



Marker-assisted selection for WDV tolerance in wheat (*Triticum aestivum*) and its transfer into applied wheat breeding

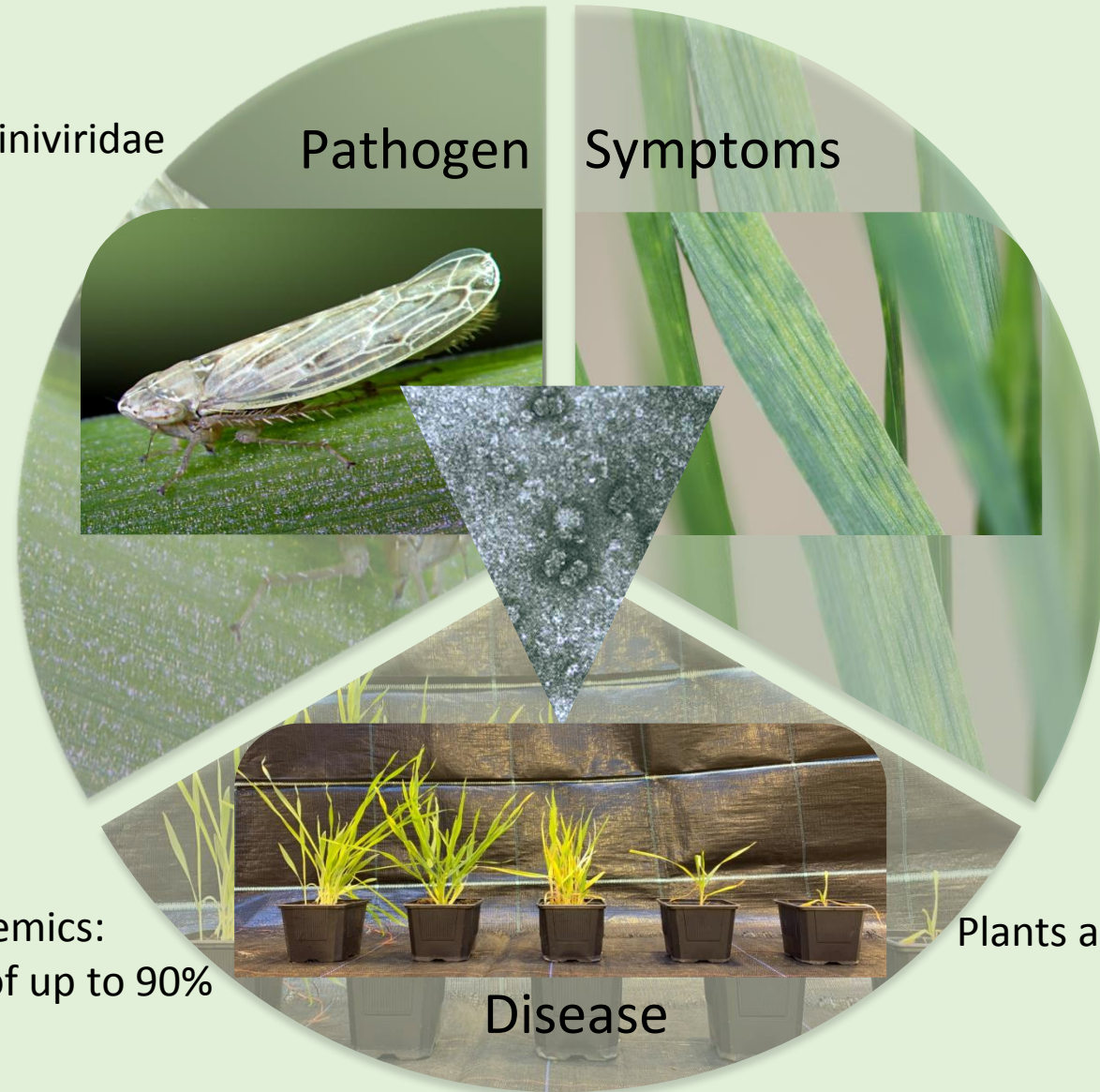
Anne-Kathrin Pfrieme^{*}, Torsten Will, Antje Habekuß

JKI, Institute for Resistance Research and Stress Tolerance, Quedlinburg

^{*} supported by a grant of Federal Ministry of Food and Agriculture, Deutsche Rentenbank



Wheat dwarf virus (WDV)



Family Geminiviridae

Pathogen

Symptoms

DNA virus

Infecting Family *Poacea*

Persistently transmitted by leafhopper
Psammotettix alienus

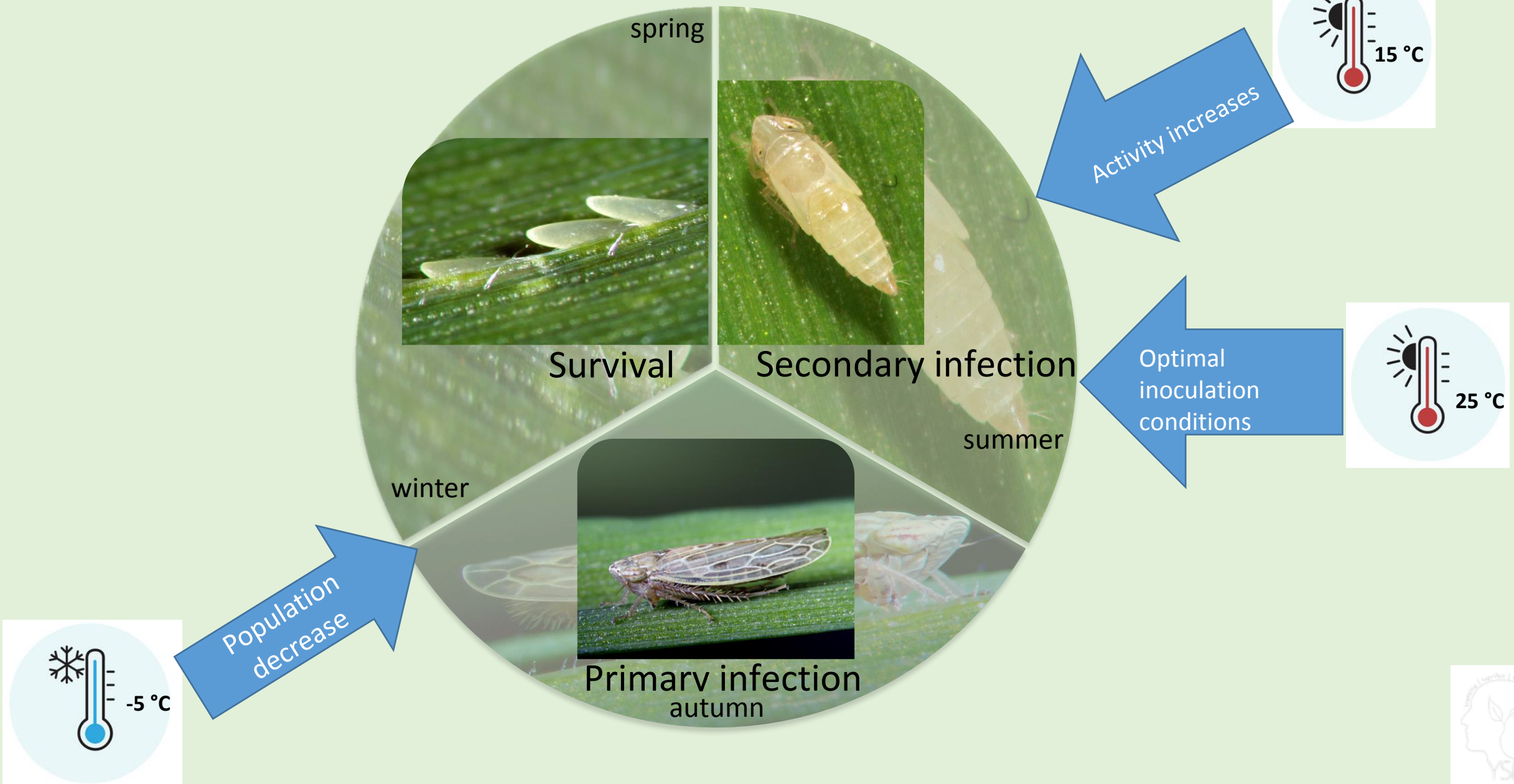
Local epidemics:
yield loss of up to 90%

Disease

Plants appear as patches on the field

- Chlorosis
- Dwarfing of shoots and roots
- Leaf yellowing
- Reduced winter hardiness
- Reduced number of ears and reduced grain weight
- Delayed heading

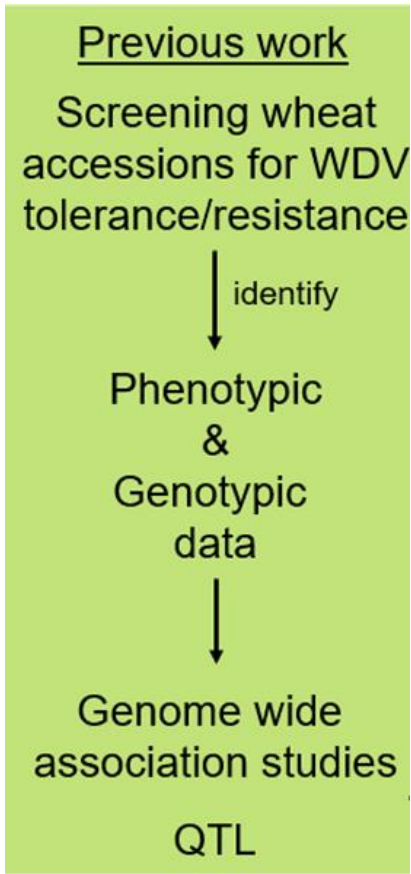
Transmission of WDV



Previous work: Screening wheat accessions for tolerance



results



Results: 35 putative QTL's for WDV tolerance:

Chromosome	1	2	3	4	5	6	7			
A			1	1	3	4	2	2	2	Plant height
B	6	3	2	2	4	1	1		1	Yield
D	1									TKW

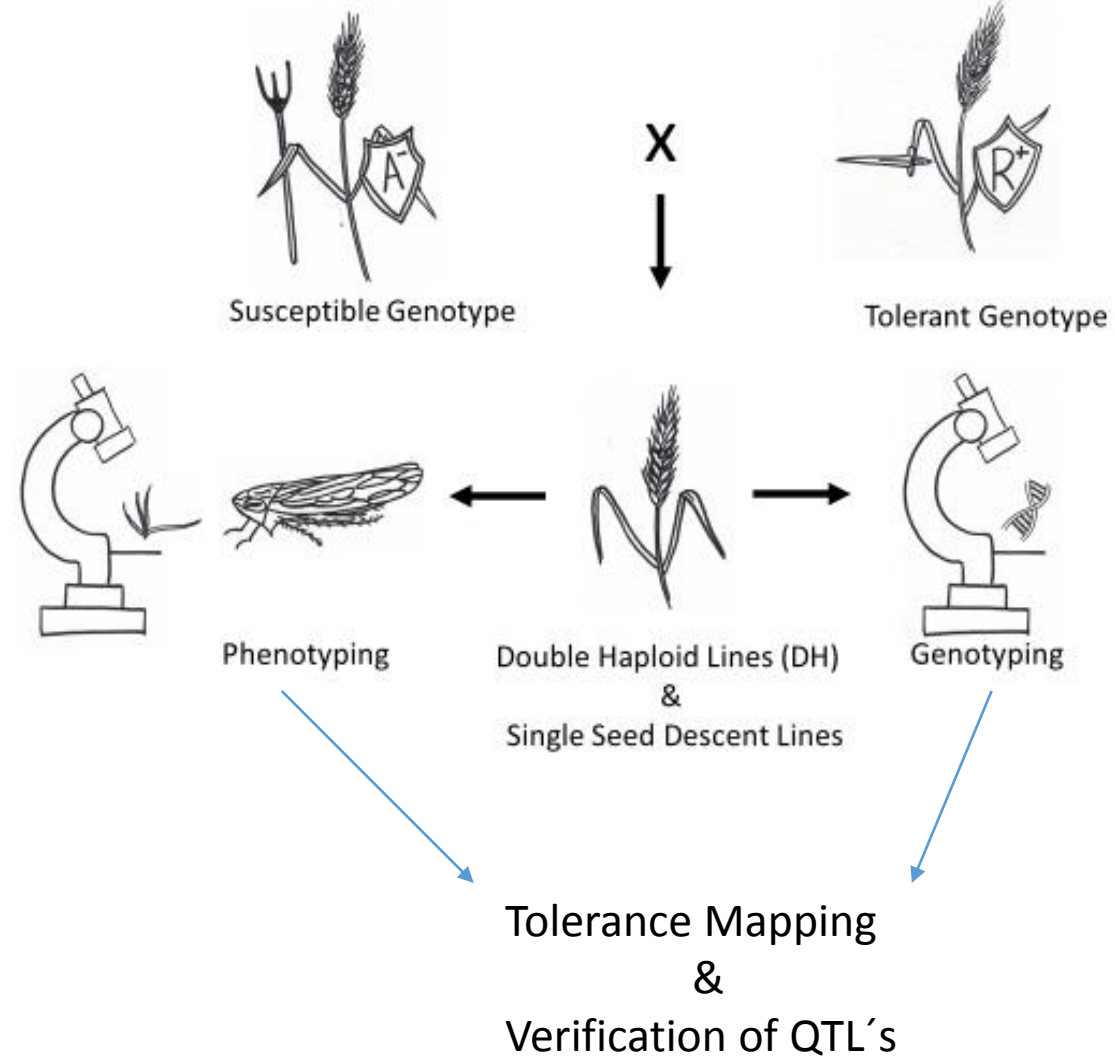
Pfrieme et al., published soon



Marker-assisted selection for WDV tolerance



Current project:



Marker-assisted selection for WDV tolerance

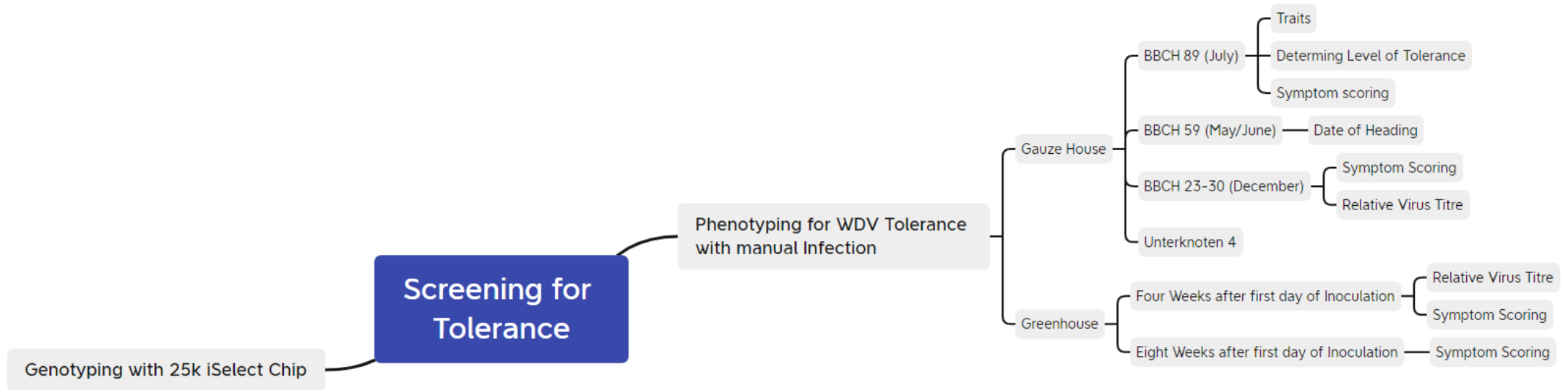


1.) Crossing of susceptible genotype with tolerant one

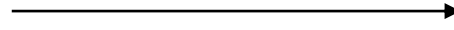
2.) **Screening for tolerance**



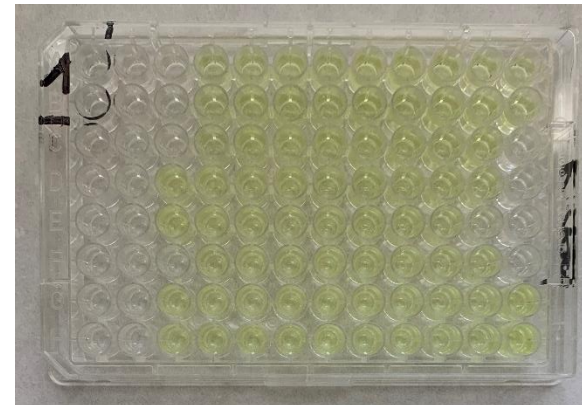
Materials & Methods



Screening for WDV tolerance



Double antibody sandwich- enzyme-linked immunosorbent assay

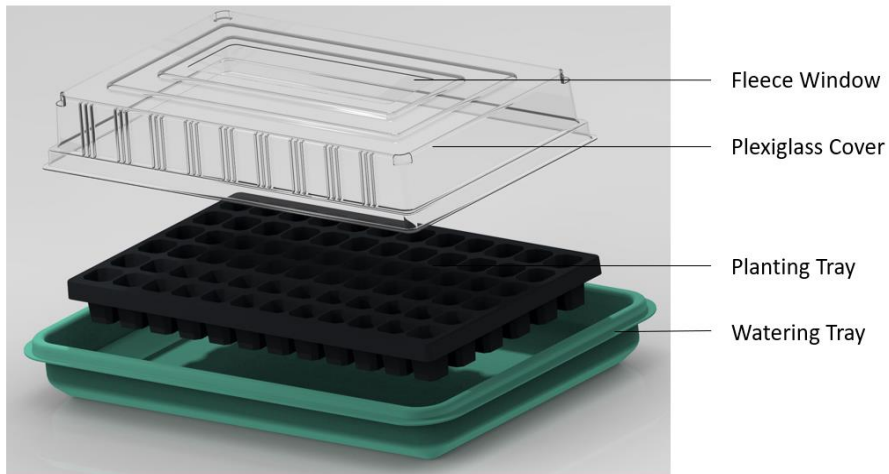
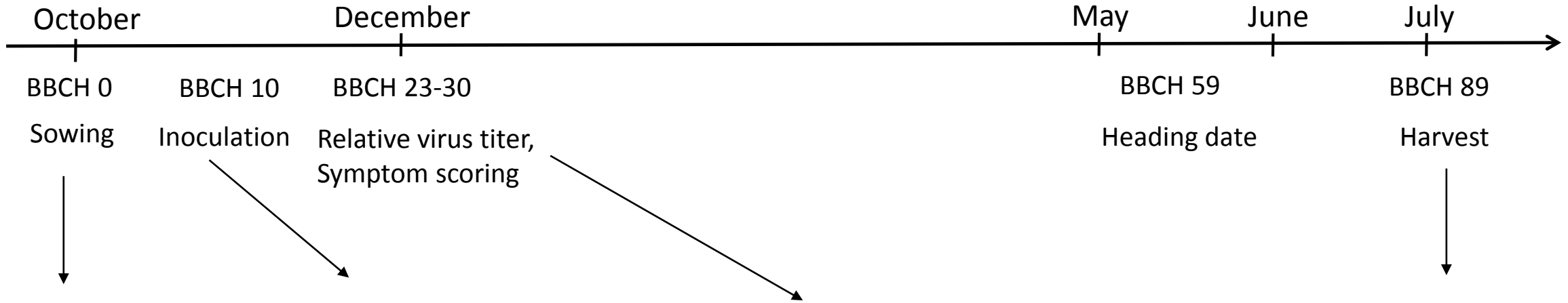


Screening for WDV tolerance

First year: Inoculation in gauze house



Experimental design



Marker-assisted selection for WDV tolerance



1.) Crossing of susceptible genotype with tolerant one

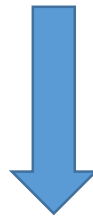
2.) Screening for WDV tolerance

3.) **Verification of QTL**



Previous Project: 35 putative QTL's for WDV tolerance

Verificated in 1 DH and 2 SSD Populations



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
WDV 3 x 4						Green	Red	Green	Yellow	Red	Green	Green			Green		Green	Green	Green				Orange								Yellow	Green	Yellow	Yellow		
WDV 3 x 7	Red	Red	Orange	Red	Red																			Yellow												
WDV 7 x 3			Orange										Red	Green									Orange	Yellow		Green					Yellow		Yellow			

- correlation in plant height
- correlation in ELISA
- correlation in both
- correlation above populations
- no correlation

Pfrieme et al., published soon

results

Marker-assisted selection for WDV tolerance

1.) Crossing of susceptible genotype with tolerant one

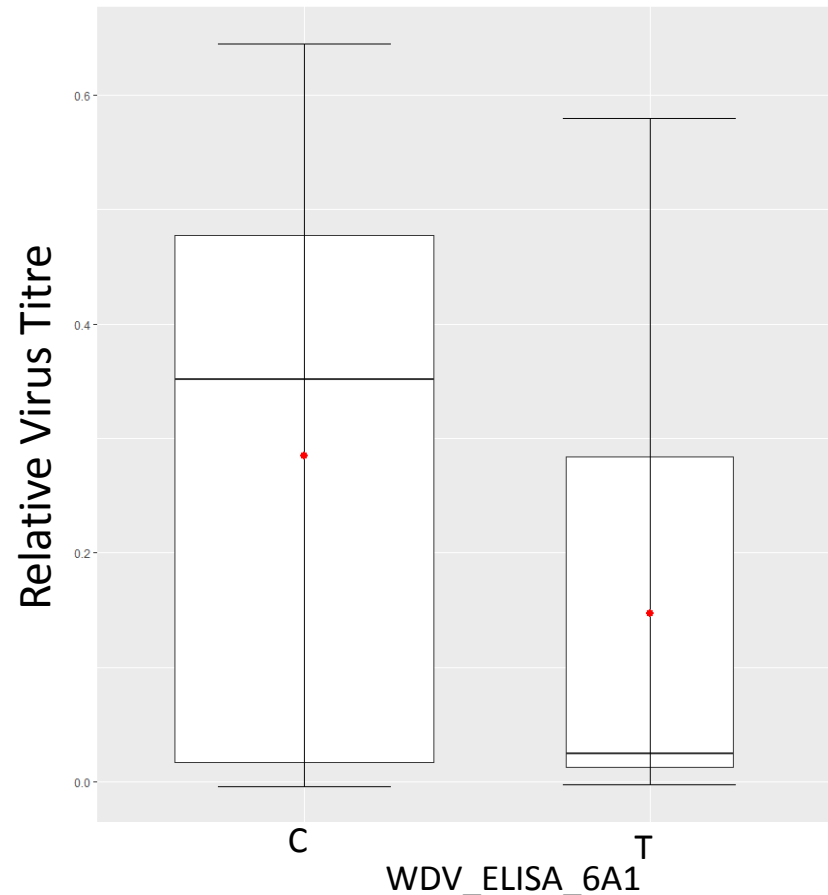
2.) Screening for WDV tolerance

3.) Verification of QTL

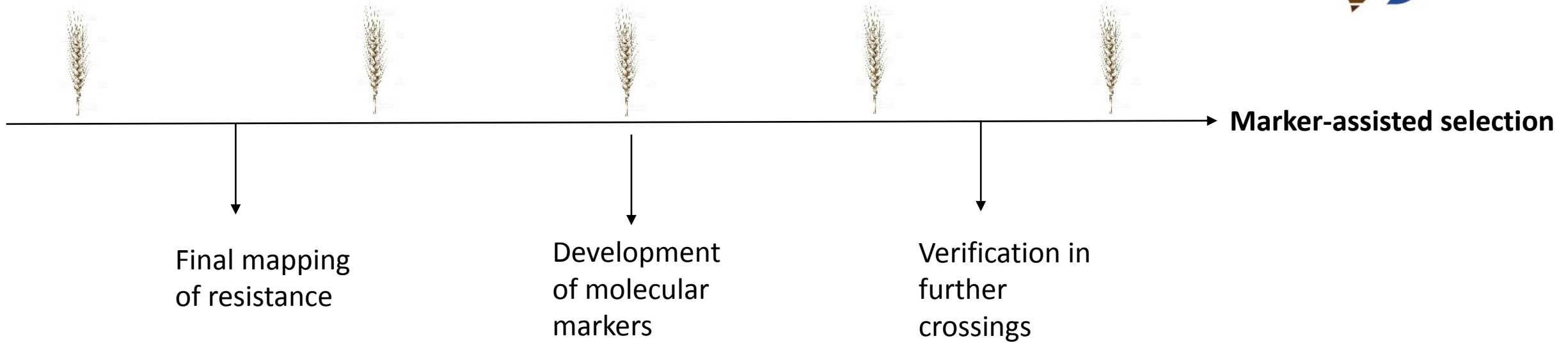
4.) **Tolerance mapping**



Preliminary Mapping:



What's next?

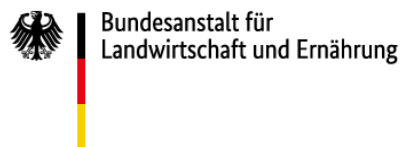


Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages

Projekträger



Working group: Virus and invertebrate pests

Head:

Dr. Torsten Will
Dr. Antje Habekuß

Technicians:

Gudrun Meißner

Postdocs:

Dr. Tim Zietsche

Phd Students:

Maria Kern
Maria Schmidt
Yungsheng Zhu
Laura Draack
Anne-Kathrin Pfrieme

Dörte Grau
Katja Dlouhy
Evelyn Betke
Katharina Stein
Kerstin Neumann
Paula Weber

