

Clone test with hybrid aspen (As130)

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Abstract

In Trenthorst / Schleswig-Holstein a test site was established mainly with hybrid-aspen clones of the clone mixture 'Großhansdorf' to approve the best clones in 2012. Preliminary results at age 5 were given. Yet there are differences between the clones. Survival and growth traits (height and dbh) are not correlated.

Key words: *Populus × wettsteinii*, growth, field test

Introduction

In the 1980s, the clone mixture 'Großhansdorf' was approved with 14 clones of the hybrid aspen (*Populus × wettsteinii*, *P. tremula × P. tremuloides*). This mixture could only be distributed if all 14 clones are included. However, the ability for vegetative propagation was very different for the single clones. Therefore, the mixture was never commercially available.

About 15 years ago, interest in hybrid aspen clones reappeared. This was taken as an opportunity for testing the clones which could be propagated vegetative easily and in high numbers with the aim to approve the best performing single clones.

Material and methods

Eight of the 14 clones of the mixture 'Großhansdorf' could be propagated in numbers so that they could be included in a clone test. The experiment was supplemented by 3 more clones of hybrid aspen, including the triploid clone 'Astria'. In addition, a grey poplar (*P. × canescens*) was included in the test. The hybrid aspen clones were selected in progeny trials of the institute. The clones of the test and their crossing parents are listed in Table 1.

The plants for the experiment were propagated by tissue culture in 2007 and were cultivated for further years in the nursery of the institute. In 2012, the site in Trenthorst (As130), Schleswig-Holstein (53° 47' N, 10° 31' E, 37 m a.s.l.), could be planted with cut back plants on 5-year old roots (0/5). The trial layout was 3 rows with 4 plants (12 plants per plot, spacing 2 m x 2 m). The plot size is 6 m * 8 m (48 m²). Each clone is replicated up to 6 times.

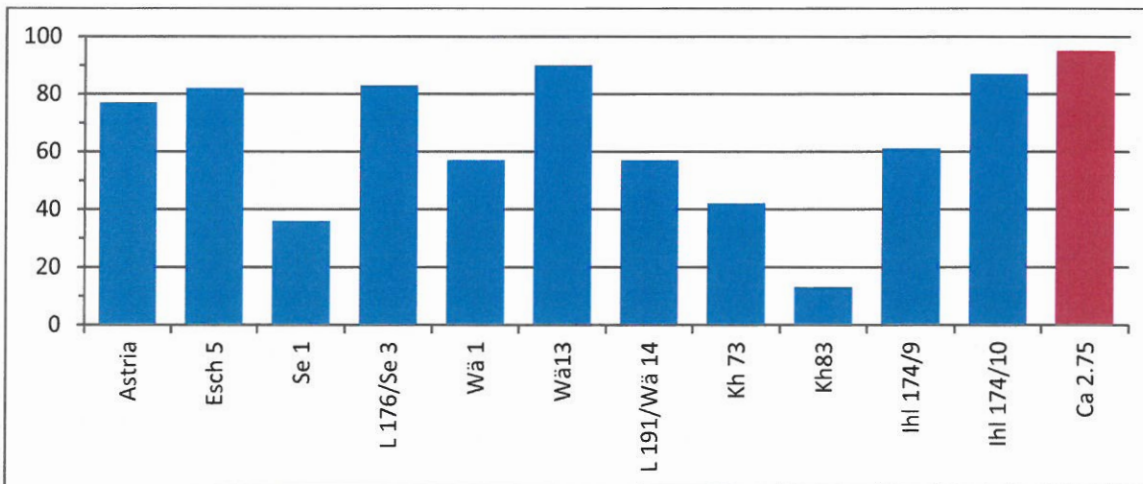
Survival was assessed and height and diameter (dbh) growth were measured in the field.

Table 1: Clones of hybrid-aspen and their parents (* clones of the mixture 'Großhansdorf')

Species	No.	Klon name	Crossing
<i>P. × wettsteinii</i> (<i>P. tremula</i> × <i>P. tremuloides</i>)	1	Astria	
	2*	Esch 5	Brauna 11 × Turesson 141
	3*	Se 1	Brauna 11 × Turesson 141
	4*	L 176 / Se 3	Brauna 11 × Turesson 141
	5*	Wä 1	Großdubrau 1 × Maple
	6*	Wä 13	Großdubrau 1 × Maple
	7*	L 191 / Wä 14	Großdubrau 1 × Maple
	8*	Kh 73	W 3 × Clone 13
	9*	Kh 83	W 3 × Clone 13
	10	Ihl 174/9	W 18 × Clone 13
	11	Ihl 174/10	W 18 × Clone 13
<i>Populus × canescens</i> (<i>P. tremula</i> × <i>P. alba</i>)	12	Ca 2.75	

Results

Two years after establishing the trial site the **survival** rate was 68 % over all 12 clones. Two years later in autumn 2016 survival was at the same level (67 %). The best survival rates had the clones Ca 2.75 (*P. × canescens*) (95 %) and Wä 13 (90 %). The lowest survival could be observed for clone Kh 83 (13 %) followed by Se 1 (36 %) (Figure 1).

**Figure 1:** Survival [%] at age 5 in the field (autumn 2016).

The mean **height** overall all 12 clones was 1.6 m in 2013, two years later (2015) it was 4.5 m and 7.9 m in 2016. The variation between the clones at age 5 in the field (2016) is shown in Figure 2. At age 4 and 5 the hybrid aspen clones (Wä 1: 8.5 m; Wä 13: 8.7 m; L 191/Wä 14: 9.4 m, and Ihl 174/10: 8.3 m) have a significant better height growth than the *P. × canescens* clone Ca 2.75 (6.1 m).

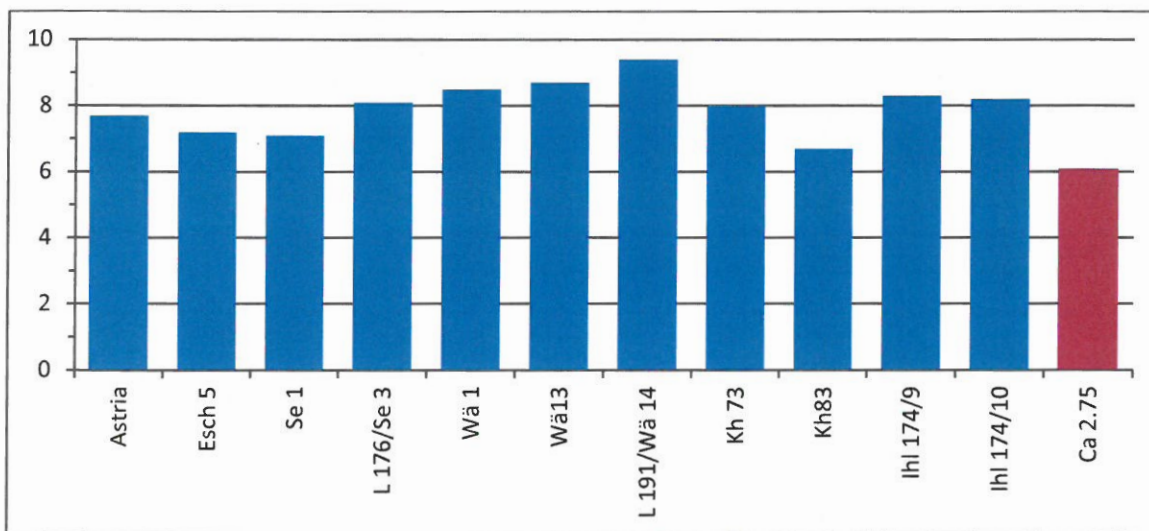


Figure 2: Mean height [m]; at age 5 in the field (autumn 2016).

The mean **dbh** overall all 12 clones was 2.9 cm in 2015, and a year later (2016) it was 4.9 cm. The variation between the clones is given in Figure 3. The mean dbh varies between 4.6 cm and 6.5 cm. However, differences between the clones were not significantly.

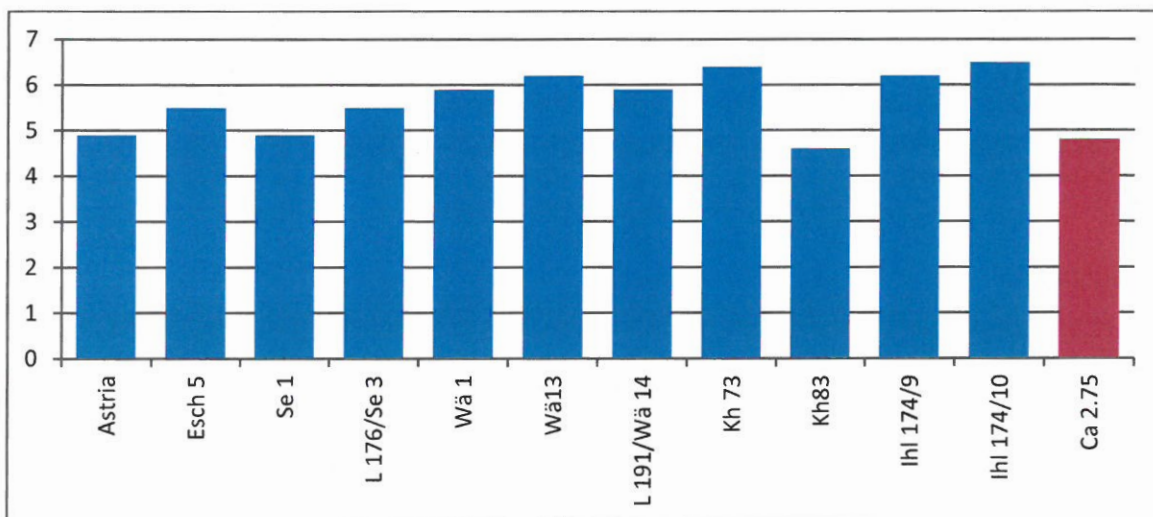


Figure 3: Mean dbh [cm] at age 5 in the field (autumn 2016).

Correlation between traits

The survival rates between the 3 assessments are correlated. Survival is also correlated with the height at age 2 in the field (2013). There is no correlation between survival and the growth traits (height and diameter) at age 4 (2015) and 5 (2016). Height at age 2 (2013) and height 5 (2016) are correlated with the diameter growth at age 4 (2015) and 5 (2016). Height at age 4 (2015) is additionally correlated with height at age 5 (2016). The diameter at age 4 (2015) is correlated with those of age 5 (2016). The results are summarized in Table 2.

Table 2: PEARSON's correlation coefficient for survival (S..), and height (H..) and dbh (D..), respectively.
(* significant $\alpha < 0.05$)

Trait	S13 (age 2)	S15 (age 4)	S16 (age 5)	H13 (age 2)	H15 (age 4)	H16 (age 5)	D15 (age 4)	D16 (age 5)
S13 (age 2)	-							
S15 (age 4)	0.998*	-						
S16 (age 5)	0.998*	0.999*	-					
H13 (age 2)	0.654*	0.648*	0.656*	-				
H15 (age 4)	0.901	0.062	0.079	0.561	-			
H16 (age 5)	0.101	0.086	0.098	0.517	0.890*	-		
D15 (age 4)	0.231	0.202	0.221	0.653*	0.949*	0.752*	-	
D16 (age 5)	0.248	0.219	0.235	0.668*	0.941*	0.755*	0.991*	-

Conclusions

The site is still young. Yet there are differences between the clones. Clones with a high survival rate are distinguished by a well height and diameter growth performance. The results will be compared with those from a parallel site in Poland.

Acknowledgments

The joint project FastWOOD was funded by the Federal Ministry of Food and Agriculture (BMEL) through the Agency for Renewable Resources e.V. (FNR). We gratefully acknowledge MANFRED RADIES, STEFAN JENCSIK and JÜRGEN BEIERMEISTER doing the assessments and measurements conscientiously. For providing the test site we thank the Thünen Institute of Organic Farming.

**German Russian Conference on Forest Genetics -
Proceedings - Ahrensburg, 2017 November 21-23**

Bernd Degen, Konstantin V. Krutovsky, Mirko Liesebach (eds.)

Thünen Report 62

Bibliografische Information:
Die Deutsche Nationalbibliothek verzeichnet diese Publikationen in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet unter www.dnb.de abrufbar.

Bibliographic information:
The Deutsche Nationalbibliothek (German National Library) lists this publication in the German National Bibliography; detailed bibliographic data is available on the Internet at www.dnb.de

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Zitationsvorschlag – Suggested source citation:
Degen B, Krutovsky KV, Liesebach M (eds) (2018)
German Russian Conference on Forest Genetics - Proceedings - Ahrensburg, 2017 November 21-23. Braunschweig:
Johann Heinrich von Thünen-Institut, 148 p, Thünen Rep 62,
DOI:10.3220/REP1539855736000

Die Verantwortung für die Inhalte liegt bei den jeweiligen Verfassern bzw. Verfasserinnen.

The respective authors are responsible for the content of their publications.



Thünen Report 62

Herausgeber/Redaktionsanschrift – *Editor/address*

Johann Heinrich von Thünen-Institut
Bundesallee 50
38116 Braunschweig
Germany

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www.thuenen.de

ISSN 2196-2324
ISBN 978-3-86576-189-7
DOI:10.3220/REP1539855736000
urn:nbn:de:gbv:253-201810-dn060232-8