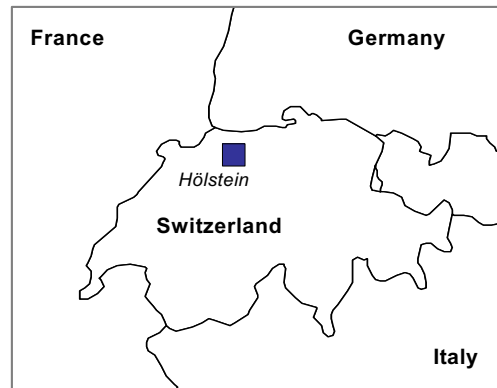
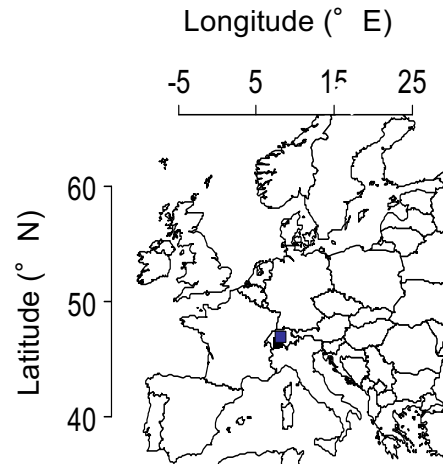


The Swiss Canopy Crane II Site



Ansgar Kahmen
University of Basel

The Swiss Canopy Crane II Site



Site

Area	1.6 ha
Elevation	550 m a.s.l
MAT	9.0 ° C
MAP	1009 mm
Soil	40% clay

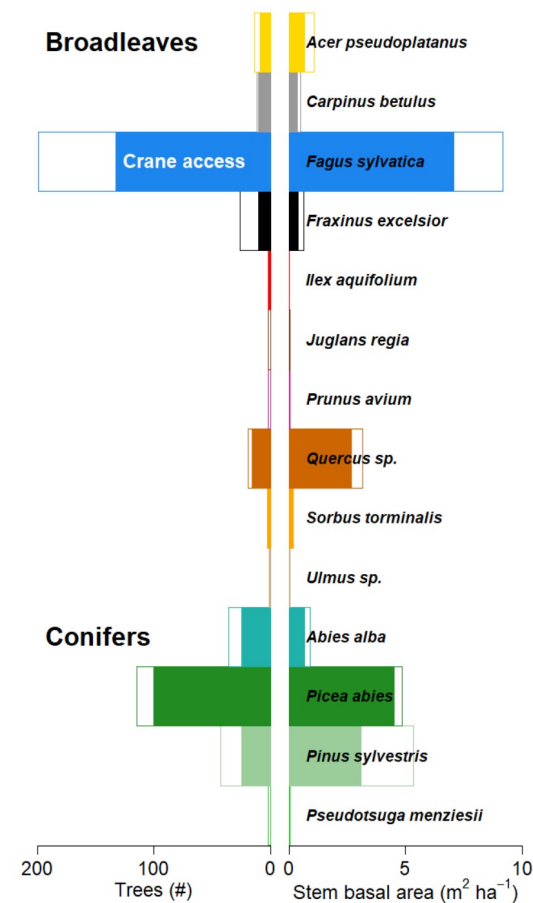
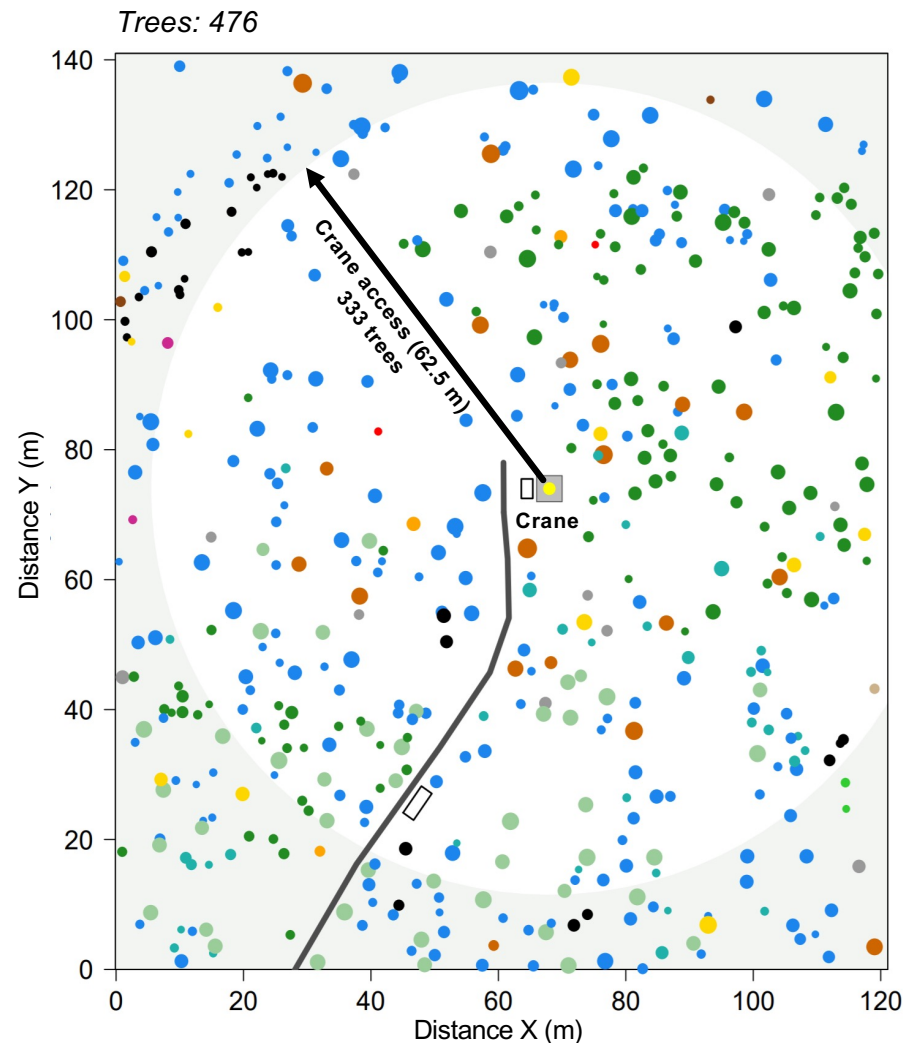


Forest

Trees _{>10cm}	476
Species	14
Density	298 trees/ha
Tree age	20-150 years
Height	~35 m
Death ₂₀₁₇₋₂₁	80 trees

The New Swiss Canopy Crane II

Species occurrence and canopy access



The Swiss Canopy Crane II Site

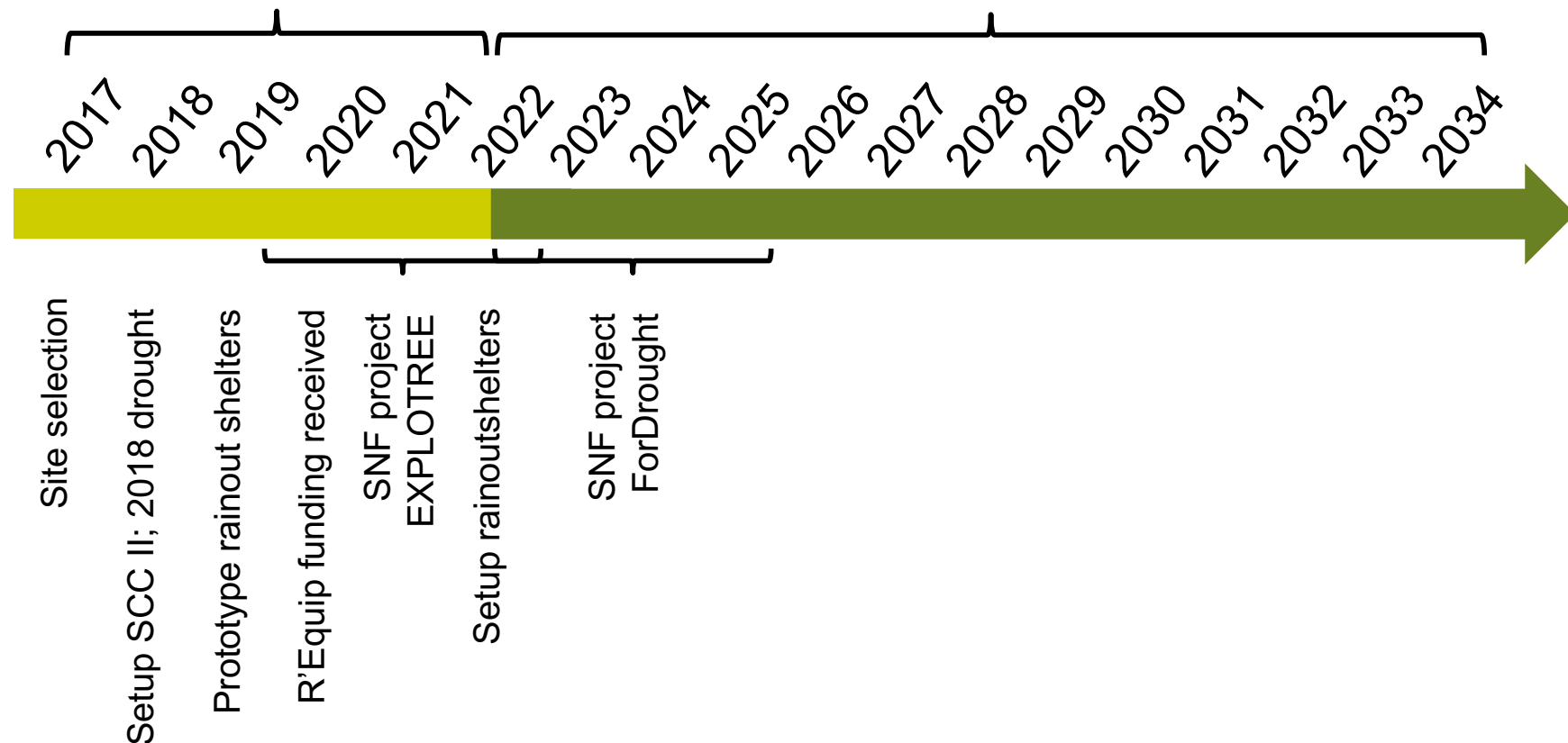


The Swiss Canopy Crane II Site

Project phases

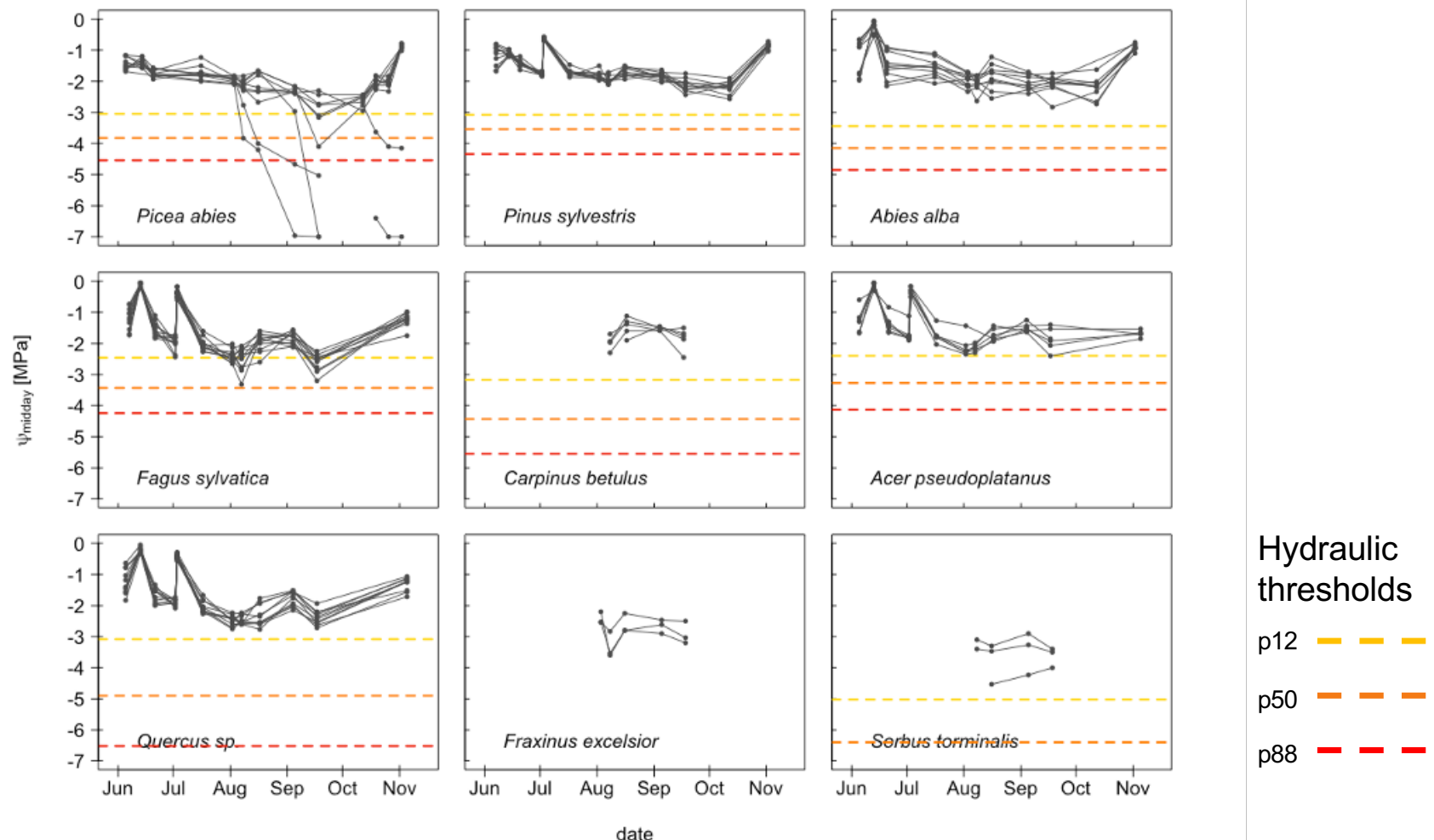
Setup & observational phase

Experimental phase



SCC II 2018 Drought

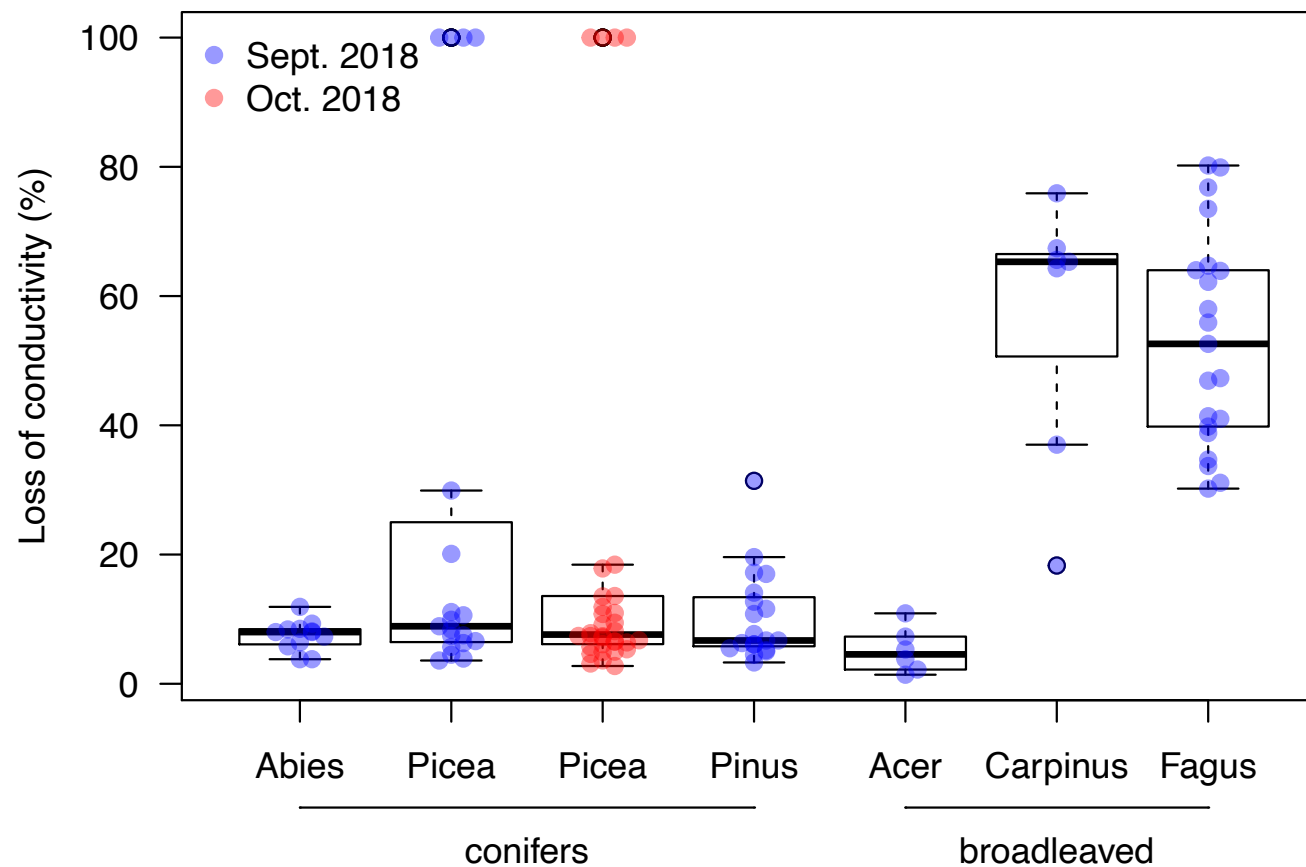
Branch water potential throughout the 2018 drought



Arend et al. 2021, *PNAS*; Arend et al. in press, *New Phyt*; Kahmen et al. in review *Plant Biol*.

SCC II 2018 Drought

Native embolism formation in the 2018 drought

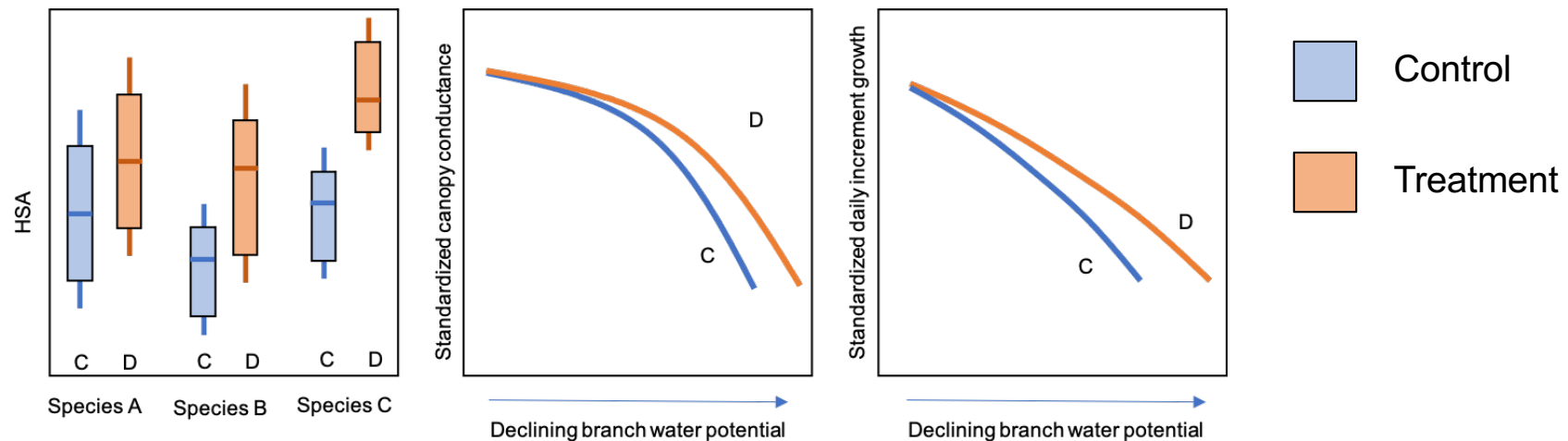


Arend et al. 2021, *PNAS*; Arend et al. in press, *New Phyt*; Kahmen et al. in review *Plant Biol*.

SCC II Throughfall Exclusion Experiment

Questions

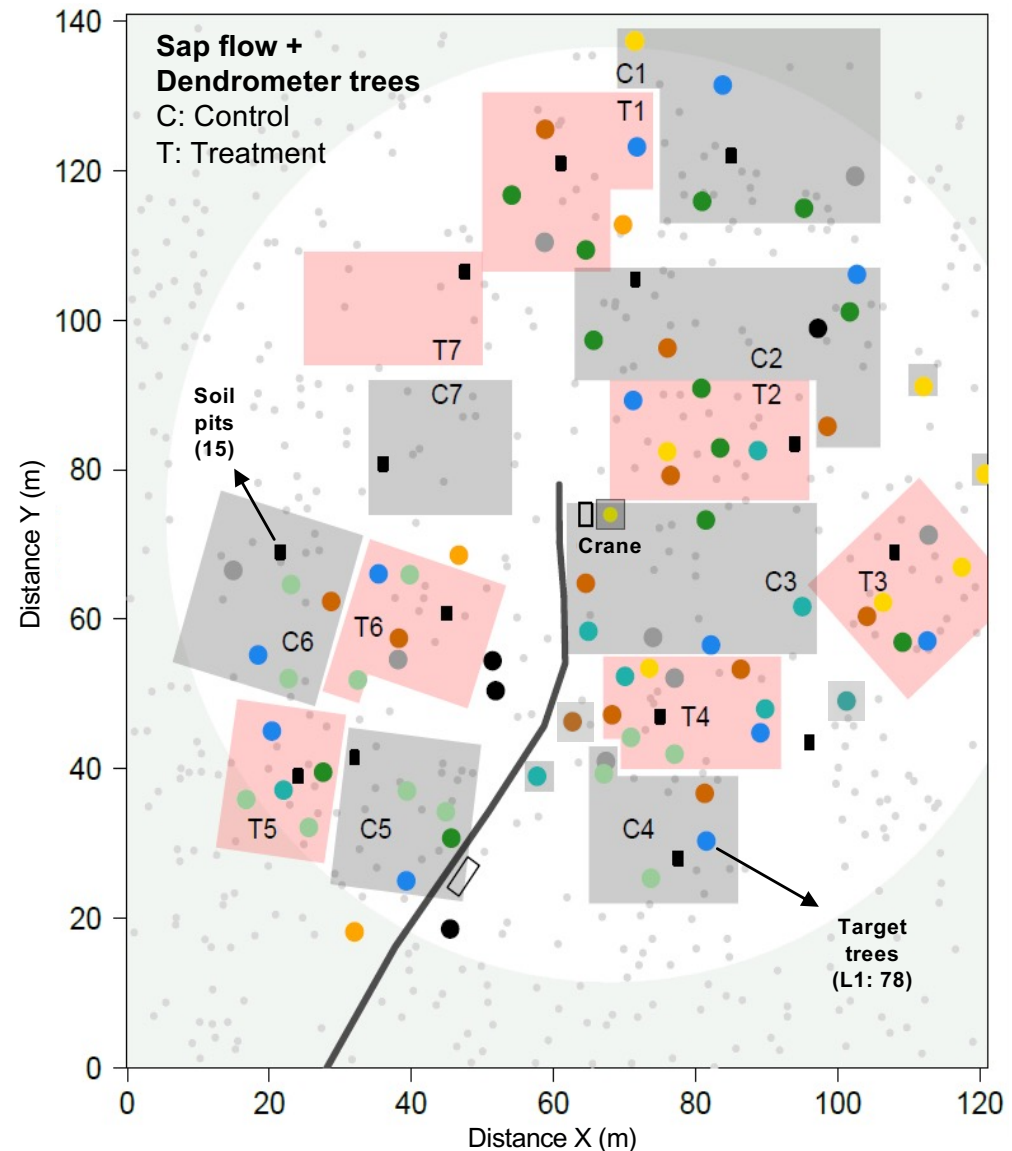
- What are the drought response strategies of European tree species?
- What are the trait syndromes that explain the drought response strategy of European tree species?
- Can phenotypic plasticity in these traits allow acclimation to a dryer climate?



SCC II Throughfall Exclusion Experiment

Experimental design

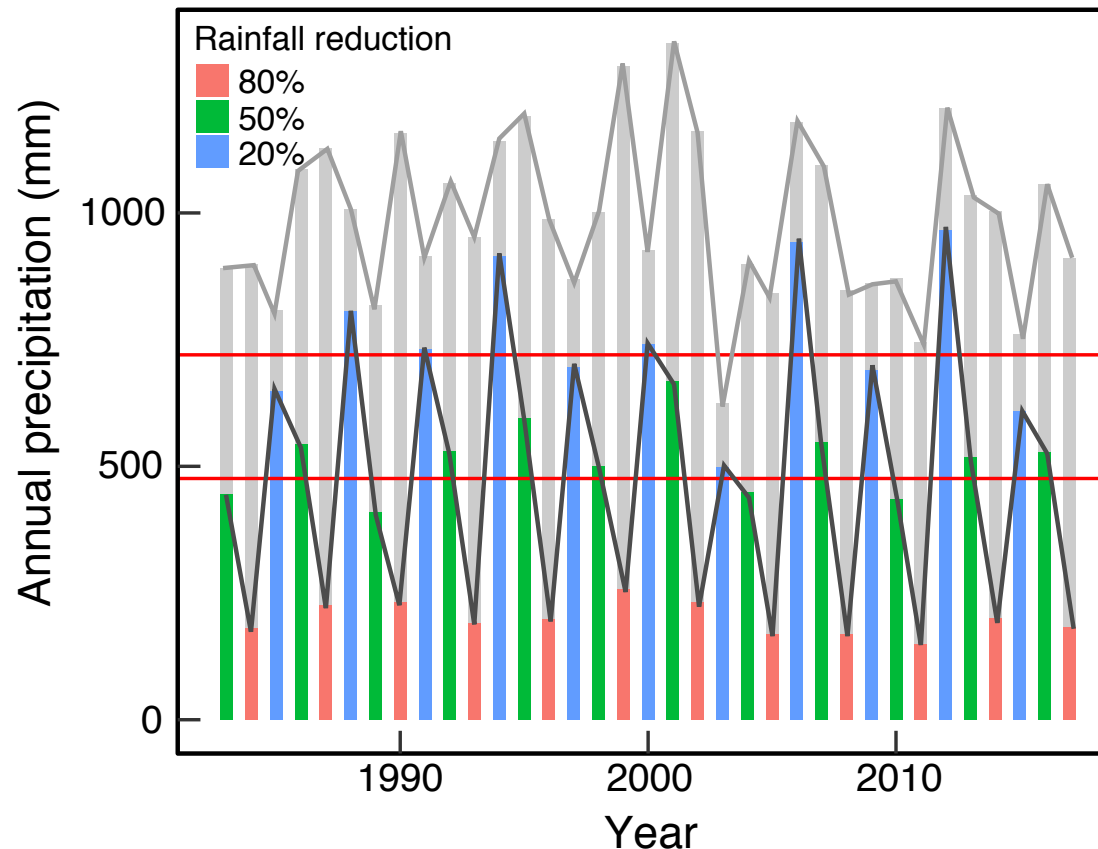
- 50% precipitation exclusion
April – October
- 7 treatment and control areas
- Total treatment area 3100 m²
- 7 target tree species
- 15 + years duration



SCC II Throughfall Exclusion Experiment

Experimental design: Rainout shelters

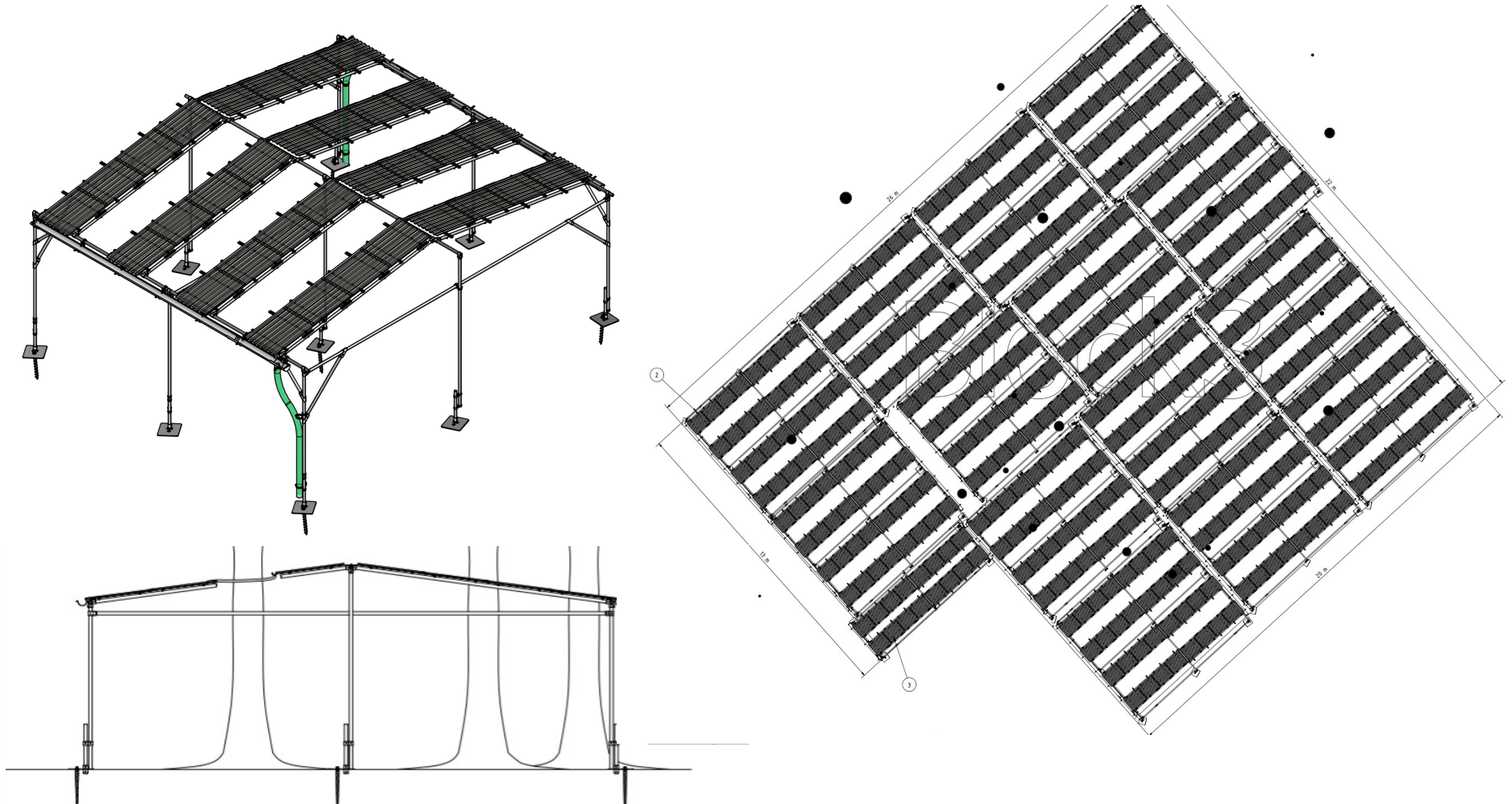
→ Rainoutshelters consist of several modules



SCC II Throughfall Exclusion Experiment

Experimental design: Rainout shelters

→ Rainoutshelters consist of several modules



SCC II Throughfall Exclusion Experiment

Target tree species

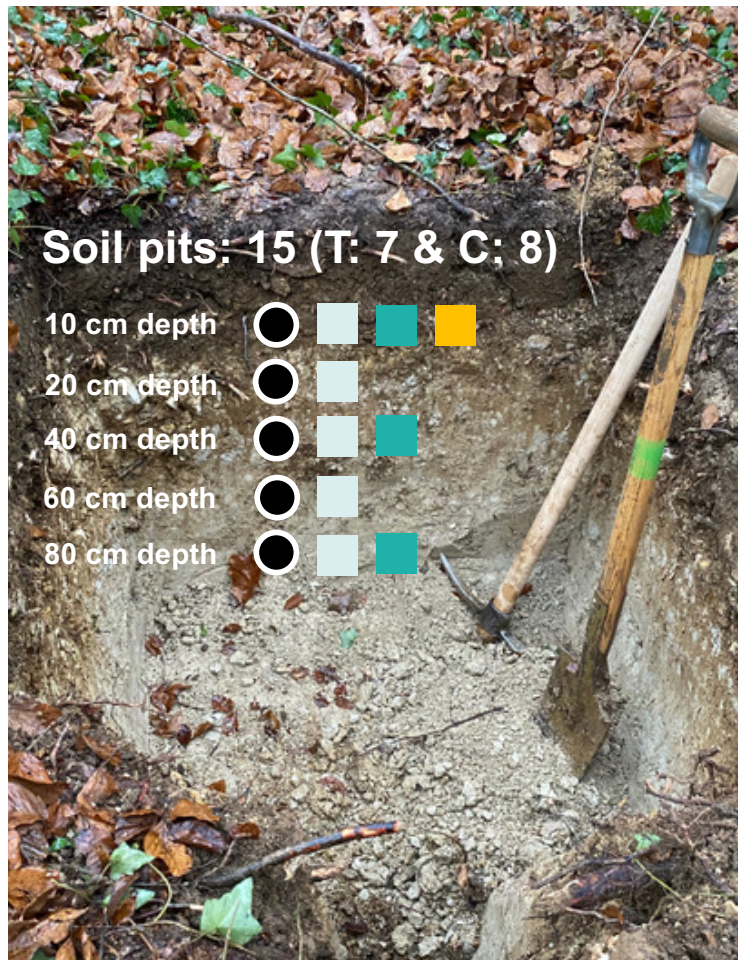
Monitoring trees	Control	Treatment	Ambient	Total
<i>Fagus sylvatica</i>	6*	6*	4**	16
<i>Quercus sp.</i>	6*	6*		12
<i>Carpinus betulus</i>	4*	4*	1**	9
<i>Acer pseudoplatanus</i>	3*	4*	2**	9
<i>Fraxinus excelsior</i>			4*	4
<i>Sorbus torminalis</i>			3*	3
<i>Picea abies</i>	6*	6*	2**	14
<i>Pinus sylvestris</i>	6*	6*		12
<i>Abies alba</i>	4*	4*	1**	9

*Sap flow sensor, point dendrometer, band dendrometer (L1)

**No sap flow sensors installed (L2)

SCC II Throughfall Exclusion Experiment

Soil measurements



2x Suction probes



3x Soil moisture



3x Soil water potential



Sensor numbers

Soil variable	Depth	Control	Treatment	Total
Soil water samples (isotopes, DOC, nutrients) (Total: 118)	10	16	14	30
	20	6	8	14
	40	16	14	30
	60	6	8	14
	80	16	14	30
Soil moisture (Total: 135)	10	24	21	45
	40	24	21	45
	80	24	21	45
Soil water potential	10	9	12	21
				274

SCC II Throughfall Exclusion Experiment

Tree measurements



Tree canopy



Leaf area per tree

Leaf water potential (LWP)

Non-structural carbohydrates (NSC)

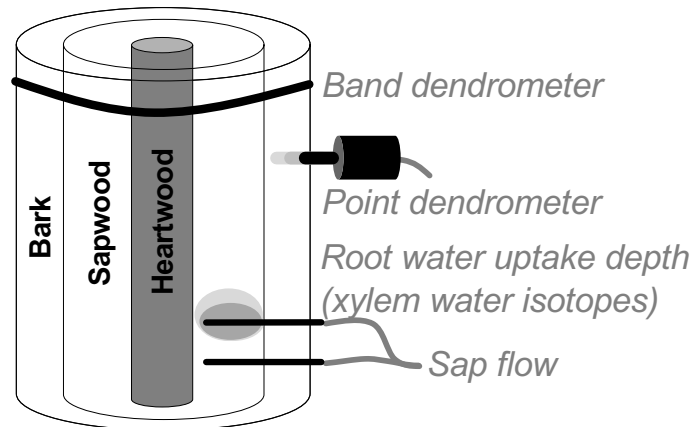
Gas exchange (LICOR)

Tree measurements

Band den.	179 trees
Point den.	88 trees
Sap flow	78 trees
LWP	78 trees
LICOR	78 trees
NSC	78 trees



Tree stem



Band dendrometer

Point dendrometer

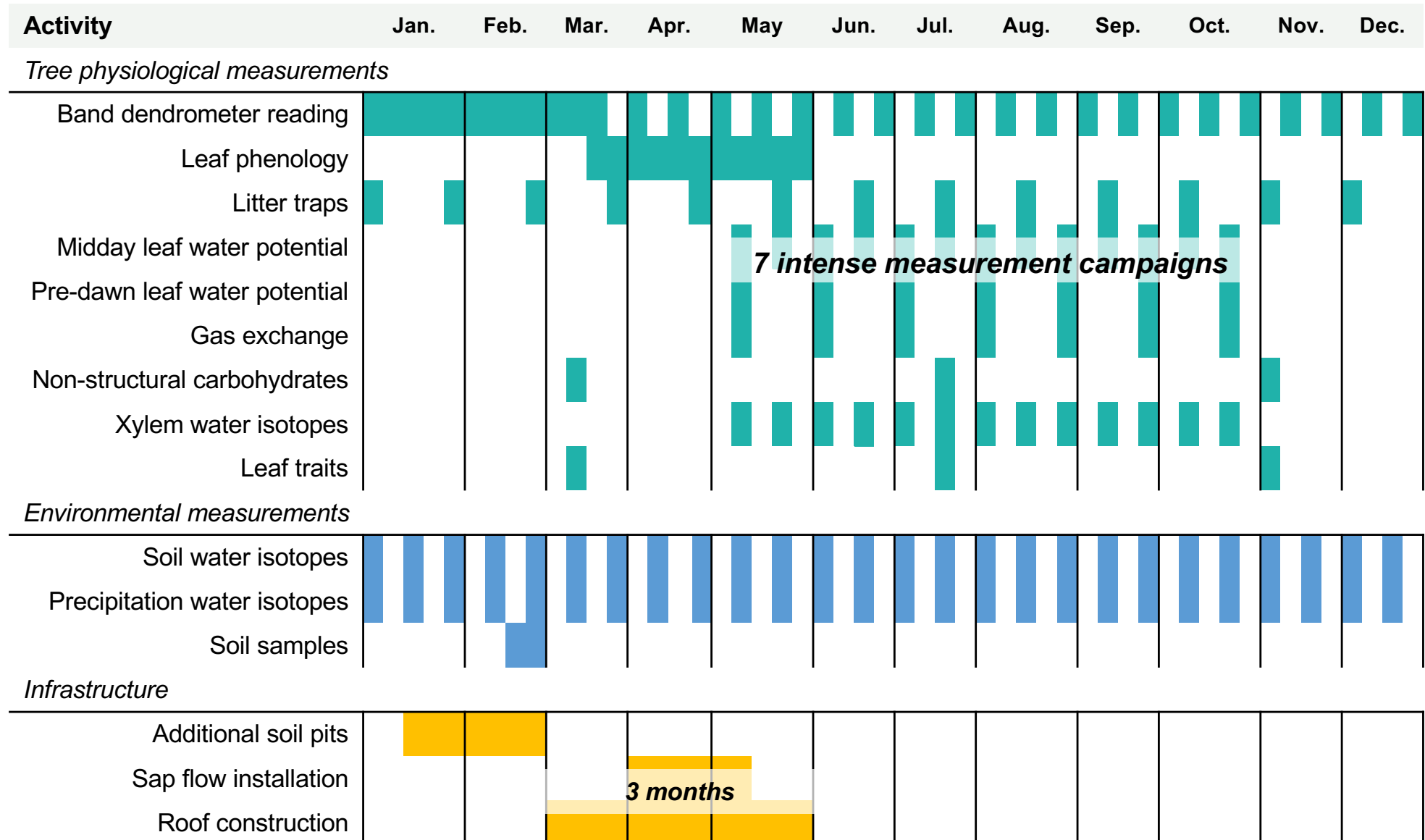
Root water uptake depth (xylem water isotopes)

Sap flow

Monitoring

Levels	L1	L2	L3
Band den.	X	X	X
Point den.	X	X	
Sap flow	X		
Tree canopy	X		

SCC II Throughfall Exclusion Experiment



SCC II Throughfall Exclusion Experiment

Team



+ many collaborators (SwissForestLab, WSL, Uni Würzburg, Uni ZH, IAP, ZHdK, ...)

Thank You!



Amt für Wald



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Umwelt BAFU



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