

CROOKEDNESS IN *LARIX* IN
PLANTATIONS IN ICELAND
(Hallormsstaður forest)



Reasons of crookedness

Lack of climatic adaptation

- damage of apical shoot in ill-timed frosts

Growing shoots may bend

- under own weight or wind





Onega
pl. year 1966
1400/ha



Hakassia
pl. year 1954
800/ha

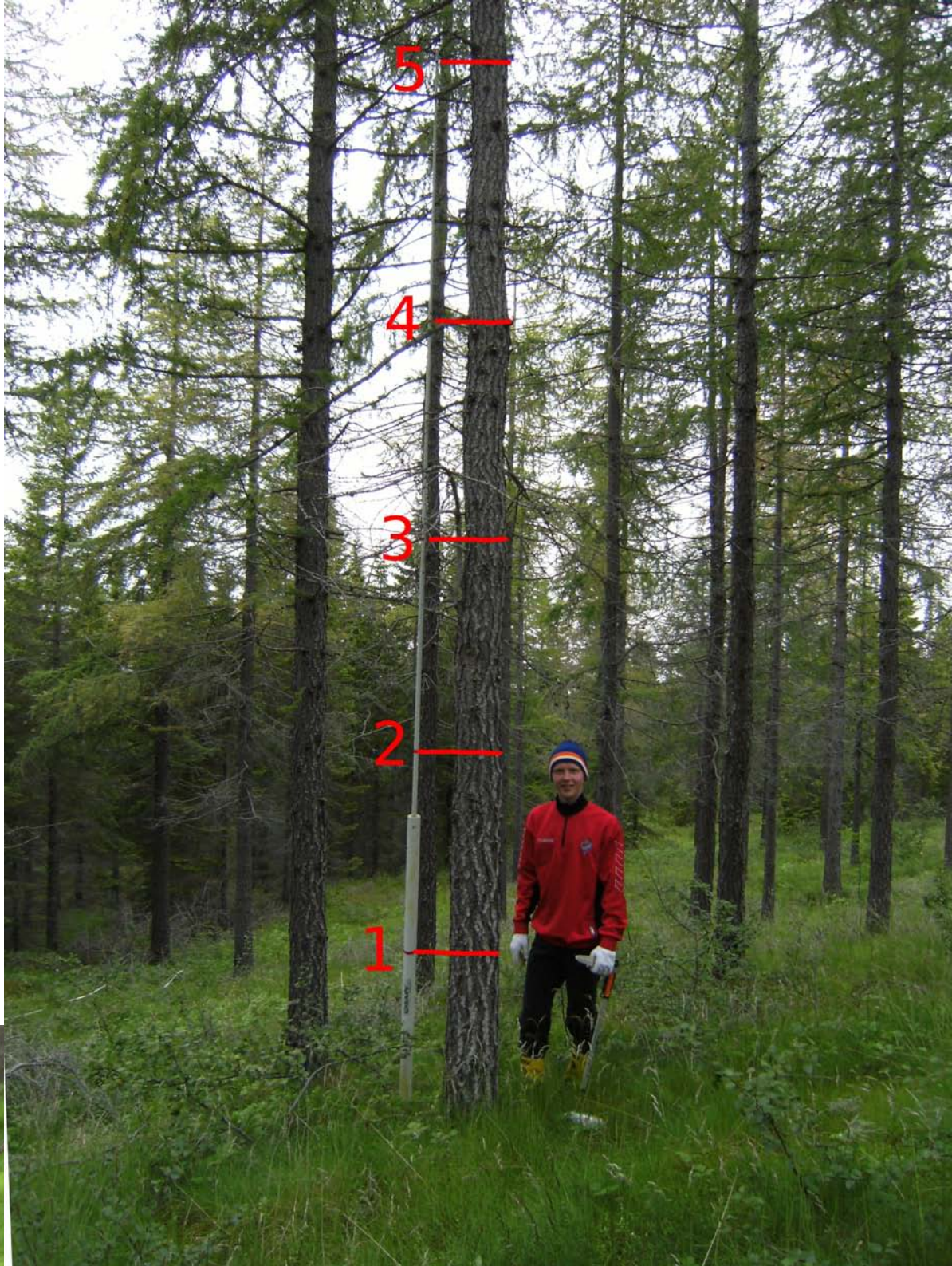


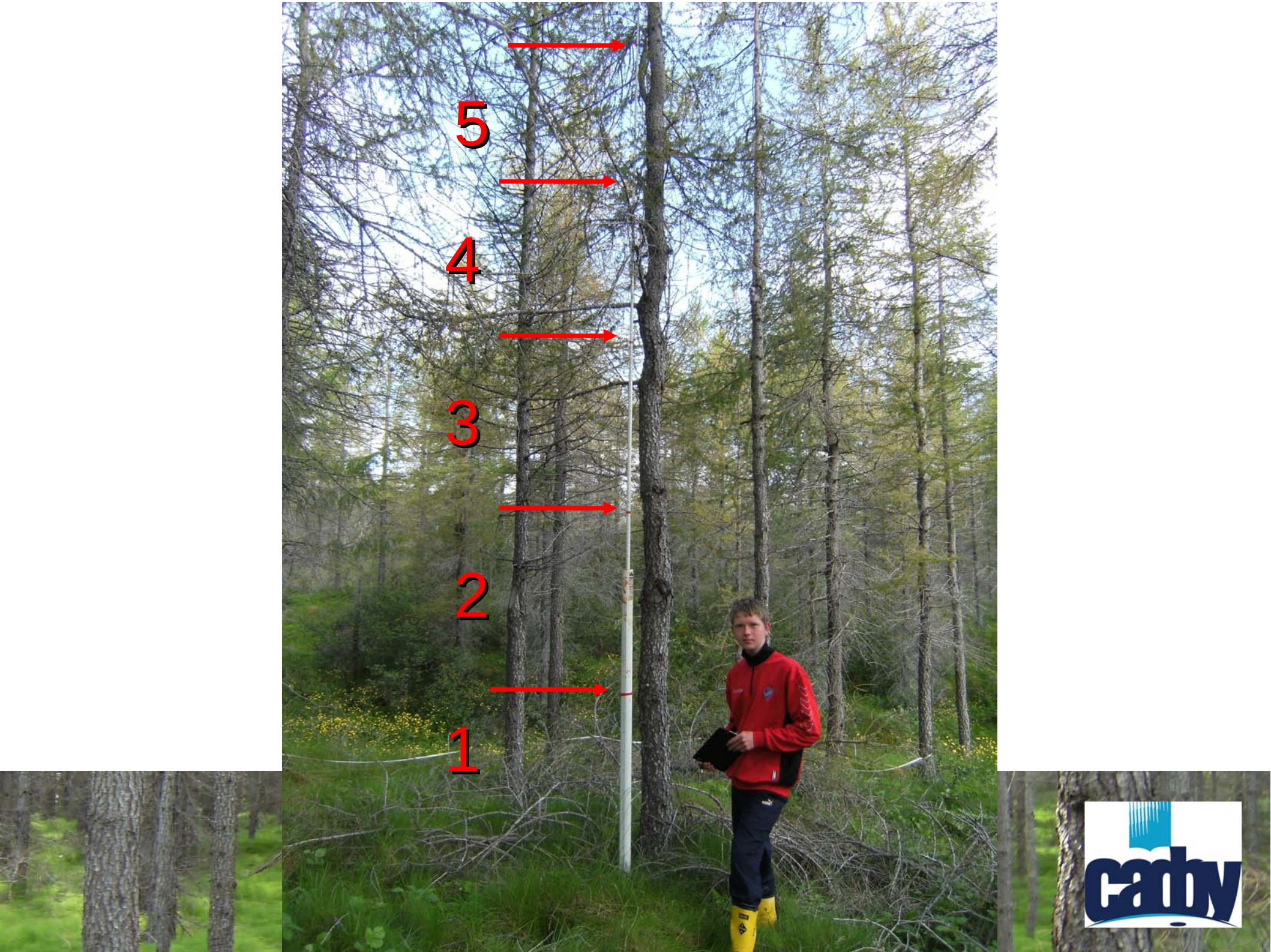
Askiz (Hakassia)
pl. year 1961
700/ha



Arkhangelsk
pl. year 1966
700/ha







5

4

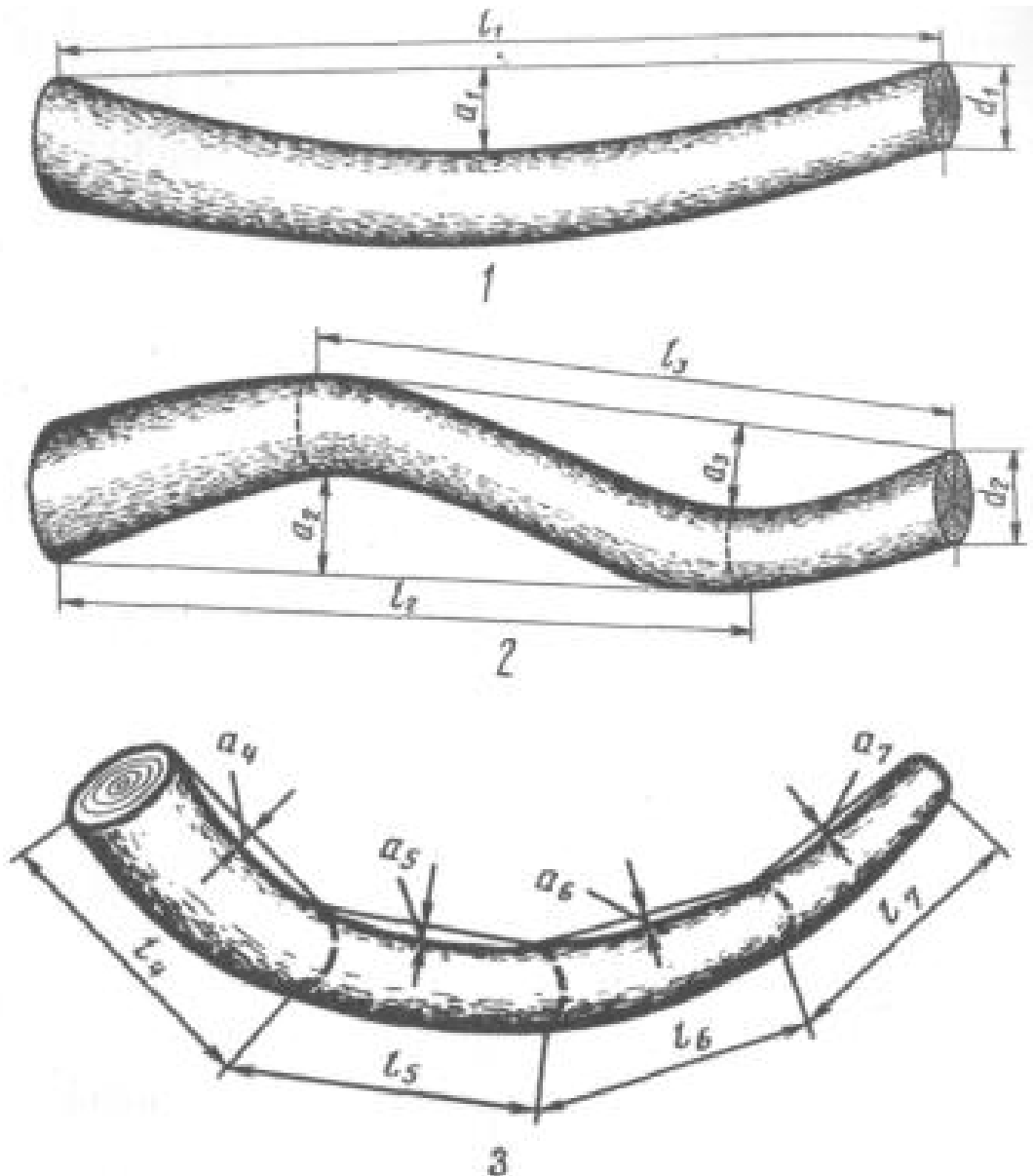
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1



Acceptable curves in log



Ok if $a < 1\%$
of l

from GOST 2140-80



Calculations

Class of stem-quality	V	IV	III	II	I	Σ
trees in the stand in each class, %	18	11	24	31	17	100
trees in the stand in each class, n	122	72	165	209	115	683
trees in the stand in each class, by 300/ha	122	72	106	0	0	300



Calculations

Proportion of stem-quality classes

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Index of stem-quality, (by 300/ha)	4,1
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Calculations

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Index of stem-quality, (by 300/ha)	4,1
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Weak correlation between the diameter of the tree and the stem quality

- 0...0,4

(tends to be stronger in older stands)

- Thinning will not necessarily leave the better trees



Arkhangelsk, pl. year 1966

Before thinning, 700/ha

Class of stem-quality	V	IV	III	II	I	Σ
trees in the stand in each class, %	12	8	17	34	29	100
trees in the stand in each class, n	209	151	309	619	525	1813
trees in the stand in each class, by 300/ha	209	91	0	0	0	300

After thinning, 1800/ha

Class of stem-quality	V	IV	III	II	I	Σ
trees in the stand in each class, %	18	11	24	31	17	100
trees in the stand in each class, n	122	72	165	209	115	683
trees in the stand in each class, by 300/ha	122	72	106	0	0	300



Plots with density up to 600/ha

№	Provenance	age, years	Region of origin	/ ha	Q classes, % as						
					if 300/ha					Q index	
					V	IV	III	II	I	300 / ha	600 / ha
717-6	Hall. ex Ark.	50	Iceland	499	18	14	37	31	0	3,2	2,5
509-15	Graubünden	49	Centr. Europe	562	20	11	27	42	0	3,1	2,3
707-6	Arkangelsk NW	51	Ark.	520	30	6	22	42	0	3,2	2,1
714-3	Raivola	55	Raivola	479	65	31	5	0	0	4,6	3,8
405-8	Raivola	56	Raivola	592	85	15	0	0	0	4,8	3,7
304-8	Karpinsk	53	Ural	491	15	23	54	8	0	3,5	2,6
714-3A	Shebalinskij	55	South Siberia	416	28	8	24	40	0	3,2	2,7
304-7	Shebalinskij	53	South Siberia	506	29	30	41	0	0	3,9	3,0
300-7B	Askiz	53	South Siberia	559	26	22	16	26	9	3,3	2,2
711-2	Shebalinskij	55	South Siberia	592	37	20	44	0	0	3,9	2,9

Plots with density 700...900/ha

№	Provenance	age, years	Region of origin	/ ha	Q classes, % as if 300/ha					Q index	
					V	IV	III	II	I	300 / ha	600 / ha
195-4	Arkangelsk	46	Ark.	683	41	24	35	0	0	4,1	3,1
195-3	Arkangelsk	46	Ark.	698	60	27	14	0	0	4,5	3,4
707-18	Sénkúrsk	49	Ark.	749	18	15	67	0	0	3,5	2,6
195-4B	Arkangelsk	46	Ark.	842	8	8	48	35	0	2,9	2,2
505-5	Raivola	46	Raivola	804	66	30	3	0	0	4,6	3,6
715-2	Sverdlovsk	50	Ural	866	25	31	44	0	0	3,8	3,1
303-6A	Askiz	51	South Siberia	680	30	27	44	0	0	3,9	2,7
704-2	Hakaskoja	58	South Siberia	792	29	23	45	3	0	3,8	2,8



Plots with density >1000/ha

№	Provenance	age, years	Region of origin	/ ha	Q classes, % as if 300/ha					Q index	
					V	IV	III	II	I	300 / ha	600 / ha
709-6	Onega	51	Ark.	1421	54	46	0	0	0	4,5	3,9
804-9	Arkangelsk	45	Ark.	1618	79	21	0	0	0	4,8	4,1
804-3	Arkangelsk	45	Ark.	1786	100	0	0	0	0	5	4,4
195-4	Arkangelsk	46	Ark.	1813	70	30	0	0	0	4,7	3,9
916-12	Jönsberg	29	orchard	1263	8	25	66	0	0	3,4	2,6
806-11	Imatra	25	orchard	1687	37	14	50	0	0	3,9	3,1
915-4	Östteg	25	orchard	3306	100	0	0	0	0	5	4,7
911-46	Jönsberg	29	orchard	4215	77	23	0	0	0	4,8	3,9



Discussions

In general provenances from NW Russia are better, though with exceptions

Other factors may to affect, f.ex.:

- site fertility
- density regime
- weather exposition et cetera

If there is a confidence, that the provenance and the site is good, it should be possible to plant fewer seedlings /ha
-> less need for spacing



Thank you very much

