02.03.2015	54	2	0.5575	0.0918
53	*Elymus farctus*	02.03.2015	54	1	0.1921	0.0423
55	*Elymus sibiricus*	02.03.2015	6	2	0.0025	0.0008
55	*Elymus sibiricus*	02.03.2015	6	2	0.0027	0.0021
55	*Elymus sibiricus*	02.03.2015	11	1	0.0037	0.0029
55	*Elymus sibiricus*	02.03.2015	11	2	0.0057	0.0050
55	*Elymus sibiricus*	02.03.2015	17	1	0.0092	0.0123
55	*Elymus sibiricus*	02.03.2015	17	2	0.0101	0.0171
55	*Elymus sibiricus*	02.03.2015	22	1	0.0170	0.0096
55	*Elymus sibiricus*	02.03.2015	22	2	0.0292	0.0162
55	*Elymus sibiricus*	02.03.2015	27	2	0.0787	0.0508
55	*Elymus sibiricus*	02.03.2015	27	1	0.0459	0.0159
55	*Elymus sibiricus*	02.03.2015	32	2	0.1591	0.0502
55	*Elymus sibiricus*	02.03.2015	32	1	0.0361	0.0151
55	*Elymus sibiricus*	02.03.2015	37	2	0.3347	0.0715
55	*Elymus sibiricus*	02.03.2015	37	1	0.4092	0.1628
55	*Elymus sibiricus*	02.03.2015	41	2	0.6421	0.1391
55	*Elymus sibiricus*	02.03.2015	41	2	0.7358	0.2031
55	*Elymus sibiricus*	02.03.2015	44	1	0.8223	0.2277
55	*Elymus sibiricus*	02.03.2015	44	2	0.7967	0.2128
55	*Elymus sibiricus*	02.03.2015	49	1	1.6249	0.4389
55	*Elymus sibiricus*	02.03.2015	49	2	1.9001	0.3751
55	*Elymus sibiricus*	02.03.2015	52	1	2.0527	0.5872
55	*Elymus sibiricus*	02.03.2015	52	2	0.9605	0.3301
55	*Elymus sibiricus*	02.03.2015	54	2	1.9540	0.5220
55	*Elymus sibiricus*	02.03.2015	54	1	1.5424	0.4681
57	*Festuca altissima*	06.03.2015	18	2	0.0018	0.0010
57	*Festuca altissima*	06.03.2015	18	1	0.0017	0.0001
57	*Festuca altissima*	06.03.2015	32	2	0.0026	0.0008
57	*Festuca altissima*	06.03.2015	32	1	NA	NA
57	*Festuca altissima*	06.03.2015	36	2	0.0028	0.0011
57	*Festuca altissima*	06.03.2015	36	2	NA	NA
57	*Festuca altissima*	06.03.2015	39	1	0.0053	0.0018
57	*Festuca altissima*	06.03.2015	39	2	NA	NA
57	*Festuca altissima*	06.03.2015	44	1	0.0233	0.0110
57	*Festuca altissima*	06.03.2015	44	2	NA	NA
57	*Festuca altissima*	06.03.2015	47	1	0.0183	0.0081

57	*Festuca altissima*	06.03.2015	47	2	NA	NA
57	*Festuca altissima*	06.03.2015	49	2	0.0130	0.0040
57	*Festuca altissima*	06.03.2015	49	1	NA	NA
57	*Festuca altissima*	06.03.2015	52	2	0.1033	0.0434
57	*Festuca altissima*	06.03.2015	52	1	NA	NA
57	*Festuca altissima*	06.03.2015	56	2	0.0890	0.0380
57	*Festuca altissima*	06.03.2015	56	1	NA	NA
57	*Festuca altissima*	06.03.2015	60	2	0.1048	0.0226
57	*Festuca altissima*	06.03.2015	60	2	NA	NA
57	*Festuca altissima*	06.03.2015	63	1	0.0985	0.0376
57	*Festuca altissima*	06.03.2015	63	2	NA	NA
57	*Festuca altissima*	06.03.2015	67	1	0.3058	0.1214
57	*Festuca altissima*	06.03.2015	67	2	NA	NA
58	*Festuca arundinacea*	02.03.2015	6	1	0.0024	0.0008
58	*Festuca arundinacea*	02.03.2015	6	2	0.0022	0.0010
58	*Festuca arundinacea*	02.03.2015	11	2	0.0032	0.0027
58	*Festuca arundinacea*	02.03.2015	11	1	0.0065	0.0053
58	*Festuca arundinacea*	02.03.2015	17	2	0.0107	0.0096
58	*Festuca arundinacea*	02.03.2015	17	1	0.0129	0.0072
58	*Festuca arundinacea*	02.03.2015	22	2	0.0306	0.0175
58	*Festuca arundinacea*	02.03.2015	22	1	0.0122	0.0089
58	*Festuca arundinacea*	02.03.2015	27	2	0.0944	0.0396
58	*Festuca arundinacea*	02.03.2015	27	2	0.0590	0.0377
58	*Festuca arundinacea*	02.03.2015	32	1	0.0558	0.0412
58	*Festuca arundinacea*	02.03.2015	32	2	0.0781	0.0289
58	*Festuca arundinacea*	02.03.2015	37	1	0.5012	0.1838
58	*Festuca arundinacea*	02.03.2015	37	2	0.1751	0.0773
58	*Festuca arundinacea*	02.03.2015	41	1	0.2229	0.0924
58	*Festuca arundinacea*	02.03.2015	41	2	0.1287	0.0850
58	*Festuca arundinacea*	02.03.2015	44	2	0.3674	0.1783
58	*Festuca arundinacea*	02.03.2015	44	1	0.5665	0.2695
58	*Festuca arundinacea*	02.03.2015	49	2	0.6205	0.2365
58	*Festuca arundinacea*	02.03.2015	49	1	0.9590	1.2697
58	*Festuca arundinacea*	02.03.2015	52	2	1.4812	0.6909
58	*Festuca arundinacea*	02.03.2015	52	1	1.2490	0.6026
58	*Festuca arundinacea*	02.03.2015	54	2	1.1852	0.6650
58	*Festuca arundinacea*	02.03.2015	54	2	1.3085	0.6535
60	*Festuca petraea*	02.03.2015	15	1	0.0034	0.0001
60	*Festuca petraea*	02.03.2015	15	2	0.0015	0.0000
60	*Festuca petraea*	02.03.2015	22	1	0.0046	0.0024
60	*Festuca petraea*	02.03.2015	22	2	NA	NA
60	*Festuca petraea*	02.03.2015	27	1	0.0136	0.0080
60	*Festuca petraea*	02.03.2015	27	2	NA	NA
60	*Festuca petraea*	02.03.2015	32	2	0.0136	0.0070

60	*Festuca petraea*	02.03.2015	32	1	NA	NA
60	*Festuca petraea*	02.03.2015	37	2	0.0471	0.0306
60	*Festuca petraea*	02.03.2015	37	1	NA	NA
60	*Festuca petraea*	02.03.2015	41	2	0.0325	0.0157
60	*Festuca petraea*	02.03.2015	41	1	NA	NA
60	*Festuca petraea*	02.03.2015	44	2	0.0486	0.0240
60	*Festuca petraea*	02.03.2015	44	2	NA	NA
60	*Festuca petraea*	02.03.2015	49	1	0.1404	0.0537
60	*Festuca petraea*	02.03.2015	49	2	NA	NA
60	*Festuca petraea*	02.03.2015	52	1	0.1281	0.0572
60	*Festuca petraea*	02.03.2015	52	2	NA	NA
60	*Festuca petraea*	02.03.2015	54	1	0.3957	0.2621
60	*Festuca petraea*	02.03.2015	54	2	NA	NA
60	*Festuca petraea*	02.03.2015	61	2	0.5010	0.1868
60	*Festuca petraea*	02.03.2015	61	1	NA	NA
61	*Festuca pratensis*	27.02.2015	8	2	0.0039	0.0018
61	*Festuca pratensis*	27.02.2015	8	1	0.0014	0.0010
61	*Festuca pratensis*	27.02.2015	13	2	0.0053	0.0059
61	*Festuca pratensis*	27.02.2015	13	1	0.0085	0.0059
61	*Festuca pratensis*	27.02.2015	20	2	0.0168	0.0247
61	*Festuca pratensis*	27.02.2015	20	2	0.0077	0.0068
61	*Festuca pratensis*	27.02.2015	25	1	0.0567	0.0368
61	*Festuca pratensis*	27.02.2015	25	2	0.0641	0.0337
61	*Festuca pratensis*	27.02.2015	30	1	0.0813	0.0486
61	*Festuca pratensis*	27.02.2015	30	2	0.0435	0.0230
61	*Festuca pratensis*	27.02.2015	33	1	0.0798	0.0404
61	*Festuca pratensis*	27.02.2015	33	2	0.1093	0.0560
61	*Festuca pratensis*	27.02.2015	36	2	0.4279	0.2289
61	*Festuca pratensis*	27.02.2015	36	1	0.4962	0.2282
61	*Festuca pratensis*	27.02.2015	40	2	0.6317	0.3286
61	*Festuca pratensis*	27.02.2015	40	1	0.4049	0.1698
61	*Festuca pratensis*	27.02.2015	44	2	0.8302	0.4864
61	*Festuca pratensis*	27.02.2015	44	1	0.8436	0.6630
61	*Festuca pratensis*	27.02.2015	47	2	0.8084	0.4841
61	*Festuca pratensis*	27.02.2015	47	2	1.1308	0.5874
61	*Festuca pratensis*	27.02.2015	52	1	1.6564	0.9073
61	*Festuca pratensis*	27.02.2015	52	2	1.8342	0.8870
61	*Festuca pratensis*	27.02.2015	55	1	2.3816	1.5573
61	*Festuca pratensis*	27.02.2015	55	2	2.1501	1.0256
62	*Festuca rubra*	27.02.2015	8	1	0.0014	0.0009
62	*Festuca rubra*	27.02.2015	8	2	0.0024	0.0010
62	*Festuca rubra*	27.02.2015	13	2	0.0052	0.0029
62	*Festuca rubra*	27.02.2015	13	1	0.0027	0.0040
62	*Festuca rubra*	27.02.2015	20	2	0.0103	0.0077

62	*Festuca rubra*	27.02.2015	20	1	0.0052	0.0063
62	*Festuca rubra*	27.02.2015	25	2	0.0156	0.0058
62	*Festuca rubra*	27.02.2015	25	1	0.0147	0.0065
62	*Festuca rubra*	27.02.2015	30	2	0.0521	0.0178
62	*Festuca rubra*	27.02.2015	30	2	0.0872	0.0230
62	*Festuca rubra*	27.02.2015	33	1	0.1301	0.0464
62	*Festuca rubra*	27.02.2015	33	2	0.0559	0.0227
62	*Festuca rubra*	27.02.2015	36	1	0.1056	0.0356
62	*Festuca rubra*	27.02.2015	36	2	0.2238	0.0832
62	*Festuca rubra*	27.02.2015	40	1	0.2348	0.1185
62	*Festuca rubra*	27.02.2015	40	2	0.1210	0.0671
62	*Festuca rubra*	27.02.2015	44	2	0.3176	0.1034
62	*Festuca rubra*	27.02.2015	44	1	0.1901	0.0711
62	*Festuca rubra*	27.02.2015	47	2	0.4843	0.2156
62	*Festuca rubra*	27.02.2015	47	1	0.4542	0.1759
62	*Festuca rubra*	27.02.2015	52	2	0.5770	0.3178
62	*Festuca rubra*	27.02.2015	52	1	0.4852	0.2901
62	*Festuca rubra*	27.02.2015	55	2	1.6942	0.5548
62	*Festuca rubra*	27.02.2015	55	2	1.6262	0.9432
63	*Festuca subverticillata*	08.03.2015	9	1	0.0036	0.0014
63	*Festuca subverticillata*	08.03.2015	9	2	0.0047	0.0012
63	*Festuca subverticillata*	08.03.2015	16	1	0.0031	0.0008
63	*Festuca subverticillata*	08.03.2015	16	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	21	1	0.0209	0.0083
63	*Festuca subverticillata*	08.03.2015	21	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	25	2	0.0151	0.0068
63	*Festuca subverticillata*	08.03.2015	25	1	NA	NA
63	*Festuca subverticillata*	08.03.2015	30	2	0.0331	0.0228
63	*Festuca subverticillata*	08.03.2015	30	1	NA	NA
63	*Festuca subverticillata*	08.03.2015	34	2	0.0671	0.0349
63	*Festuca subverticillata*	08.03.2015	34	1	NA	NA
63	*Festuca subverticillata*	08.03.2015	37	2	0.0508	0.0174
63	*Festuca subverticillata*	08.03.2015	37	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	42	1	0.0856	0.0429
63	*Festuca subverticillata*	08.03.2015	42	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	45	1	0.2317	0.1062
63	*Festuca subverticillata*	08.03.2015	45	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	47	1	0.2467	0.1014
63	*Festuca subverticillata*	08.03.2015	47	2	NA	NA
63	*Festuca subverticillata*	08.03.2015	50	2	0.7082	0.2375
63	*Festuca subverticillata*	08.03.2015	50	1	NA	NA
63	*Festuca subverticillata*	08.03.2015	54	2	0.6712	0.2141
63	*Festuca subverticillata*	08.03.2015	54	1	NA	NA
64	*Holcus mollis*	27.02.2015	8	2	0.0003	0.0003

64	*Holcus mollis*	27.02.2015	8	1	0.0002	0.0003
64	*Holcus mollis*	27.02.2015	13	2	0.0025	0.0009
64	*Holcus mollis*	27.02.2015	13	2	0.0018	0.0019
64	*Holcus mollis*	27.02.2015	20	1	0.0024	0.0050
64	*Holcus mollis*	27.02.2015	20	2	0.0026	0.0031
64	*Holcus mollis*	27.02.2015	25	1	0.0065	0.0034
64	*Holcus mollis*	27.02.2015	25	2	0.0049	0.0036
64	*Holcus mollis*	27.02.2015	30	1	0.0139	0.0084
64	*Holcus mollis*	27.02.2015	30	2	0.0398	0.0178
64	*Holcus mollis*	27.02.2015	33	2	0.0318	0.0186
64	*Holcus mollis*	27.02.2015	33	1	0.0927	0.0508
64	*Holcus mollis*	27.02.2015	36	2	0.2677	0.1194
64	*Holcus mollis*	27.02.2015	36	1	0.2925	0.1327
64	*Holcus mollis*	27.02.2015	40	2	0.8604	0.4445
64	*Holcus mollis*	27.02.2015	40	1	0.4926	0.1876
64	*Holcus mollis*	27.02.2015	44	2	0.6210	0.5182
64	*Holcus mollis*	27.02.2015	44	2	0.4207	0.1764
64	*Holcus mollis*	27.02.2015	47	1	0.9787	0.4539
64	*Holcus mollis*	27.02.2015	47	2	1.1328	0.4387
64	*Holcus mollis*	27.02.2015	52	1	1.9530	0.7000
64	*Holcus mollis*	27.02.2015	52	2	2.1212	0.8394
64	*Holcus mollis*	27.02.2015	55	1	2.0981	0.6543
64	*Holcus mollis*	27.02.2015	55	2	1.9610	0.9499
65	*Hordeum brachyantherum*	02.03.2015	10	2	0.0092	0.0022
65	*Hordeum brachyantherum*	02.03.2015	10	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	22	2	0.0601	0.0458
65	*Hordeum brachyantherum*	02.03.2015	22	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	27	2	0.0134	0.0069
65	*Hordeum brachyantherum*	02.03.2015	27	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	32	2	0.0889	0.0389
65	*Hordeum brachyantherum*	02.03.2015	32	2	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	37	1	0.2665	0.1606
65	*Hordeum brachyantherum*	02.03.2015	37	2	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	41	1	0.0730	0.0518
65	*Hordeum brachyantherum*	02.03.2015	41	2	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	44	1	0.1777	0.0596
65	*Hordeum brachyantherum*	02.03.2015	44	2	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	49	2	0.6931	0.3146
65	*Hordeum brachyantherum*	02.03.2015	49	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	52	2	1.1140	0.3751
65	*Hordeum brachyantherum*	02.03.2015	52	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	54	2	0.9539	0.3642
65	*Hordeum brachyantherum*	02.03.2015	54	1	NA	NA
65	*Hordeum brachyantherum*	02.03.2015	61	2	2.0721	0.8036

65	*Hordeum brachyantherum*	02.03.2015	61	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	22	1	0.0024	0.0003
68	*Koeleria macrantha*	02.03.2015	22	2	0.0022	0.0001
68	*Koeleria macrantha*	02.03.2015	27	1	0.0023	0.0008
68	*Koeleria macrantha*	02.03.2015	27	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	32	1	0.0187	0.0073
68	*Koeleria macrantha*	02.03.2015	32	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	37	2	0.0215	0.0082
68	*Koeleria macrantha*	02.03.2015	37	1	NA	NA
68	*Koeleria macrantha*	02.03.2015	41	2	0.0447	0.0186
68	*Koeleria macrantha*	02.03.2015	41	1	NA	NA
68	*Koeleria macrantha*	02.03.2015	44	2	0.0531	0.0261
68	*Koeleria macrantha*	02.03.2015	44	1	NA	NA
68	*Koeleria macrantha*	02.03.2015	49	2	0.0245	0.0121
68	*Koeleria macrantha*	02.03.2015	49	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	52	1	0.0497	0.0224
68	*Koeleria macrantha*	02.03.2015	52	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	54	1	0.1966	0.0470
68	*Koeleria macrantha*	02.03.2015	54	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	61	1	0.2873	0.0991
68	*Koeleria macrantha*	02.03.2015	61	2	NA	NA
68	*Koeleria macrantha*	02.03.2015	65	2	0.0961	0.0228
68	*Koeleria macrantha*	02.03.2015	65	1	NA	NA
68	*Koeleria macrantha*	02.03.2015	69	2	0.0530	0.0245
68	*Koeleria macrantha*	02.03.2015	69	1	NA	NA
69	*Leymus arenarius*	06.03.2015	4	2	0.0080	0.0038
69	*Leymus arenarius*	06.03.2015	4	1	0.0017	0.0013
69	*Leymus arenarius*	06.03.2015	11	2	0.0097	0.0072
69	*Leymus arenarius*	06.03.2015	11	2	0.0120	0.0079
69	*Leymus arenarius*	06.03.2015	18	1	0.0309	0.0077
69	*Leymus arenarius*	06.03.2015	18	2	0.0428	0.0179
69	*Leymus arenarius*	06.03.2015	23	1	0.0302	0.0058
69	*Leymus arenarius*	06.03.2015	23	2	0.1140	0.0223
69	*Leymus arenarius*	06.03.2015	25	1	0.1322	0.0492
69	*Leymus arenarius*	06.03.2015	25	2	0.0948	0.0185
69	*Leymus arenarius*	06.03.2015	28	2	0.2935	0.0738
69	*Leymus arenarius*	06.03.2015	28	1	0.2760	0.0603
69	*Leymus arenarius*	06.03.2015	32	2	0.3946	0.1169
69	*Leymus arenarius*	06.03.2015	32	1	0.6329	0.1516
69	*Leymus arenarius*	06.03.2015	36	2	0.2823	0.0606
69	*Leymus arenarius*	06.03.2015	36	1	0.2601	0.0733
69	*Leymus arenarius*	06.03.2015	39	2	1.1085	0.6181
69	*Leymus arenarius*	06.03.2015	39	2	0.8671	0.6060
69	*Leymus arenarius*	06.03.2015	44	1	0.9800	0.4159

69	*Leymus arenarius*	06.03.2015	44	2	1.3583	0.3154
69	*Leymus arenarius*	06.03.2015	47	1	0.9111	0.1554
69	*Leymus arenarius*	06.03.2015	47	2	1.4238	0.4066
69	*Leymus arenarius*	06.03.2015	49	1	1.9966	NA
69	*Leymus arenarius*	06.03.2015	49	2	0.4669	NA
70	*Lolium perenne*	27.02.2015	8	2	0.0027	0.0005
70	*Lolium perenne*	27.02.2015	8	1	0.0025	0.0015
70	*Lolium perenne*	27.02.2015	13	2	0.0071	0.0079
70	*Lolium perenne*	27.02.2015	13	1	0.0073	0.0054
70	*Lolium perenne*	27.02.2015	20	2	0.0238	0.0353
70	*Lolium perenne*	27.02.2015	20	1	0.0107	0.0122
70	*Lolium perenne*	27.02.2015	25	2	0.0484	0.0287
70	*Lolium perenne*	27.02.2015	25	2	0.0235	0.0151
70	*Lolium perenne*	27.02.2015	30	1	0.1217	0.0538
70	*Lolium perenne*	27.02.2015	30	2	0.0394	0.0293
70	*Lolium perenne*	27.02.2015	33	1	0.0601	0.0300
70	*Lolium perenne*	27.02.2015	33	2	0.0324	0.0231
70	*Lolium perenne*	27.02.2015	36	1	0.2525	0.1340
70	*Lolium perenne*	27.02.2015	36	2	0.5186	0.2268
70	*Lolium perenne*	27.02.2015	40	2	0.2308	0.1155
70	*Lolium perenne*	27.02.2015	40	1	0.8327	0.3150
70	*Lolium perenne*	27.02.2015	44	2	0.9305	0.6609
70	*Lolium perenne*	27.02.2015	44	1	0.7436	0.6888
70	*Lolium perenne*	27.02.2015	47	2	0.8057	0.5574
70	*Lolium perenne*	27.02.2015	47	1	1.0241	0.4902
70	*Lolium perenne*	27.02.2015	52	2	1.8125	0.8447
70	*Lolium perenne*	27.02.2015	52	2	1.6298	0.7465
70	*Lolium perenne*	27.02.2015	55	1	3.1131	0.9204
70	*Lolium perenne*	27.02.2015	55	2	3.4762	1.1558
71	*Lolium perenne*	02.03.2015	5	1	0.0004	0.0004
71	*Lolium perenne*	02.03.2015	5	2	0.0010	0.0015
71	*Lolium perenne*	02.03.2015	11	1	0.0123	0.0110
71	*Lolium perenne*	02.03.2015	11	2	0.0113	0.0106
71	*Lolium perenne*	02.03.2015	17	2	0.0428	0.0228
71	*Lolium perenne*	02.03.2015	17	1	0.0474	0.0294
71	*Lolium perenne*	02.03.2015	22	2	0.0463	0.0232
71	*Lolium perenne*	02.03.2015	22	1	0.0723	0.0287
71	*Lolium perenne*	02.03.2015	27	2	0.2359	0.1035
71	*Lolium perenne*	02.03.2015	27	1	0.2719	0.1529
71	*Lolium perenne*	02.03.2015	32	2	0.4796	0.2343
71	*Lolium perenne*	02.03.2015	32	2	0.2908	0.1295
71	*Lolium perenne*	02.03.2015	37	1	0.4478	0.2513
71	*Lolium perenne*	02.03.2015	37	2	0.7189	0.3859
71	*Lolium perenne*	02.03.2015	41	1	0.5740	0.2713

71	*Lolium perenne*	02.03.2015	41	2	0.3688	0.1471
71	*Lolium perenne*	02.03.2015	44	1	1.0315	0.4092
71	*Lolium perenne*	02.03.2015	44	2	2.0391	0.8814
71	*Lolium perenne*	02.03.2015	49	2	1.4874	1.1877
71	*Lolium perenne*	02.03.2015	49	1	1.6134	0.6529
71	*Lolium perenne*	02.03.2015	52	2	1.2578	0.7672
71	*Lolium perenne*	02.03.2015	52	1	1.4031	0.6732
71	*Lolium perenne*	02.03.2015	54	2	2.0960	1.1034
71	*Lolium perenne*	02.03.2015	54	1	1.6216	0.5173
73	*Phalaris arundinacea*	27.02.2015	8	2	0.0011	0.0000
73	*Phalaris arundinacea*	27.02.2015	8	2	0.0022	0.0005
73	*Phalaris arundinacea*	27.02.2015	13	1	0.0036	0.0027
73	*Phalaris arundinacea*	27.02.2015	13	2	0.0028	0.0018
73	*Phalaris arundinacea*	27.02.2015	20	1	0.0055	0.0043
73	*Phalaris arundinacea*	27.02.2015	20	2	0.0100	0.0090
73	*Phalaris arundinacea*	27.02.2015	25	1	0.0156	0.0083
73	*Phalaris arundinacea*	27.02.2015	25	2	0.0203	0.0109
73	*Phalaris arundinacea*	27.02.2015	30	2	0.0830	0.0409
73	*Phalaris arundinacea*	27.02.2015	30	1	0.0762	0.0221
73	*Phalaris arundinacea*	27.02.2015	33	2	0.0652	0.0260
73	*Phalaris arundinacea*	27.02.2015	33	1	0.0621	0.0235
73	*Phalaris arundinacea*	27.02.2015	36	2	0.2816	0.1143
73	*Phalaris arundinacea*	27.02.2015	36	1	0.4081	0.1286
73	*Phalaris arundinacea*	27.02.2015	40	2	1.0515	0.4667
73	*Phalaris arundinacea*	27.02.2015	40	2	0.8061	0.3919
73	*Phalaris arundinacea*	27.02.2015	44	1	1.0816	0.5934
73	*Phalaris arundinacea*	27.02.2015	44	2	0.6425	0.2291
73	*Phalaris arundinacea*	27.02.2015	47	1	1.5866	0.5955
73	*Phalaris arundinacea*	27.02.2015	47	2	2.0091	0.8350
73	*Phalaris arundinacea*	27.02.2015	52	1	3.0349	0.8064
73	*Phalaris arundinacea*	27.02.2015	52	2	2.1018	0.4355
73	*Phalaris arundinacea*	27.02.2015	55	2	2.3625	0.9586
73	*Phalaris arundinacea*	27.02.2015	55	1	2.8975	0.7959
74	*Phalaris coerulescens*	27.02.2015	8	2	0.0030	0.0008
74	*Phalaris coerulescens*	27.02.2015	8	1	0.0012	0.0004
74	*Phalaris coerulescens*	27.02.2015	13	2	0.0073	0.0062
74	*Phalaris coerulescens*	27.02.2015	13	1	0.0046	0.0074
74	*Phalaris coerulescens*	27.02.2015	20	2	0.0095	0.0067
74	*Phalaris coerulescens*	27.02.2015	20	2	0.0119	0.0112
74	*Phalaris coerulescens*	27.02.2015	25	1	0.0202	0.0144
74	*Phalaris coerulescens*	27.02.2015	25	2	0.0193	0.0144
74	*Phalaris coerulescens*	27.02.2015	30	1	0.0934	0.0507
74	*Phalaris coerulescens*	27.02.2015	30	2	0.1351	0.0419
74	*Phalaris coerulescens*	27.02.2015	33	1	0.0456	0.0290

74	*Phalaris coerulescens*	27.02.2015	33	2	0.1934	0.1152
74	*Phalaris coerulescens*	27.02.2015	36	2	0.4492	0.1628
74	*Phalaris coerulescens*	27.02.2015	36	1	0.5575	0.2321
74	*Phalaris coerulescens*	27.02.2015	40	2	1.2237	0.3585
74	*Phalaris coerulescens*	27.02.2015	40	1	1.2709	0.3616
74	*Phalaris coerulescens*	27.02.2015	44	2	1.3249	0.4162
74	*Phalaris coerulescens*	27.02.2015	44	1	1.0094	0.4673
74	*Phalaris coerulescens*	27.02.2015	47	2	2.2457	0.4493
74	*Phalaris coerulescens*	27.02.2015	47	2	1.4212	0.5079
74	*Phalaris coerulescens*	27.02.2015	52	1	2.8261	0.5006
74	*Phalaris coerulescens*	27.02.2015	52	2	2.8435	0.4522
74	*Phalaris coerulescens*	27.02.2015	55	1	3.0250	0.3868
74	*Phalaris coerulescens*	27.02.2015	55	2	2.5317	0.5209
75	*Phleum pratense*	27.02.2015	8	1	0.0005	0.0000
75	*Phleum pratense*	27.02.2015	8	2	0.0004	0.0000
75	*Phleum pratense*	27.02.2015	13	2	0.0023	0.0028
75	*Phleum pratense*	27.02.2015	13	1	0.0025	0.0050
75	*Phleum pratense*	27.02.2015	20	2	0.0033	0.0040
75	*Phleum pratense*	27.02.2015	20	1	0.0064	0.0064
75	*Phleum pratense*	27.02.2015	25	2	0.0114	0.0124
75	*Phleum pratense*	27.02.2015	25	1	0.0139	0.0080
75	*Phleum pratense*	27.02.2015	30	2	0.0532	0.0206
75	*Phleum pratense*	27.02.2015	30	2	0.0544	0.0232
75	*Phleum pratense*	27.02.2015	33	1	0.1841	0.0950
75	*Phleum pratense*	27.02.2015	33	2	0.1106	0.0649
75	*Phleum pratense*	27.02.2015	36	1	0.0243	0.0180
75	*Phleum pratense*	27.02.2015	36	2	0.1979	0.0869
75	*Phleum pratense*	27.02.2015	40	1	0.7021	0.2168
75	*Phleum pratense*	27.02.2015	40	2	0.3680	0.2030
75	*Phleum pratense*	27.02.2015	44	2	0.3914	0.1949
75	*Phleum pratense*	27.02.2015	44	1	0.4627	0.1534
75	*Phleum pratense*	27.02.2015	47	2	0.3907	0.1171
75	*Phleum pratense*	27.02.2015	47	1	0.5856	0.1998
75	*Phleum pratense*	27.02.2015	52	2	1.7540	0.6758
75	*Phleum pratense*	27.02.2015	52	1	0.9781	0.3481
75	*Phleum pratense*	27.02.2015	55	2	1.4264	0.6302
75	*Phleum pratense*	27.02.2015	55	2	1.0562	0.3159
76	*Poa alpina*	27.02.2015	13	1	0.0001	0.0004
76	*Poa alpina*	27.02.2015	13	2	0.0003	0.0005
76	*Poa alpina*	27.02.2015	25	1	0.0021	0.0021
76	*Poa alpina*	27.02.2015	25	2	0.0053	0.0048
76	*Poa alpina*	27.02.2015	30	1	0.0062	0.0033
76	*Poa alpina*	27.02.2015	30	2	0.0074	0.0050
76	*Poa alpina*	27.02.2015	33	2	0.0339	0.0221

76	*Poa alpina*	27.02.2015	33	1	0.0113	0.0056
76	*Poa alpina*	27.02.2015	36	2	0.0635	0.0377
76	*Poa alpina*	27.02.2015	36	1	0.1032	0.0430
76	*Poa alpina*	27.02.2015	40	2	0.0971	0.0812
76	*Poa alpina*	27.02.2015	40	1	0.1281	0.0475
76	*Poa alpina*	27.02.2015	44	2	0.1174	0.0547
76	*Poa alpina*	27.02.2015	44	2	0.1098	0.0441
76	*Poa alpina*	27.02.2015	47	1	0.4171	0.1266
76	*Poa alpina*	27.02.2015	47	2	0.2230	0.1105
76	*Poa alpina*	27.02.2015	52	1	0.5699	0.2597
76	*Poa alpina*	27.02.2015	52	2	0.5084	0.3769
76	*Poa alpina*	27.02.2015	55	1	0.7499	0.2824
76	*Poa alpina*	27.02.2015	55	2	0.8362	0.2594
76	*Poa alpina*	27.02.2015	57	2	0.7484	0.2894
76	*Poa alpina*	27.02.2015	57	1	0.8139	0.3147
76	*Poa alpina*	27.02.2015	61	2	1.1822	0.5826
76	*Poa alpina*	27.02.2015	61	1	1.1031	0.5728
77	*Poa pratensis*	27.02.2015	8	2	0.0005	0.0001
77	*Poa pratensis*	27.02.2015	8	1	0.0001	0.0006
77	*Poa pratensis*	27.02.2015	13	2	0.0014	0.0009
77	*Poa pratensis*	27.02.2015	13	2	0.0024	0.0012
77	*Poa pratensis*	27.02.2015	20	1	0.0043	0.0031
77	*Poa pratensis*	27.02.2015	20	2	0.0059	0.0055
77	*Poa pratensis*	27.02.2015	25	1	0.0090	0.0056
77	*Poa pratensis*	27.02.2015	25	2	0.0083	0.0030
77	*Poa pratensis*	27.02.2015	30	1	0.0152	0.0062
77	*Poa pratensis*	27.02.2015	30	2	0.0126	0.0045
77	*Poa pratensis*	27.02.2015	33	2	0.0050	0.0025
77	*Poa pratensis*	27.02.2015	33	1	0.0083	0.0030
77	*Poa pratensis*	27.02.2015	36	2	0.0667	0.0368
77	*Poa pratensis*	27.02.2015	36	1	0.0729	0.0235
77	*Poa pratensis*	27.02.2015	40	2	0.0507	0.0255
77	*Poa pratensis*	27.02.2015	40	1	0.2435	0.0742
77	*Poa pratensis*	27.02.2015	44	2	0.2864	0.1016
77	*Poa pratensis*	27.02.2015	44	2	0.2527	0.1023
77	*Poa pratensis*	27.02.2015	47	1	0.4711	0.1350
77	*Poa pratensis*	27.02.2015	47	2	0.3466	0.1522
77	*Poa pratensis*	27.02.2015	52	1	0.4791	0.1833
77	*Poa pratensis*	27.02.2015	52	2	0.5064	0.3805
77	*Poa pratensis*	27.02.2015	55	1	0.8189	0.3749
77	*Poa pratensis*	27.02.2015	55	2	1.0109	0.2939
78	*Poa secunda*	03.03.2015	14	2	0.0039	0.0020
78	*Poa secunda*	03.03.2015	14	1	0.0042	0.0023
78	*Poa secunda*	03.03.2015	21	2	0.0054	0.0040

78	*Poa secunda*	03.03.2015	21	1	NA	NA
78	*Poa secunda*	03.03.2015	26	2	0.0112	0.0089
78	*Poa secunda*	03.03.2015	26	1	NA	NA
78	*Poa secunda*	03.03.2015	31	2	0.0180	0.0116
78	*Poa secunda*	03.03.2015	31	2	NA	NA
78	*Poa secunda*	03.03.2015	35	1	0.0213	0.0218
78	*Poa secunda*	03.03.2015	35	2	NA	NA
78	*Poa secunda*	03.03.2015	39	1	0.0597	0.0352
78	*Poa secunda*	03.03.2015	39	2	NA	NA
78	*Poa secunda*	03.03.2015	42	1	0.0157	0.0188
78	*Poa secunda*	03.03.2015	42	2	NA	NA
78	*Poa secunda*	03.03.2015	47	2	0.0784	0.0715
78	*Poa secunda*	03.03.2015	47	1	NA	NA
78	*Poa secunda*	03.03.2015	50	2	0.1572	0.0793
78	*Poa secunda*	03.03.2015	50	1	NA	NA
78	*Poa secunda*	03.03.2015	52	2	0.0694	0.0543
78	*Poa secunda*	03.03.2015	52	1	NA	NA
78	*Poa secunda*	03.03.2015	55	2	0.2704	0.1582
78	*Poa secunda*	03.03.2015	55	2	NA	NA
79	*Polypogon viridis*	03.03.2015	14	1	0.0022	0.0011
79	*Polypogon viridis*	03.03.2015	14	2	NA	NA
79	*Polypogon viridis*	03.03.2015	21	1	0.0042	0.0017
79	*Polypogon viridis*	03.03.2015	21	2	0.0089	0.0055
79	*Polypogon viridis*	03.03.2015	26	1	0.0059	0.0031
79	*Polypogon viridis*	03.03.2015	26	2	0.0086	0.0041
79	*Polypogon viridis*	03.03.2015	31	2	0.0106	0.0087
79	*Polypogon viridis*	03.03.2015	31	1	0.0224	0.0118
79	*Polypogon viridis*	03.03.2015	35	2	0.0745	0.0352
79	*Polypogon viridis*	03.03.2015	35	1	0.1194	0.0746
79	*Polypogon viridis*	03.03.2015	39	2	0.2238	0.0953
79	*Polypogon viridis*	03.03.2015	39	1	0.2273	0.0972
79	*Polypogon viridis*	03.03.2015	42	2	0.0793	0.0533
79	*Polypogon viridis*	03.03.2015	42	2	0.0891	0.0523
79	*Polypogon viridis*	03.03.2015	47	1	0.8492	0.4867
79	*Polypogon viridis*	03.03.2015	47	2	0.9119	0.4950
79	*Polypogon viridis*	03.03.2015	50	1	1.2140	0.3197
79	*Polypogon viridis*	03.03.2015	50	2	0.9581	0.4456
79	*Polypogon viridis*	03.03.2015	52	1	1.0964	0.4424
79	*Polypogon viridis*	03.03.2015	52	2	0.9345	0.3717
79	*Polypogon viridis*	03.03.2015	55	2	1.8208	0.4832
79	*Polypogon viridis*	03.03.2015	55	1	0.6346	0.3918
79	*Polypogon viridis*	03.03.2015	58	2	2.8275	0.7267
79	*Polypogon viridis*	03.03.2015	58	1	NA	NA
80	*Puccinellia distans*	02.03.2015	10	2	0.0011	0.0000

80	*Puccinellia distans*	02.03.2015	10	1	0.0013	0.0001
80	*Puccinellia distans*	02.03.2015	17	2	0.0039	0.0021
80	*Puccinellia distans*	02.03.2015	17	2	0.0040	0.0046
80	*Puccinellia distans*	02.03.2015	22	1	0.0071	0.0063
80	*Puccinellia distans*	02.03.2015	22	2	0.0135	0.0102
80	*Puccinellia distans*	02.03.2015	27	1	0.0183	0.0104
80	*Puccinellia distans*	02.03.2015	27	2	0.0186	0.0111
80	*Puccinellia distans*	02.03.2015	32	1	0.0215	0.0181
80	*Puccinellia distans*	02.03.2015	32	2	0.0447	0.0138
80	*Puccinellia distans*	02.03.2015	37	2	0.1581	0.0546
80	*Puccinellia distans*	02.03.2015	37	1	0.1546	0.0684
80	*Puccinellia distans*	02.03.2015	41	2	0.2394	0.0651
80	*Puccinellia distans*	02.03.2015	41	1	0.3237	0.0890
80	*Puccinellia distans*	02.03.2015	44	2	0.4589	0.1749
80	*Puccinellia distans*	02.03.2015	44	1	0.3273	0.1369
80	*Puccinellia distans*	02.03.2015	49	2	0.7496	0.2281
80	*Puccinellia distans*	02.03.2015	49	2	0.5354	0.2094
80	*Puccinellia distans*	02.03.2015	52	1	0.7565	0.1836
80	*Puccinellia distans*	02.03.2015	52	2	1.0409	0.2714
80	*Puccinellia distans*	02.03.2015	54	1	1.3248	0.5052
80	*Puccinellia distans*	02.03.2015	54	2	NA	NA
80	*Puccinellia distans*	02.03.2015	61	1	2.0514	0.5377
80	*Puccinellia distans*	02.03.2015	61	2	1.2986	0.3258
81	*Trisetum flavescens*	02.03.2015	15	2	0.0048	0.0012
81	*Trisetum flavescens*	02.03.2015	15	1	0.0030	0.0009
81	*Trisetum flavescens*	02.03.2015	22	2	0.0076	0.0053
81	*Trisetum flavescens*	02.03.2015	22	1	NA	NA
81	*Trisetum flavescens*	02.03.2015	27	2	0.0168	0.0087
81	*Trisetum flavescens*	02.03.2015	27	1	NA	NA
81	*Trisetum flavescens*	02.03.2015	32	2	0.0107	0.0091
81	*Trisetum flavescens*	02.03.2015	32	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	37	1	0.1315	0.0544
81	*Trisetum flavescens*	02.03.2015	37	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	41	1	0.2425	0.0783
81	*Trisetum flavescens*	02.03.2015	41	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	44	1	0.1903	0.0718
81	*Trisetum flavescens*	02.03.2015	44	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	49	2	0.7812	0.2384
81	*Trisetum flavescens*	02.03.2015	49	1	NA	NA
81	*Trisetum flavescens*	02.03.2015	52	2	0.9058	0.2010
81	*Trisetum flavescens*	02.03.2015	52	1	NA	NA
81	*Trisetum flavescens*	02.03.2015	54	2	1.0516	0.4428
81	*Trisetum flavescens*	02.03.2015	54	1	0.9961	0.4627
81	*Trisetum flavescens*	02.03.2015	61	2	1.6472	0.8491

81	*Trisetum flavescens*	02.03.2015	61	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	65	1	2.1604	0.9807
81	*Trisetum flavescens*	02.03.2015	65	2	NA	NA
81	*Trisetum flavescens*	02.03.2015	69	1	1.6790	0.3023
81	*Trisetum flavescens*	02.03.2015	69	2	NA	NA

Appendix II. Lab protocols

A) Mastermix for polymerase chain reaction (PCR).

Basic mix pcr x 1	Basic mix pcr x 25	Basic mix pcr x 100	Final conc
5 µl JumpStart	12.5 µl JumpStart	1250 µl JumpStart	1x
0.2 µl Primer F	0.5 µl Primer F	50 µl Primer F	0.4 µM
0.2 µl Primer R	0.5 µl Primer R	50 µl Primer R	0.4 µM
1 µl DNA templat	1 µl DNA templat	1 µl DNA templat	1-200 ng
3.6 µl mq H_2O	10.5 µl mq H_2O	1050 µl mq H_2O	
10 µl	25 µl	2500 µl	

B) Preamplification with PCR. Machine used for running PCR was Mastercycler EP gradient Thermal cycler (Eppendorf, Hamburg, Germany)

30 cycles:

Initial denaturation	94 ^{O}C	2 min
Denaturation	94^{O}C	30 sec
Annealing	58^{O}C	30 sec
Extention	72^{O}C	1.5 min
Final Extention	72^{O}C	5 min
Hold	4^{O}C	

C) Purification of PCR product.

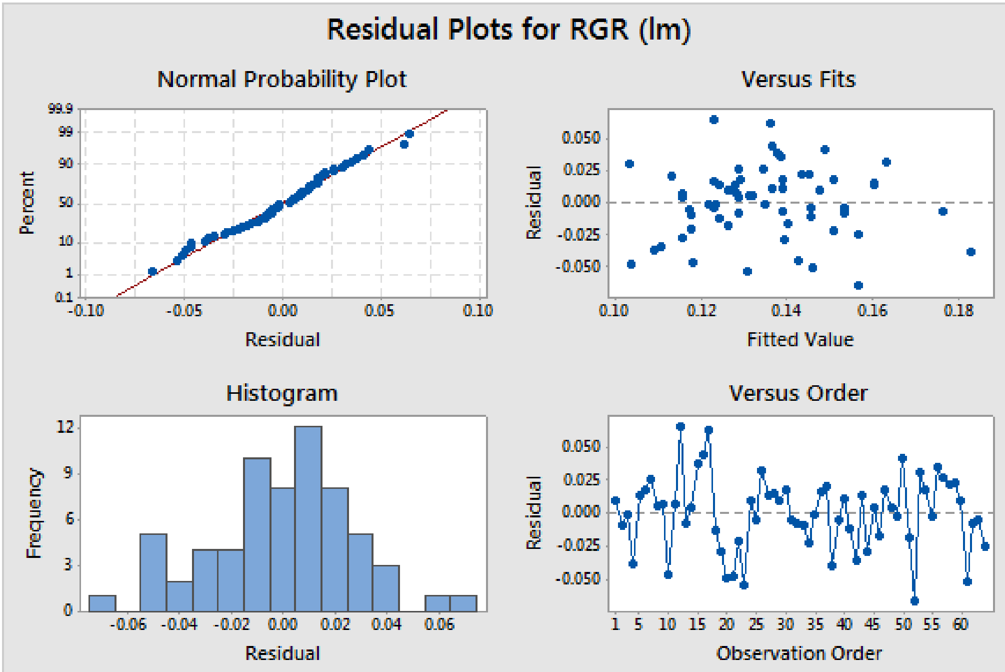
Montage PCR plates from Millipore were used. The volume of PCR product was adjusted to 100 µl. with TA bufferand transferred to the Montage plate. Vacuum was added on a vacuume manifoil, at 15 inches Hg for 6-7 minutes until the wells were dry. 50 µl. mq H_2O were added and the proceedure on the vacuume manifoil were repeated two times. The samples were dissolved in 20 µl TA buffer and placed on a vortex plate. The purifyed PCR products were retrieved by pipetting.

D) Sequencing reaction.

Sequencing reaction X 1	Sequencing reaction x100
1.0 µl Big Dye	100 µl Big Dye
1.0 µl primer	100 µl primer
1.0 µl 2.5x TA buffer	50 µl 2.5x TA buffer
6 µl mq H2O	650 µl mq H2O
10 µl	100 µl

E) Preamplification and purifying of sequencing reaction, and sequencing.

The PCR were run for 96 ^{O}C for 10 secounds, 53 ^{O}C for 5 secounds, 60 ^{O}C for 4 min and finally 4 ^{O}C on hold. The sequencing reactions were purified with Montage Seq plates from Millipore, following the same protocol as above except in the final step, were 25 µl injection solution were added. An ABI 3700 DNA Analyser with 48 cappilaries were used for sequencing, running the instrument protocoll called "SeqBDv3" with run module "StdSeq36_POP7_1" and dye set "Z-BigDyeV3".



Appendix III. Diagnostics plot for regression model for the trait relative growth rate (RGR). Created in Minitab™ Statistical software

Appendix IV. Mean Biomass seed (mg)

Species	Seed weight (mg)
Achnatherum calamagrostis	73.646
Agrostis canina	16.491
Agrostis capillaris	25.169
Agrostis stolonifera	3.185
Alopecurus pratensis	22.724
Alopercurus geniculatus	19.916
Ammophila arenaria	100.400
Ampleodesmos mauritanica	152.506
Arrhenatherum elatius	59.789
Brachypodium distachyon	91.270
Brachypodium pinnatum	154.972
Briza media	11.310
Bromus benekeni	125.581
Bromus inermis	106.824
Bromus ramosus	261.767

Calamagrostis canescens	49.559
Cynosurus cristatus	13.7714
Dactylis glomerata	23.5391
Deschampsia cespitosa	28.508
Diarrhena americana	269.269
Diarrhena americana	276.026
Duthiea brachypodium	352.097
Elymus caninus	67.307
Elymus farctus	302.989
Elymus repens	34.098
Elymus sibiricus	94.523
Elymus trachycaulus	33.465
Festuca altissima	23.127
Festuca arundinacea	62.556
Festuca ovina	17.651
Festuca petraea	21.608
Festuca pratensis	63.087
Festuca rubra	45.163
Festuca subverticillata	111.386
Glyceria fluitans	60.082
Glyceria occidentalis	63.774
Glyceria occidentalis	25.987
Glyceria striata	92.823
Holcus mollis	18.356
Machrocloa tenacissima	37.839
Melica nutans	66.866
Nardus stricta	16.713
Nasella leucottricha	189.148
Nassella viridula	80.899
Nassella viridula	165.272
Oloptum miliaceum	99.838
Oloptum miliaceum	22.099
Oloptum miliaceum	27.254
Oloptum miliaceum	28.635
Oloptum miliaceum	29.831

Phaenospema globosa	200.645
Piptatherum coerulescens	48.254
Schizachne purpurascens	20.678
Schizachne purpurascens	99.290
Stipa barbata	91.999
Stipa lagascae	192.934
Stipa lagascae	585.137
Stipa pennata	160.870
Stipa pennata	166.201
Stipa pennata	354.327
Stipa robusta	47.093
Stipa spartea	279.411

Appendix V. Results from JModelTest

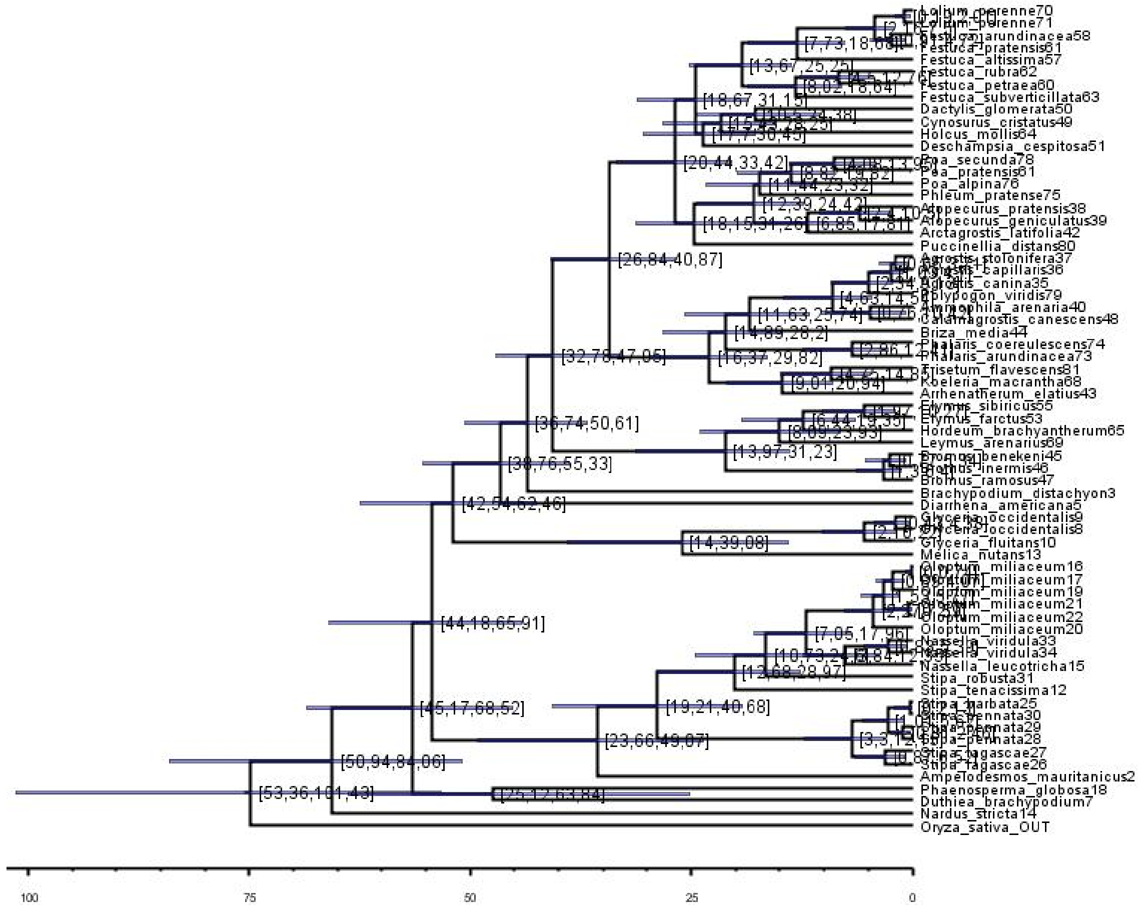
JModel test were performed in the package *phangorn* in R.

matK	Model	df	logLik	AIC	AICw	AICc	AICcw	BIC
1	JC	133	-7879.392	16024.78	2.898106e-173	16049.96	2.165184e-172	16735.80
2	JC+I	134	-7726.013	15720.03	4.360602e-107	15745.60	2.671831e-106	16436.39
3	JC+G	134	-7697.024	15662.05	1.696475e-94	15687.62	1.039465e-93	16378.41
4	JC+G+I	135	-7692.585	15655.17	5.283939e-93	15681.14	2.650735e-92	16376.88
5	F81	136	-7748.940	15769.88	6.514612e-118	15796.25	2.671193e-117	16496.94
6	F81+I	137	-7611.027	15496.05	1.881271e-58	15522.83	6.294150e-58	16228.46
7	F81+G	137	-7583.885	15441.77	1.154346e-46	15468.55	3.862083e-46	16174.17
8	F81+G+I	138	-7580.202	15436.40	1.687913e-45	15463.59	4.600064e-45	16174.15
9	K80	134	-7810.972	15889.94	5.526936e-144	15915.51	3.386468e-143	16606.31
10	K80+I	135	-7657.158	15584.32	1.284619e-77	15610.28	6.444404e-77	16306.03
11	K80+G	135	-7627.959	15525.92	6.160670e-65	15551.89	3.090554e-64	16247.63
12	K80+G+I	136	-7623.465	15518.93	2.027669e-63	15545.30	8.314073e-63	16245.99
13	HKY	137	-7662.109	15598.22	1.230400e-80	15625.00	4.116538e-80	16330.62
14	HKY+I	138	-7535.833	15347.67	3.138333e-26	15374.85	8.552890e-26	16085.41
15	HKY+G	138	-7508.300	15292.60	2.845117e-14	15319.79	7.753789e-14	16030.35
16	HKY+G+I	139	-7505.062	15288.12	2.667892e-13	15315.73	5.912458e-13	16031.22
17	SYM	138	-7796.367	15868.73	2.229453e-139	15895.92	6.075924e-139	16606.48
18	SYM+I	139	-7650.114	15578.23	2.696562e-76	15605.83	5.975995e-76	16321.32
19	SYM+G	139	-7620.052	15518.10	3.064141e-63	15545.71	6.790607e-63	16261.20
20	SYM+G+I	140	-7615.620	15511.24	9.487493e-62	15539.26	1.706841e-61	16259.68
21	GTR	141	-7611.587	15505.17	1.967736e-60	15533.62	2.868831e-60	16258.96
22	GTR+I	142	-7504.565	15293.13	2.182215e-14	15321.99	2.573860e-14	16052.26
23	GTR+G	142	-7474.674	15233.35	2.091023e-01	15262.21	2.466302e-01	15992.48
24	GTR+G+I	143	-7472.344	15230.69	7.908977e-01	15259.98	7.533698e-01	15995.17

ndhF	Model	df	logLik	AIC	AICw	AICc	AICcw	BIC
1	JC	133	-7623.620	15513.24	1.893968e-303	15541.87	2.003485e-302	16208.71
2	JC+I	134	-7266.338	14800.68	1.020327e-148	14829.76	8.601884e-148	15501.38
3	JC+G	134	-7213.955	14695.91	5.733450e-126	14724.99	4.833593e-125	15396.61
4	JC+G+I	135	-7194.380	14658.76	6.690585e-118	14688.30	4.486436e-117	15364.69
5	F81	136	-7500.271	15272.54	3.502726e-251	15302.55	1.864522e-250	15983.70
6	F81+I	137	-7161.013	14596.03	2.805178e-104	14626.49	1.182998e-103	15312.41
7	F81+G	137	-7113.505	14501.01	1.203571e-83	14531.48	5.075693e-83	15217.40
8	F81+G+I	138	-7096.937	14469.87	6.942622e-77	14500.81	2.314973e-76	15191.49
9	K80	134	-7490.407	15248.81	4.978010e-246	15277.90	4.196719e-245	15949.51
10	K80+I	135	-7129.859	14529.72	7.025733e-90	14559.26	4.711173e-89	15235.65
11	K80+G	135	-7077.615	14425.23	3.434276e-67	14454.77	2.302887e-66	15131.16
12	K80+G+I	136	-7057.881	14387.76	4.700338e-59	14417.76	2.502018e-58	15098.92
13	HKY	137	-7337.758	14949.52	4.883177e-181	14979.98	2.059331e-180	15665.90
14	HKY+I	138	-7011.569	14299.14	8.252474e-40	14330.08	2.751735e-39	15020.75

15	HKY+G	138	-6967.154	14210.31	1.606014e-20	14241.25	5.355152e-20	14931.92
16	HKY+G+I	139	-6952.935	14183.87	8.840076e-15	14215.28	2.326009e-14	14910.72
17	SYM	138	-7471.711	15219.42	1.200168e-239	15250.36	4.001883e-239	15941.04
18	SYM+I	139	-7117.454	14512.91	3.139056e-86	14544.32	8.259516e-86	15239.75
19	SYM+G	139	-7066.578	14411.16	3.908002e-64	14442.57	1.028277e-63	15138.00
20	SYM+G+I	140	-7047.083	14374.17	4.210881e-56	14406.06	8.725570e-56	15106.24
21	GTR	141	-7277.705	14837.41	1.076175e-156	14869.78	1.752666e-156	15574.72
22	GTR+I	142	-6971.815	14227.63	2.779766e-24	14260.49	3.550977e-24	14970.16
23	GTR+G	142	-6926.861	14137.72	9.278564e-05	14170.58	1.185278e-04	14880.26
24	GTR+G+I	143	-6916.576	14119.15	9.999072e-01	14152.50	9.998815e-01	14866.91

rbcL	**Model**	**df**	**logLik**	**AIC**	**AICw**	**AICc**	**AICcw**	**BIC**
1	JC	133	-4581.020	9428.040	3.670330e-144	9456.623	3.536803e-143	10123.704
2	JC+I	134	-4346.432	8960.864	1.024604e-42	8989.901	7.871705e-42	9661.760
3	JC+G	134	-4358.115	8984.229	8.647547e-48	9013.266	6.643632e-47	9685.125
4	JC+G+I	135	-4318.601	8907.202	4.604681e-31	8936.696	2.814903e-30	9613.328
5	F81	136	-4560.713	9393.427	1.204302e-136	9423.382	5.846454e-136	10104.784
6	F81+I	137	-4328.089	8930.177	4.722245e-36	8960.597	1.816934e-35	9646.764
7	F81+G	137	-4339.365	8952.730	5.982943e-41	8983.150	2.302001e-40	9669.317
8	F81+G+I	138	-4300.670	8877.340	1.404738e-24	8908.229	4.275210e-24	9599.158
9	K80	134	-4529.012	9326.025	5.211368e-122	9355.062	4.003726e-121	10026.920
10	K80+I	135	-4294.419	8858.839	1.462369e-20	8888.333	8.939657e-20	9564.965
11	K80+G	135	-4306.061	8882.122	1.285675e-25	8911.616	7.859502e-25	9588.248
12	K80+G+I	136	-4265.642	8803.283	1.693802e-08	8833.238	8.222800e-08	9514.640
13	HKY	137	-4506.532	9287.065	1.503225e-113	9317.485	5.783819e-113	10003.652
14	HKY+I	138	-4275.290	8826.580	1.479078e-13	8857.469	4.501459e-13	9548.398
15	HKY+G	138	-4286.070	8848.140	3.078314e-18	8879.029	9.368611e-18	9569.958
16	HKY+G+I	139	-4247.605	8773.211	5.741194e-02	8804.572	1.379342e-01	9500.259
17	SYM	138	-4521.531	9319.062	1.694215e-120	9349.950	5.156212e-120	10040.879
18	SYM+I	139	-4287.426	8852.853	2.917132e-19	8884.214	7.008514e-19	9579.901
19	SYM+G	139	-4298.766	8875.532	3.469656e-24	8906.893	8.335973e-24	9602.580
20	SYM+G+I	140	-4257.857	8795.714	7.454787e-07	8827.553	1.411063e-06	9527.993
21	GTR	141	-4496.853	9275.706	4.399628e-111	9308.026	6.547878e-111	10013.216
22	GTR+I	142	-4268.419	8820.837	2.612128e-12	8853.642	3.050577e-12	9563.577
23	GTR+G	142	-4278.427	8840.855	1.175593e-16	8873.659	1.372918e-16	9583.595
24	GTR+G+I	143	-4240.807	8767.614	9.425873e-01	8800.907	8.620643e-01	9515.584



Appendix VI . 95% highest credibility interval

Credibility Interval (CI) on the Dated Bayesian chronogram of the subfamily Pooideae, inferred from tree chloroplast regions (*matK, ndhF* and *rbcL*) generated in BEAST. *Oryza sativa* is used as outgroup and time is Ma. Numbers following the species names refer to Table 2.

Appendix VII. Pictures from the growth experiment

a) Picture from day 18 in the growth experiment. All plants on table belong to early diverging Pooideae lineages.

b) Picture from day 18 in the growth experiment . All plants on table belong to the core Pooideae.

Norges miljø- og biovitenskapelig universitet
Noregs miljø- og biovitskapelege universitet
Norwegian University of Life Sciences

Postboks 5003
NO-1432 Ås
Norway