



Applied Period In Forest Institution 2018

University of Freiburg - Chair of Forest Growth and Dendroecology

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MSc European Forestry

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1. Introduction about the host organization

- Chair of Forest Growth – Faculty of Environment and Natural Resources
- PD Dr. Hans-Peter Kahle
- Supervisors:
 - Dr. Christopher Morhart
 - Dr. Michael Nahm
- A part of SIDATIM project



2. Description of my activities

- 2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)
 - Demonstration of growing valuable timber with broadleaved trees in applying an extensive approach
- 2.2. Leaf biomass measurement of Wild Cherry (*Prunus avium* L.)
 - Assess 3D tree structures and the above-ground C-sequestration potential of trees using Terrestrial Laser Scanning technology

2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

- Study site
- Sampling
- Measurements
- Discussions



2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

- **Study site**
 - Wyhl am Kaiserstuhl (Lat.: 48.15438; Long.: 7.67095)
- **Tree species:** Walnut (*Juglans regia* L.)
 - Land consolidation: Trees had been felled (no cardinal direction known + some uncertainties about the height of disc sampling)



2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

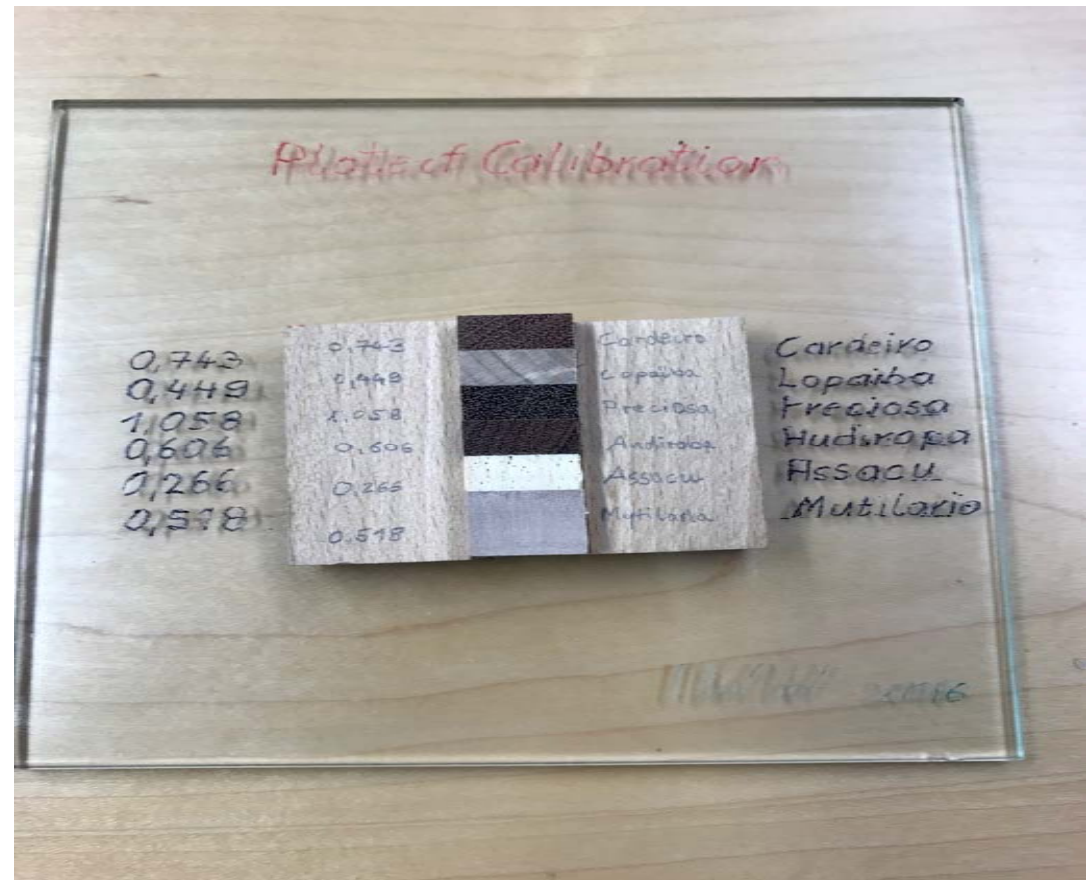
- Sampling

- 3 stems in different heights in each tree
- Each stem was measured in 4 directions (North, West, South, East)
- **At 1.3 m height**
 - 20: the number of the sample
 - 1: the height
 - 1 – 3 – 5 – 7 ~ North – West – South - East



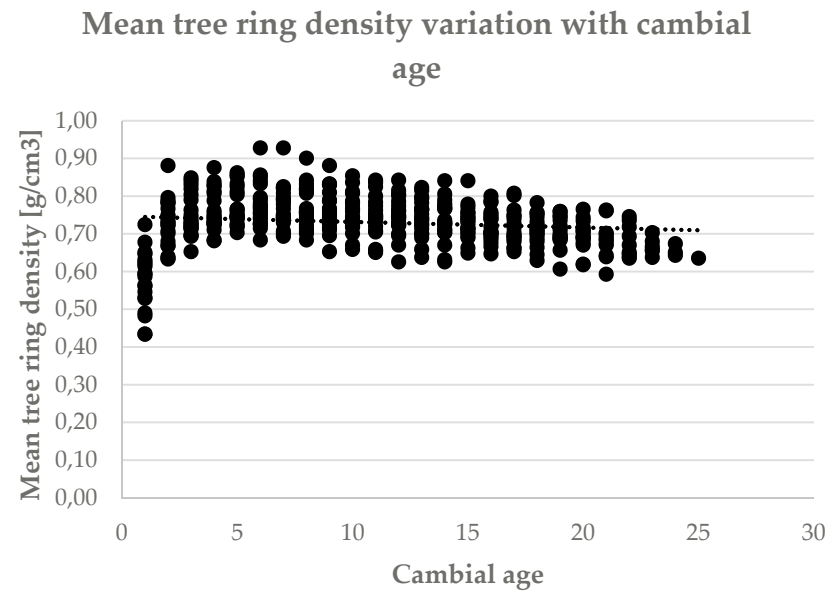
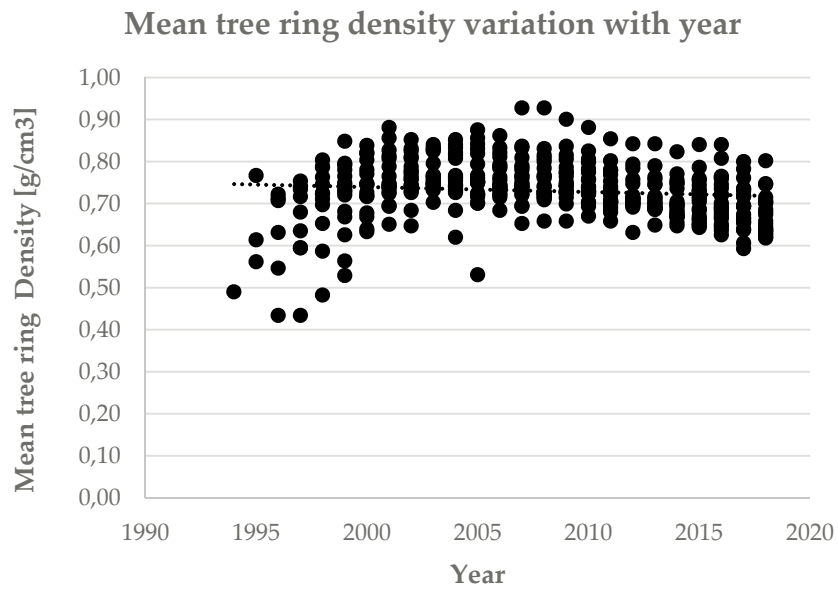
2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

- Measurements
 - Using High Frequency Densitometry
 - Parameters: Calibration Probe C1, Mobi 1: Gain 4.28, Offset 5.62



2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

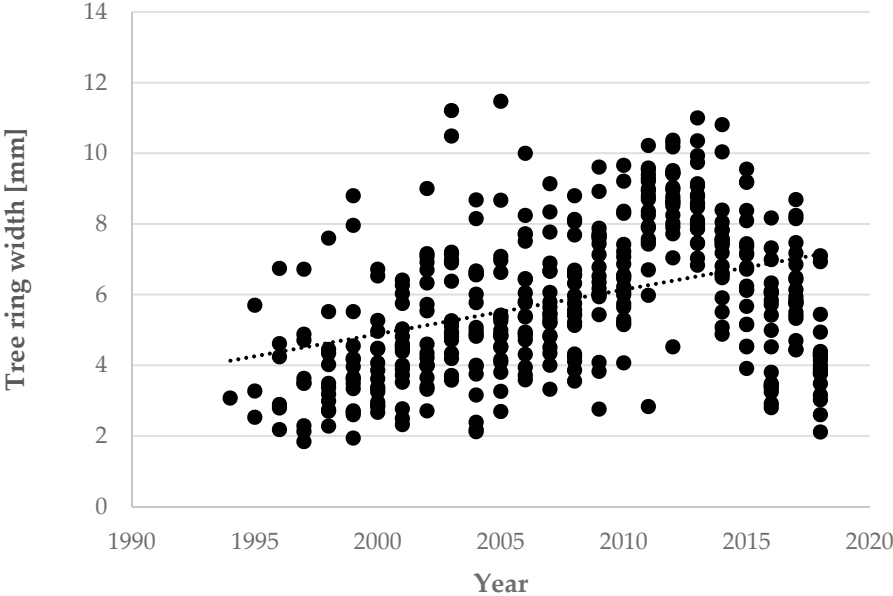
- Discussions



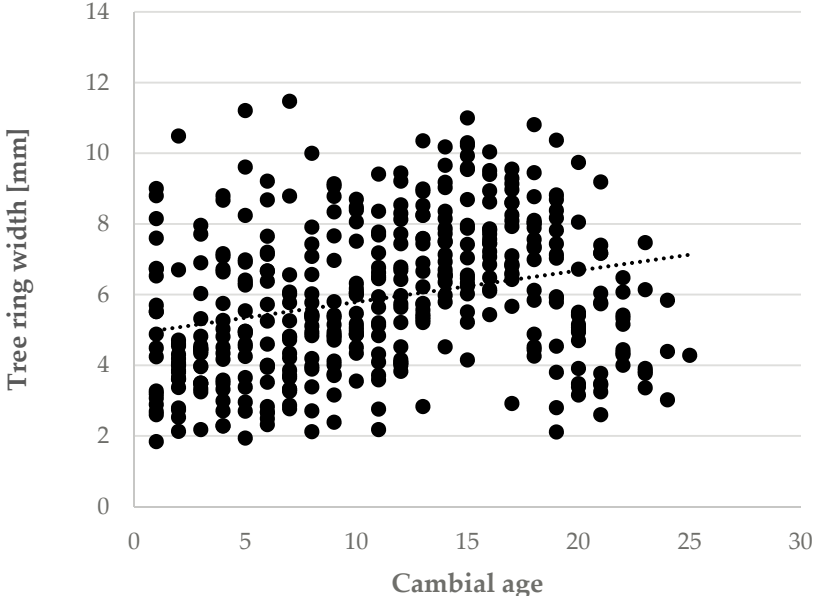
2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

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Tree ring width variation with year

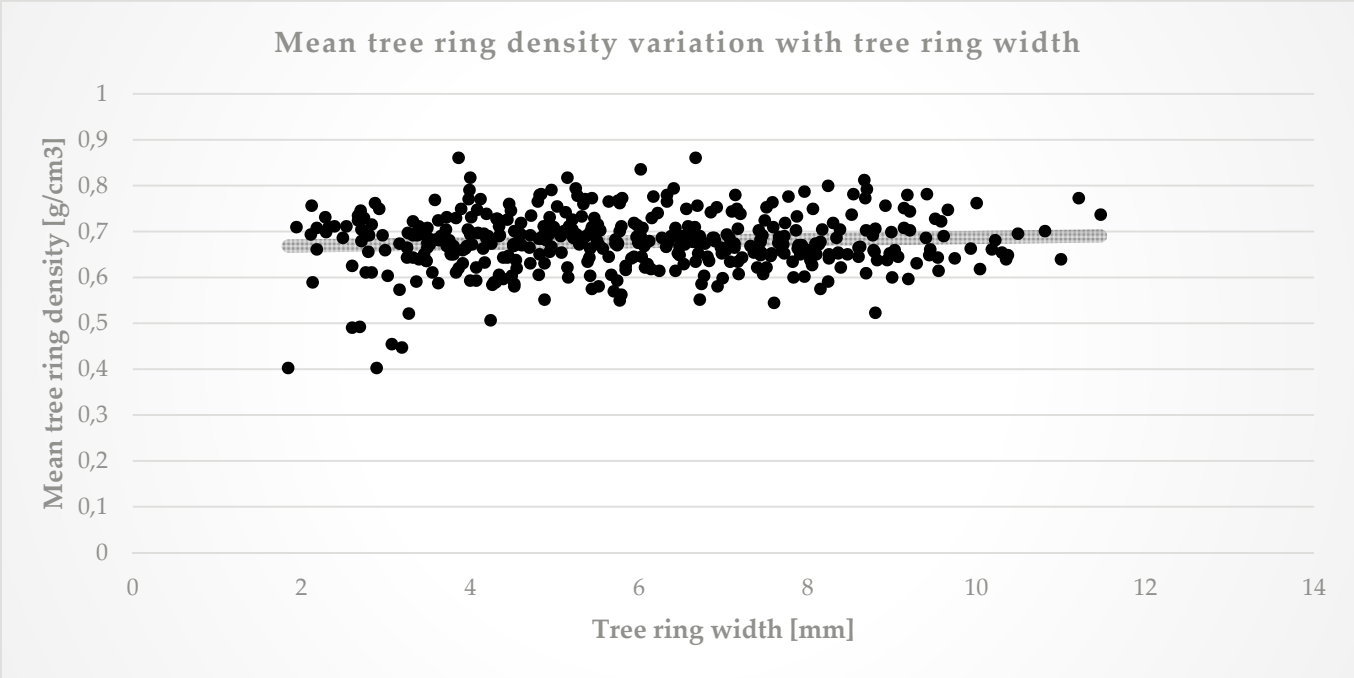


Tree ring width variation with cambial age



2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

- Discussions



2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

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Tree species	Density in literature (g/cm ³)	Source
<i>Eucalyptus grandis</i> × <i>E. urophylla</i> <i>Fagus sylvatica</i>	0.41 - 0.68	Wassenberg, 2014
<i>Fagus sylvatica</i>	0.59	Wassenberg, 2014
<i>Mytilaria laosensis</i>	0.49	Wassenberg, 2014
<i>Picea abies</i>	0.37 - 0.45	Wassenberg, 2014
<i>Pinus sylvestris</i>	0.37 - 0.48	Wassenberg, 2014
<i>Prunus avium</i>	0.47	Wassenberg, 2014
<i>Quercus petraea</i>	0.56 - 0.68	Wassenberg, 2014
<i>Tectona grandis</i>	0.52 - 0.72	Wassenberg, 2014
<i>Juglans regia</i> L.	0.65 - 0.7	Wood Density Chart, 2018
<i>Juglans regia</i> L. (in my project)	0.73	Huu Minh, 2018

2.1. Analysis of wood density of Common Walnut (*Juglans regia* L.)

- Discussions



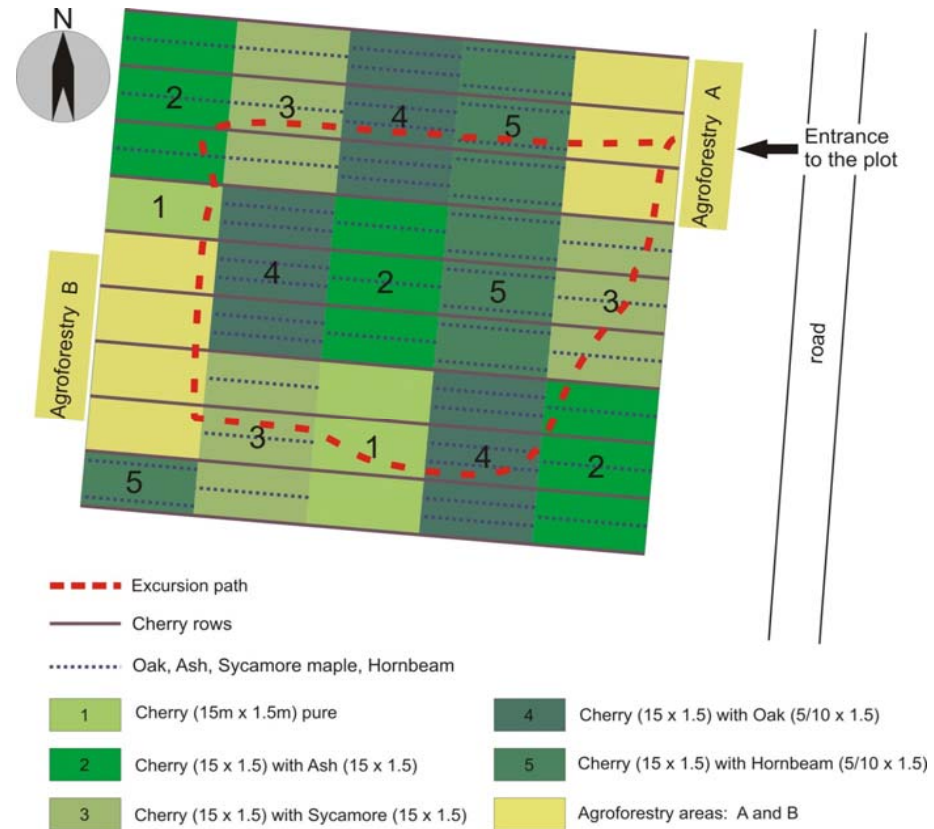
2.2. Leaf biomass measurement of Wild cherry (*Prunus avium* L.)

- Study site
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2.2. Leaf biomass measurement of Wild cherry (*Prunus avium* L.)

- Study site

- Rhine river area
- 48.06984 N, 7.58924 E

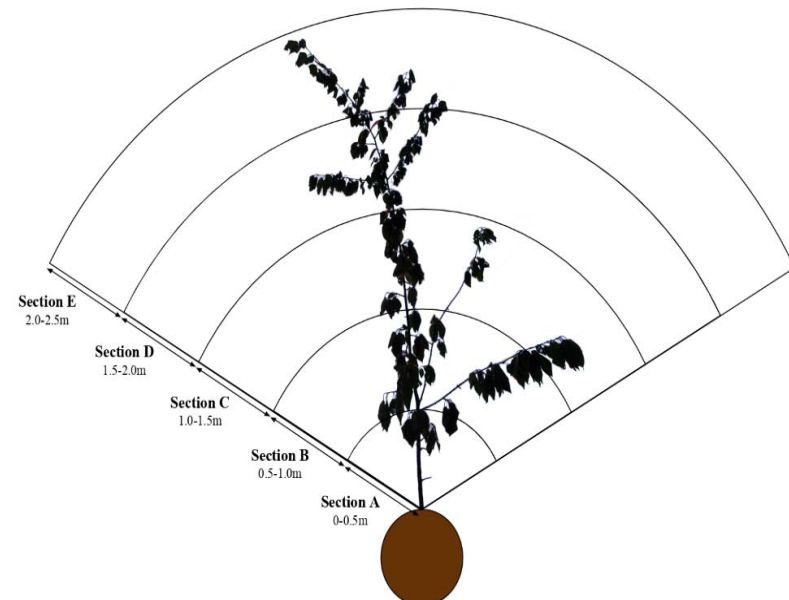


2.2. Leaf biomass measurement of Wild cherry (*Prunus avium* L.)

- Sampling
 - 13 branches in different height in one tree
 - 1st time: 7 branches (9th July)
 - 2nd time: 8 branches (16th of July)
 - Take the leaf in every section

Leaf sampling

Wild cherry (*Prunus avium* L.)



2.2. Leaf biomass measurement of Wild cherry (*Prunus avium* L.)

- Measurements
 - Step 1: Weight of the total fresh leaf in each section
 - Step 2: Select 10 leaves randomly in each section, then weight the leaf and petiole separately
 - Step 3: Scan samples in step 2
 - Step 4: Pick 10 samples from step 2 then dry those to figure out the conversion factor
 - 73 sections, 174 samples were measured

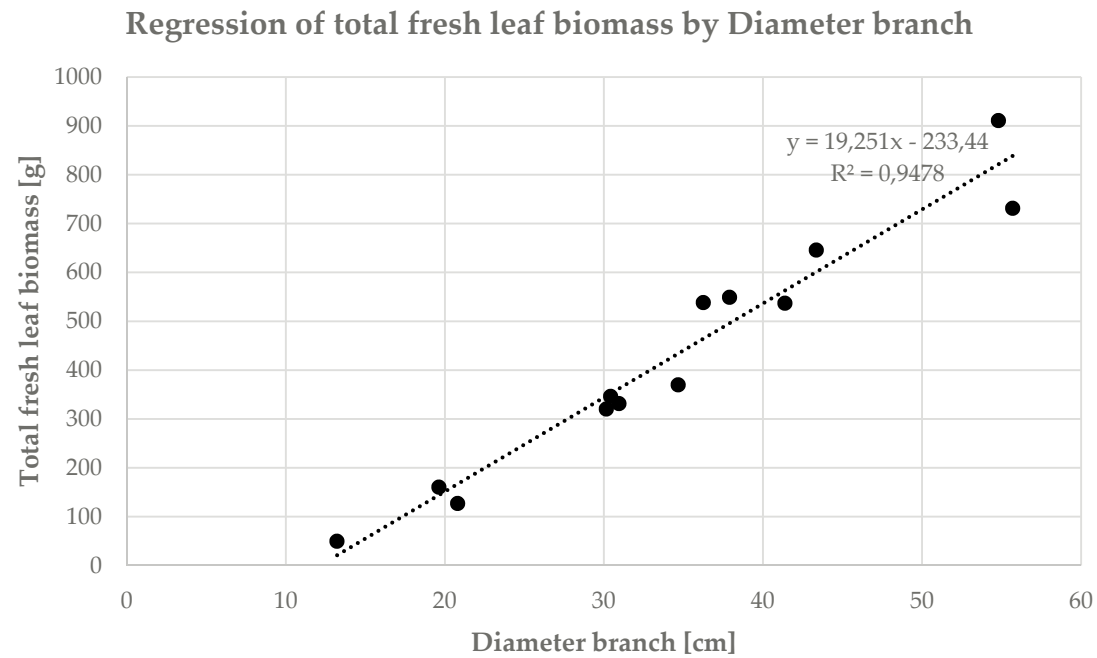
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Tree Nr.	Section B1				Leaf area [mm ²]	Section B2				Leaf area [mm ²]	Section B3				Leaf area [mm ²]
	Leaf Weight B1 [g]	Petiole Weight B1 [g]	Leaf + petiole B1 Fresh weight [g]	Leaf + petiole B1 Dry weight [g]		Leaf Weight B2 [g]	Petiole Weight B2 [g]	Leaf + petiole B2 Fresh weight [g]	Leaf + petiole B2 Dry weight [g]		Leaf Weight B3 [g]	Petiole Weight B3 [g]	Leaf + petiole B3 Fresh weight [g]	Leaf + petiole B3 Dry weight [g]	
1-7-5	5.23	0.83	6.06	3.0906		5.06	0.72	5.78	2.9478	0	0	0	0		
1-7-5	5.05	0.44	5.49	2.7999		5.07	0.46	5.53	2.8203		5.01	0.49	5.5	2.805	
1-7-5	5.27	0.88	6.15	3.1365		4.88	0.61	5.49	2.7999		2.87	0.32	3.19	1.6269	
1-7-5	6.1	0.91	7.01	3.5751		6.13	0.81	6.94	3.5394		6.32	0.86	7.18	3.6618	
1-7-5	7.09	0.85	7.94	4.0494		4.4	0.52	4.92	2.5092		0	0	0	0	
1-7-5	5.48	0.84	6.32	3.2232		0	0	0	0		0	0	0	0	
1-7-5	6.62	0.85	7.47	3.8097		0	0	0	0		0	0	0	0	
1-7-5	6.72	0.97	7.69	3.9219		0	0	0	0		0	0	0	0	
1-7-5	5.95	0.77	6.72	3.4272		6.7	0.85	7.55	3.8505		5.64	0.81	6.45	3.2895	
1-7-5	5.07	0.64	5.71	2.9121		4.94	0.75	5.69	2.9019		0	0	0	0	
1-7-5	7.38	0.82	8.2	4.182		6.17	0.7	6.87	3.5037		0	0	0	0	
1-7-5	6.98	0.91	7.89	4.0239		7.48	0.89	8.37	4.2687		0	0	0	0	
1-7-5	5.81	0.58	6.39	3.2589		5.75	0.73	6.48	3.3048		0	0	0	0	

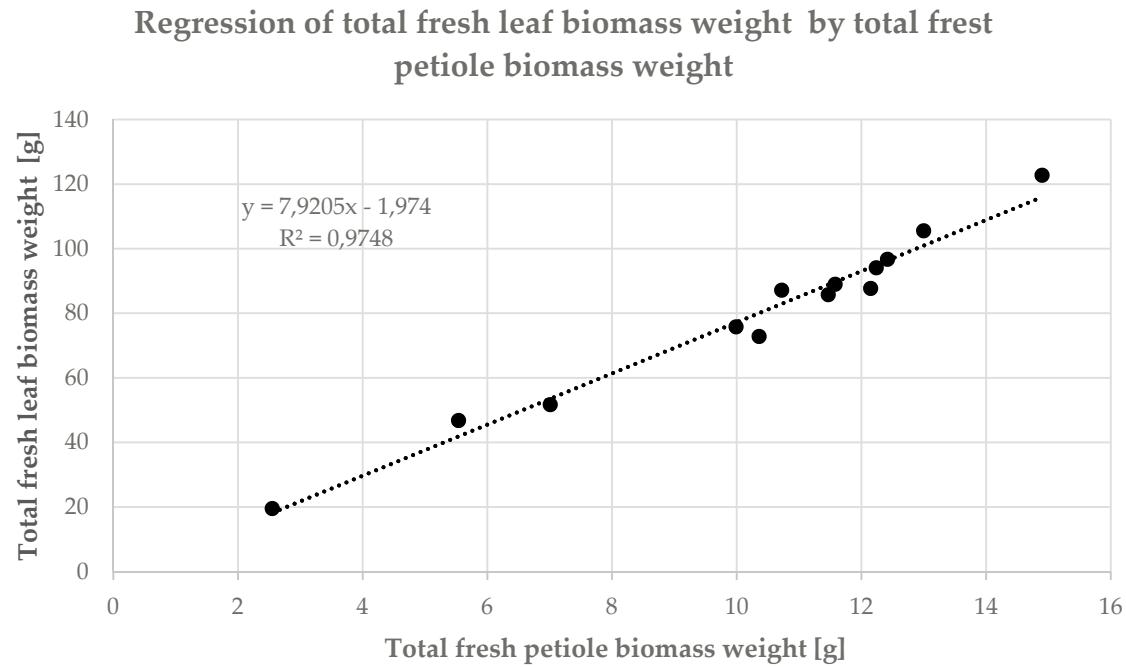
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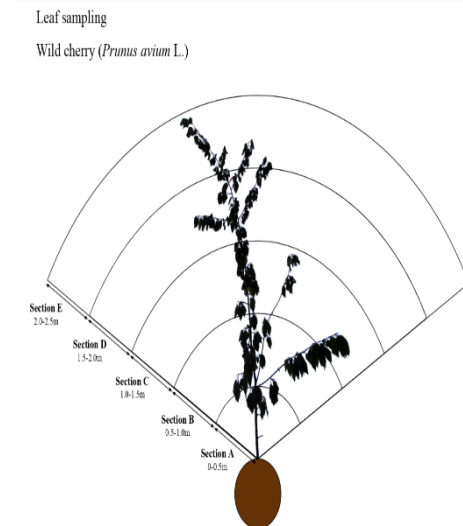
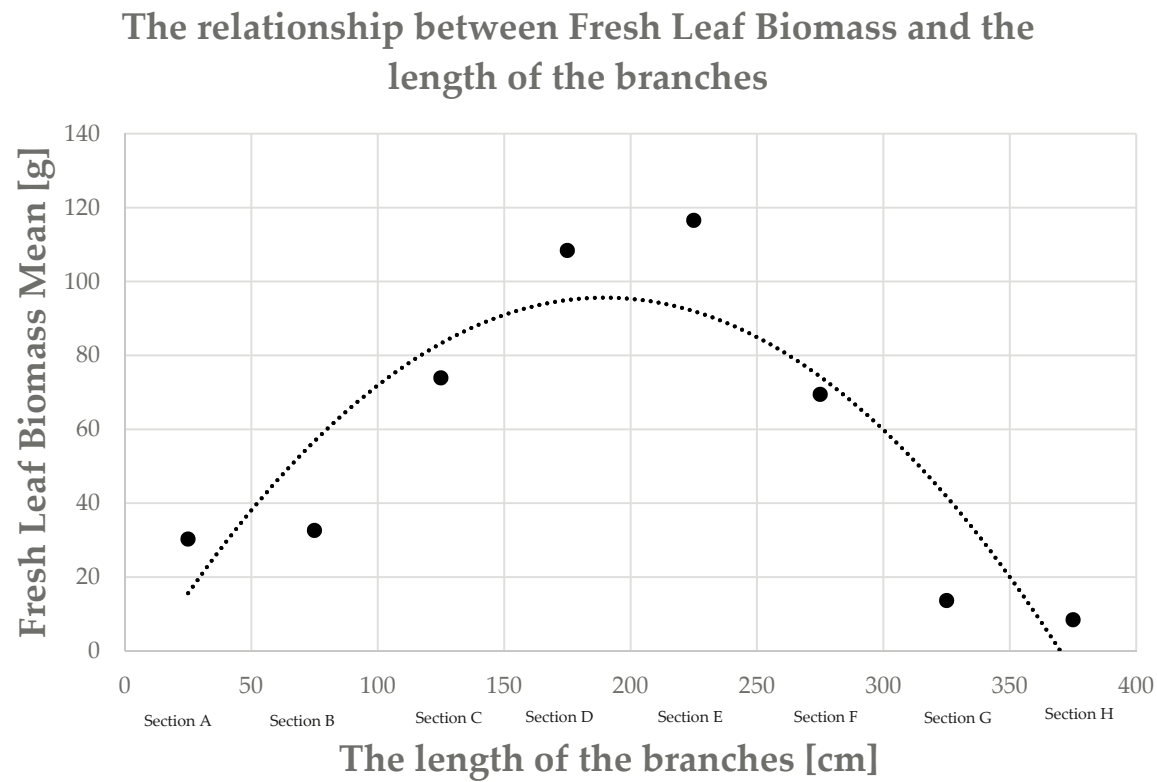
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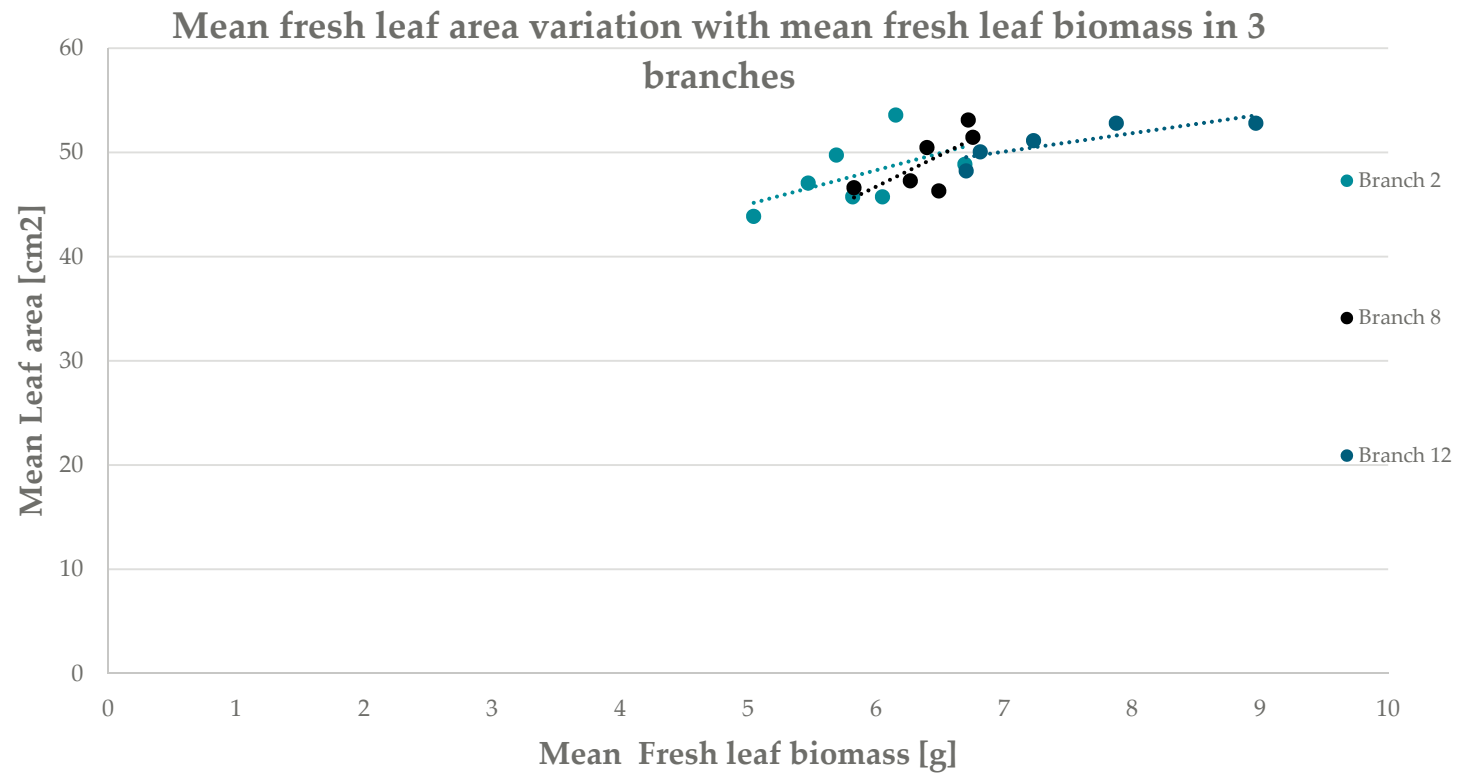
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3. Conclusion

- Improved knowledge and skills about forestry in Germany
- Learned valuable lessons from lecturers, staffs
- Requires experiences and complicated for wood density measurement
- Need to be test with more samples

Thanks for your listening!