The water absorption of reed for roofing depends on the lignin content of the culms

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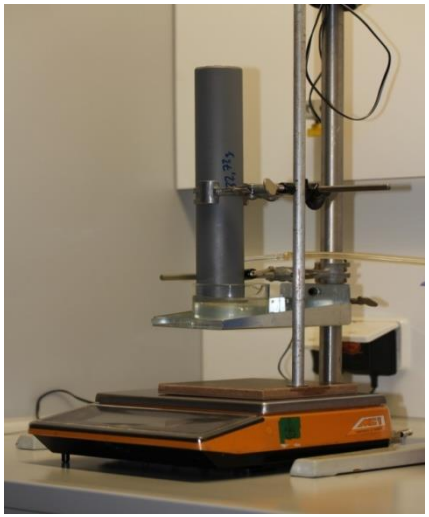
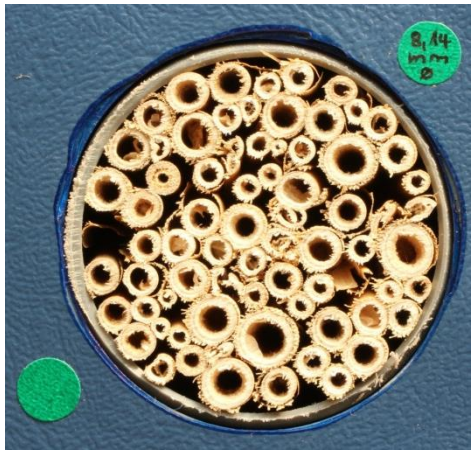
The degradation of reed on a roof is natural process.

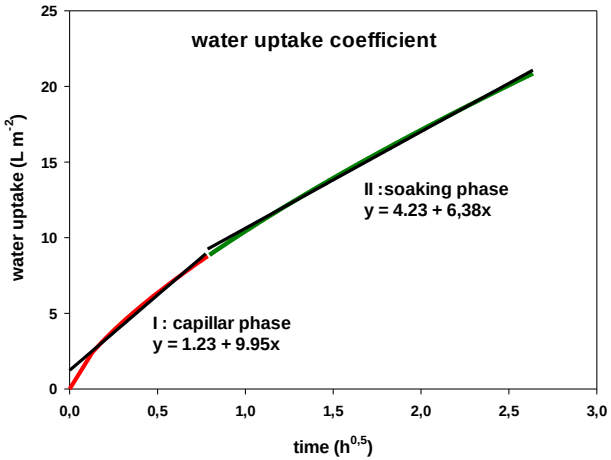
The moisture dynamic is a key driver for microbial deterioration (premature material degradation)

The water absorption depends on the capillary saturation and on some contents of the reed material (culms).

Water absorption was measured in tubes by special instrumentation for calculation of the water uptake coefficient.

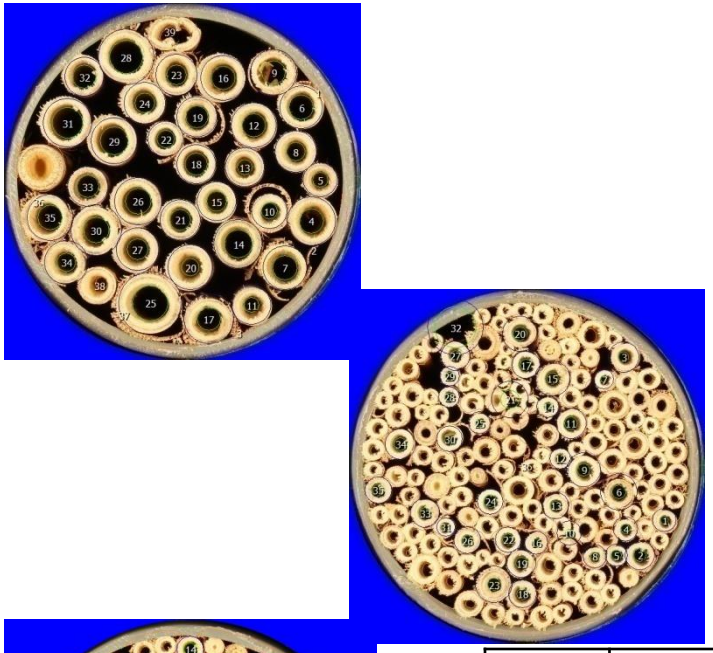


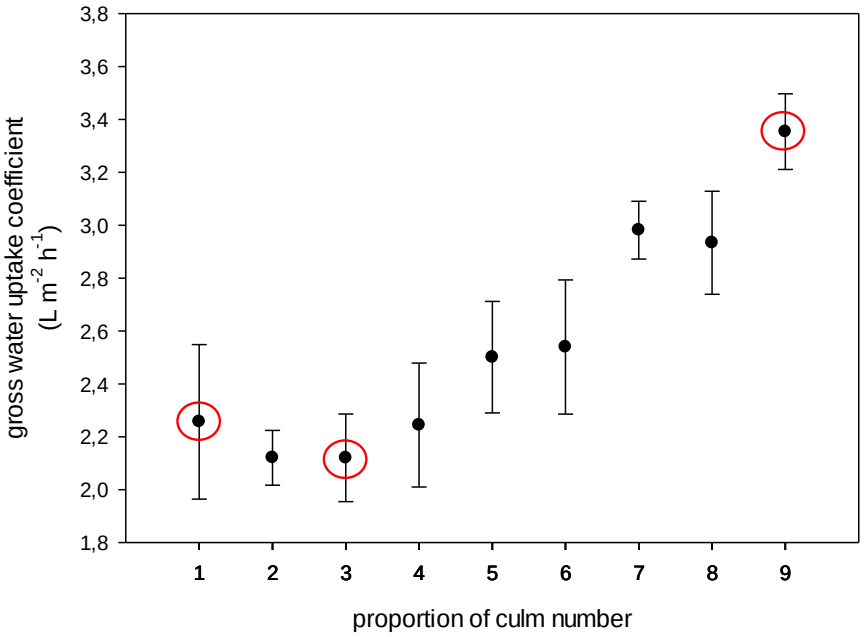




Composition of the culm wall (Cellullose / Lignin) was measured by NDf / ADF / ADL analysis.

Water absorption depends basically on the bulk density / number of culms per tube (square meter of the roof)



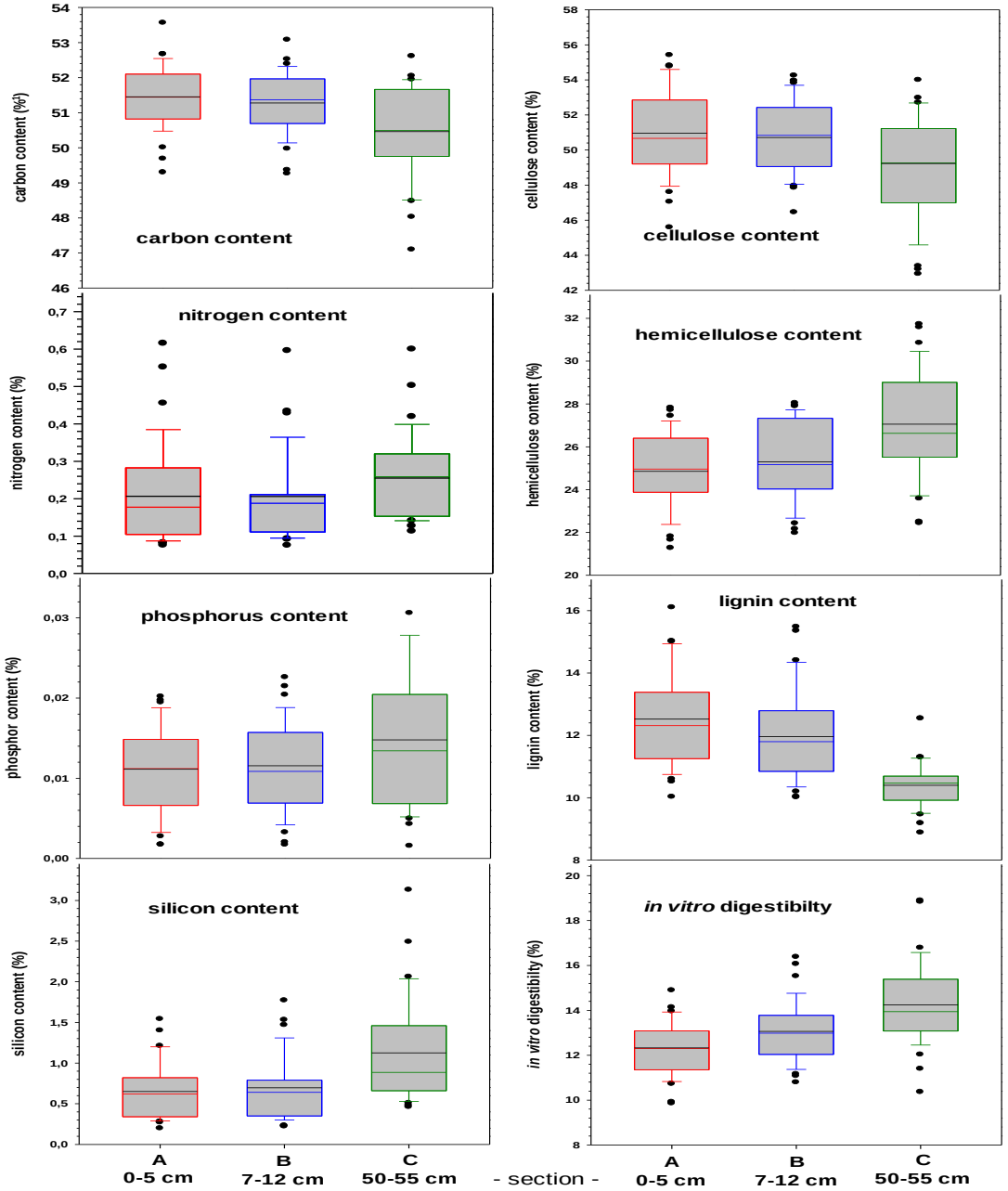


Cate-gorie	Dia-meter mm	1	2	3	4	5	6	7	8	9
Small	< 3.0	0 %	1 %	0 %	45 %	18 %	61 %	70 %	40 %	60 %
Medium	3.0 - 5.0	13 %	31 %	64 %	20 %	62 %	18 %	18 %	58 %	40 %
Large	> 5.0	87 %	68 %	36 %	35 %	20 %	21 %	12 %	2 %	0 %

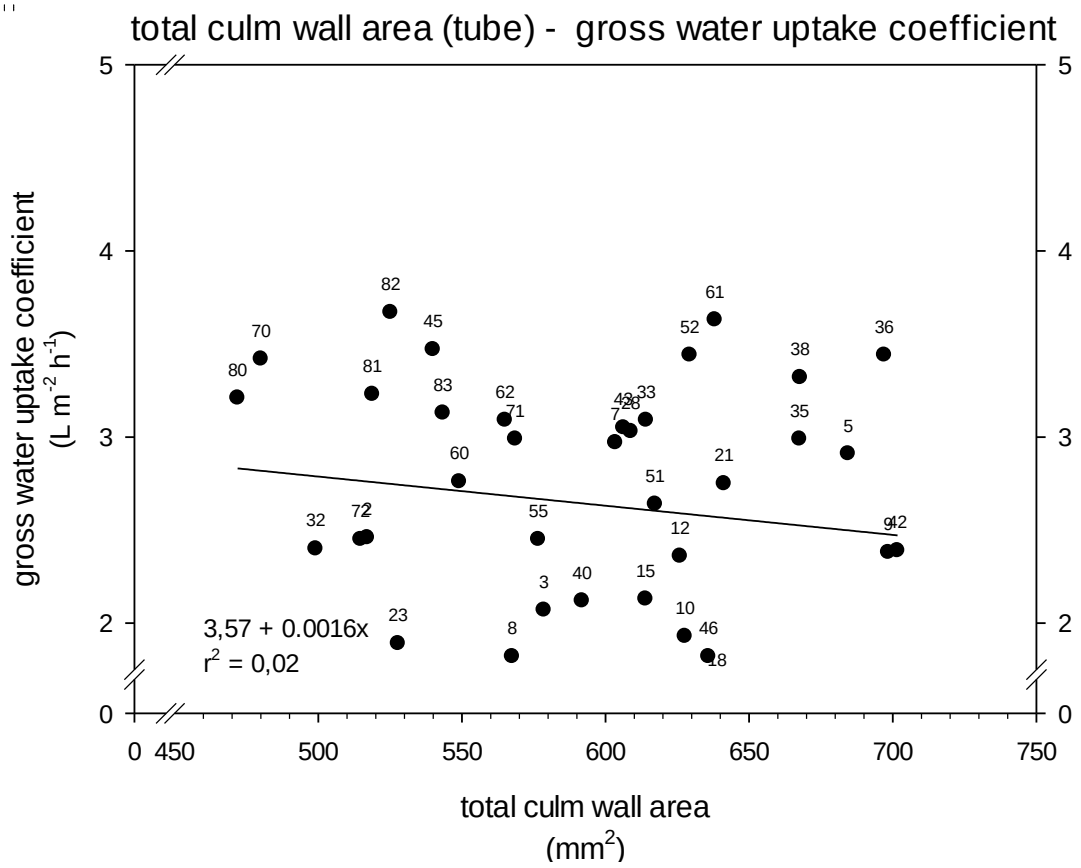
The composition of large and small culms is not equal due to stability reasons.

	1	2	3	4	5	6	7	8	9
g g d.m.	L	MLL	M	SML	SLL	SL	SSL	MML	S
Nitrogen	0,27	0,25	0,26	0,27	0,27	0,26	0,25	0,19	0,18
Carbon	51,17	50,92	50,87	51,01	51,00	51,07	51,14	51,06	51,52
C/N	193	201	198	188	188	200	202	270	285
Silicium	0,66	0,57	0,72	0,70	0,63	0,55	0,46	0,38	0,27
Lignin	15,25	14,96	14,41	14,54	14,82	14,22	13,59	13,30	13,09
Cellulose	52,98	53,91	52,77	52,53	52,91	52,07	51,11	51,89	50,82
Hemicellulose	23,80	23,42	24,77	24,79	24,35	25,56	27,02	26,73	27,97
ELOS digestibilty	10,51	10,44	11,84	11,79	11,28	12,00	13,27	13,03	14,00

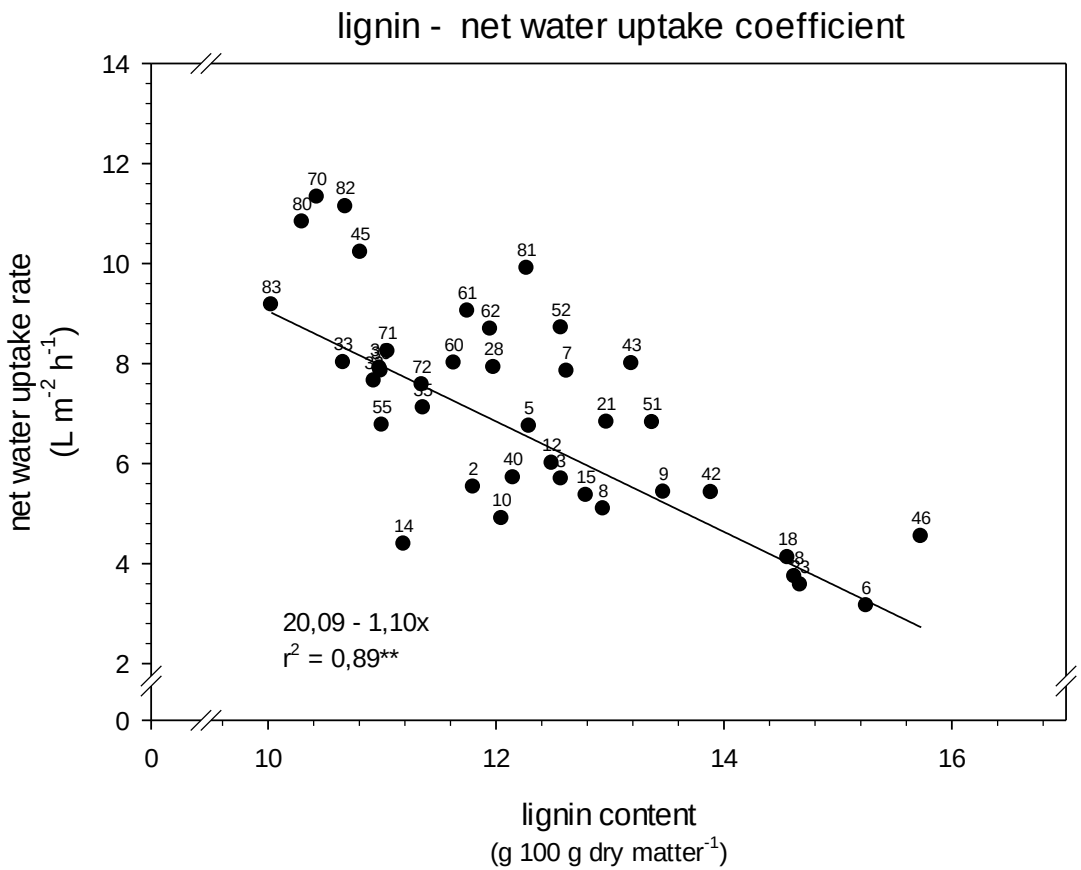
Gradient of components in different culm sections



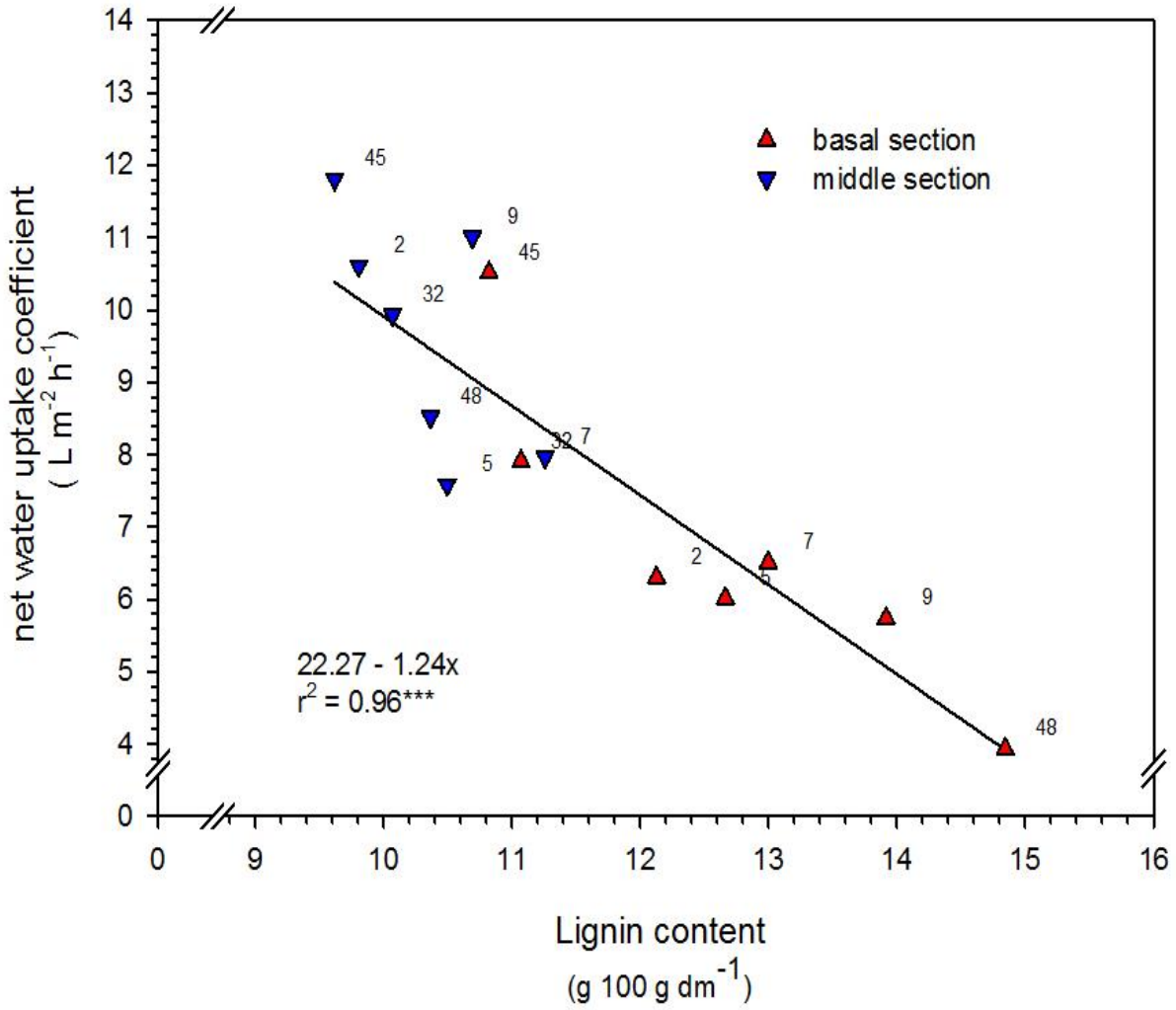
Water uptake of different reed origins in dependence of the area of the culm wall area



Water uptake of different reed origins in dependence of the content of lignin



Water uptake in in dependence of the content of lignin in the basal and the middle section of the culm



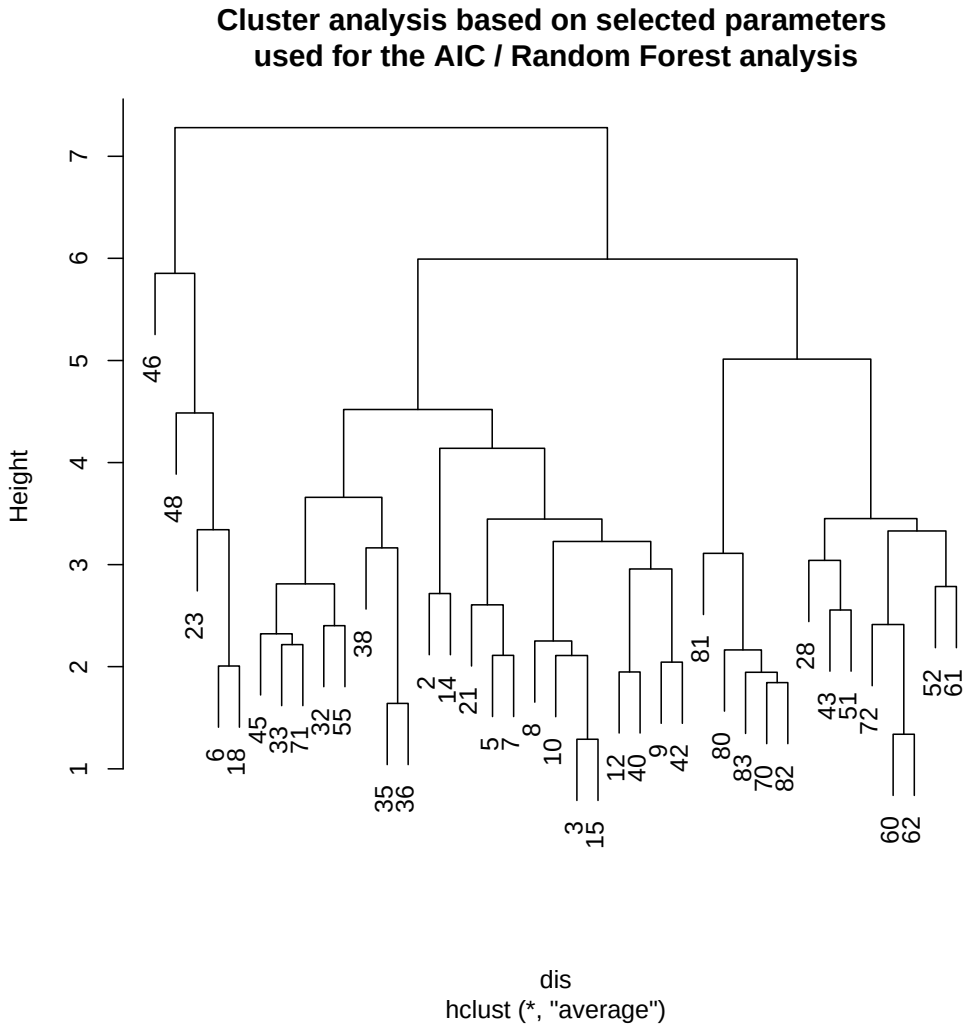
Conclusion

Building up of quality categories based on the lignin content in the basal and middle section of the culm

Category		IV	III	II	I
Lignin content (g 100 g dry matter^{-1})		**< 10.5**	**10.6 - 11.9**	**12.0 -13.5**	**> 13.6**
Basal section A A (0 -5 cm)		70; 83	14; 28; 32; 33; 35; 36; 38; 45; 55; 71; 72; 80; 82	02; 03; 05; 07; 08; 10; 12; 15; 21; 40; 52; 60; 61; 62; 81	06; 09; 18; 23; 42; 43; 46; 48; 51
	sum	**2**	**13**	**15**	**9**
Basal section B B (7 - 12 m)		33; 38; 55; 70; 80; 83	02; 05; 10; 12; 14; 32; 35; 36; 40; 45; 60; 61; 62; 71; 72; 81; 82	03; 07; 08; 09; 15; 21; 28; 42; 43; 51; 52	06; 18; 23; 46; 48;
	sum	**6**	**19**	**11**	**5**
Middle section C C (50 - 55 cm)		02; 03; 05; 12; 14; 32; 33; 35; 36; 38; 40; 45; 48; 52; 61; 62; 70; 71; 72; 80; 81; 82; 83	06; 07; 08; 09; 10; 15; 18; 21; 28; 42; 43; 46; 51; 55; 60	23	
overall sum = 119	**sum**	**23**	**15**	**1**	**0**

Conclusion

Clusters analysis based on quality parameters of the different reed origins



Thanks for your attention