

# Growth response of wild service tree (*Sorbus torminalis* (L.) Crantz) on the release



Václav Hurt<sup>1</sup>, Jan May<sup>1</sup>, Jiří Souček<sup>2</sup>

vaclav.hurt@mendelu.cz

Mendel university in Brno<sup>1</sup>, Forestry and Game Management Research Institute (FGMRI) at Jiloviste-Strnady<sup>2</sup>



## 1. Introduction:

Wild service tree (ST) is a native species in the Czech Republic. Unfortunately, slow decrease is being monitored in last decades due to current way of silvicultural management. The natural occurrence of ST is in coppice with standards with diversified stand structure. ST is a slow-growing species with reduced competitive ability in high forest. Extensive root system allows ST to tolerate dry stands. Therefore, ST can be used for reforestation of extreme sites, e.g. slopes with soil erosion or landslide risk, moreover, this ability is of great importance in situation of climate change.

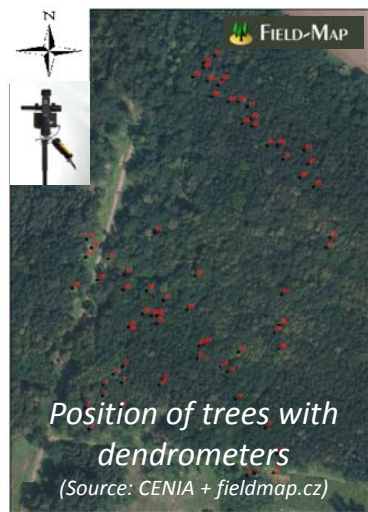


Litterfall of ST enriches soil environment. In case of ample amount, ST provides a valuable bee pasture. Fruits are used for production of tasteful jams and liqueurs with price up to 28 €/1 dcl. Fruits are also considered as high-quality food for game. The most valuable and valued product of ST is its wood with specific texture and structure caused by slow growth. Its design is similar to wood from tropics and is considered as its adequate substitute. In 2009 in Austria, the price reached 20 000 €/m<sup>3</sup>.

## 2. Goals of study

- to determine the extent of reaction of ST to release and climate conditions on the Halín plot (N 50°18.92998', E 16°7.85930') in growing season of 2013,
- to assess the state of ST in evaluated forest stands and to suggest preliminary silvicultural treatment

Classification to the DBH interval



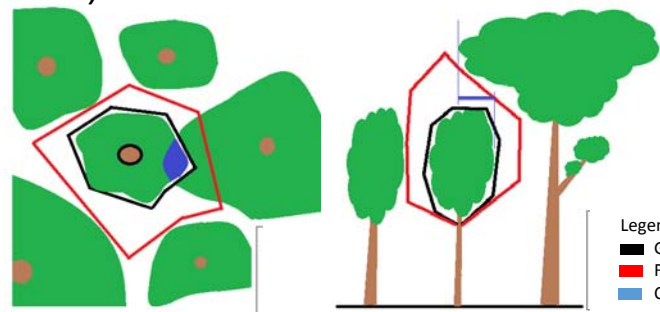
## 3. Methods

- site conditions of evaluated stands: 60 year old mixture ST, lime and oak, soil type Cambisol, forest site complex *Fageto-Quercetum illimerosum trophicum*,
- 75 trees were included in the measurement, reading of dendrometers was carried out every 14 days in the growing season of 2013,
- measured parameters: DBH, height, crown projection, GPS position of each tree and their competitors, free growth area – FGA (m<sup>2</sup>), FGA in m<sup>3</sup> – FGS, crown overlap – CO, Competition number SCHÜTZ (1989; SI) and Lorimer (LI).



DBH class	DBH range	Classification
14	12,1 - 16,0	Low DBH
18	16,1 - 20,0	
22	20,1 - 24,0	Middle DBH
26	24,1 - 28,0	
30	28,1 - 32,0	High DBH
34	32,1 - 36,0	

Growth area (on the left crown projections, on the right linear profiles of trees)



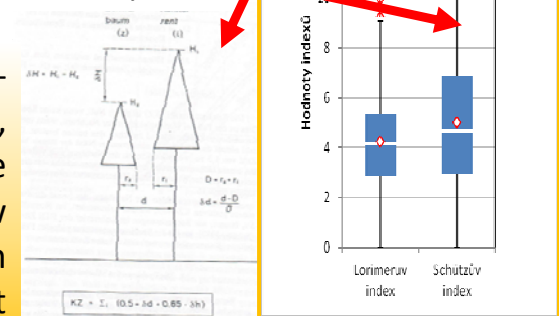
Optimum distance of ST from neighbours according to the results and Leder (2011)

BHD class	DBH range [cm]	Coefficient	Optimal distance between trees [m]	State on plot Halín
I.	7 – 15	40	2,8 – 6	57 %
II.	15 – 25	30	4,5 – 7,5	18 %
III.	25 – 60	20	5,5 – 12	16 %

## 4. Results

Two growth phases were distinguished in 2013 (I.-15.6.-30.6. and II.-6. 9.-19.9. 2013). The DBH class 18, characterised by high level of competition, included the majority of evaluated trees. Low DBH (<20 cm), or low FGA (FGA<5 m<sup>2</sup>; CO>60%), with the increase between 1.5-2 mm/year were significant marks for the most suppressed trees. The significant DBH growth (3.5-6.0 mm/year) was recorded for FGA above 15 m<sup>2</sup> (or CO 40%).

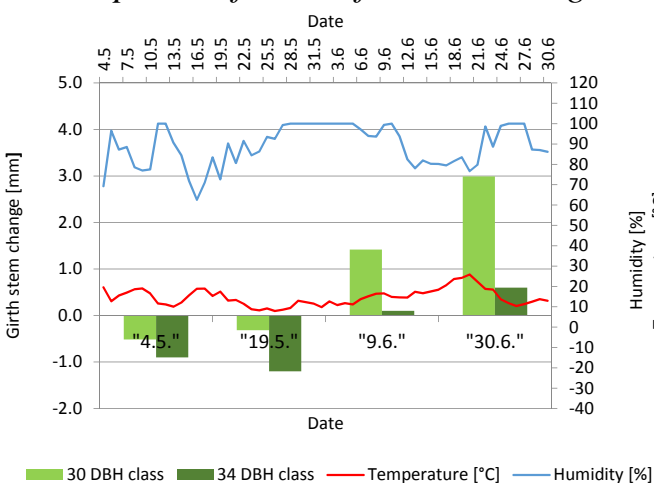
Competition number SI (SCHÜTZ 1989)



Evaluation of growth area FGA

Classification	Classification of FGA	FGA (m <sup>2</sup> )	FGS (m <sup>3</sup> )	SI or LI	CO %
Strongly suppressed	1	0-5	0-50	9+	80+
Suppressed	2	5-10	50-100	7-9	60-80
Slightly suppressed	3	10-15	100-150	5-7	40-60
Temporarily released	4	15-20	150-200	3-5	20-40
Released	5	20+	200+	0-3	0-20

Development of circumferential change and climate (4.5. – 30.6.)



At the beginning of the spring, rich in precipitation, the growth reaction was not recorded. Probably due to influence of low temperatures. The highest increment showed trees with DBH class 30. The growth increment decreased with decreasing FGA.

## 5. Conclusions

In the mixture with lime and oak, ST of 60 years is able to react to release. The 40% release of crown scan be suggested as optimal. The DBH dimensions of 60 cm are assumed in the age of 100 years. FGA 10-15 m<sup>2</sup> is necessary for minimum increment 2-3.4 mm/year, or even existence of ST in the stand, and FGA>15 m<sup>2</sup> is appropriate for optimal increment 3.5-6 mm/year. According to the results, the method Q-D Wilhelm (2013) is suitable in this age.

## 6. References

LEDER, B., 2011. Die Elsbeere in Nordhein-Westfalen. Amsberg; Nettersheim, 32 s.; Schütz, J., P., 1989. Zum Problem Konkurrenz in Mischbeständen. Sch.Z. Forstwes., 1069-1083.

## 7. Acknowledgement

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