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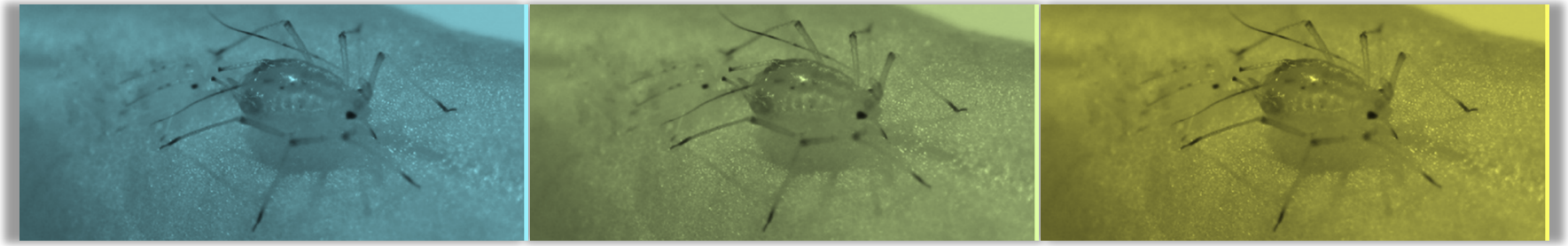
Federal Research Centre for Cultivated Plants

The impact of TuYV isolate diversity and abiotic factors on existing R54-based TuYV resistance

Torsten Will, Maria Kern, Heiko Ziebell, Andreas Stahl, Thomas Thieme



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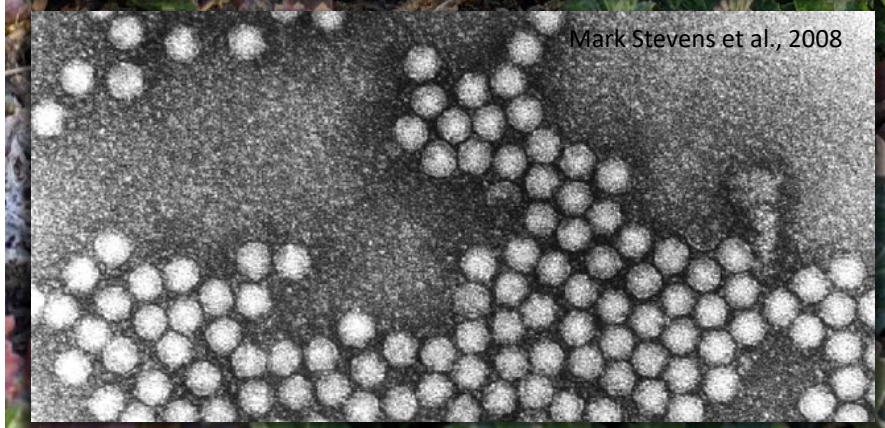
Turnip yellows virus, its spread and the symptoms



Mark Stevens et al., 2008

Habekuß und Will, 2018

Compo-
sitae

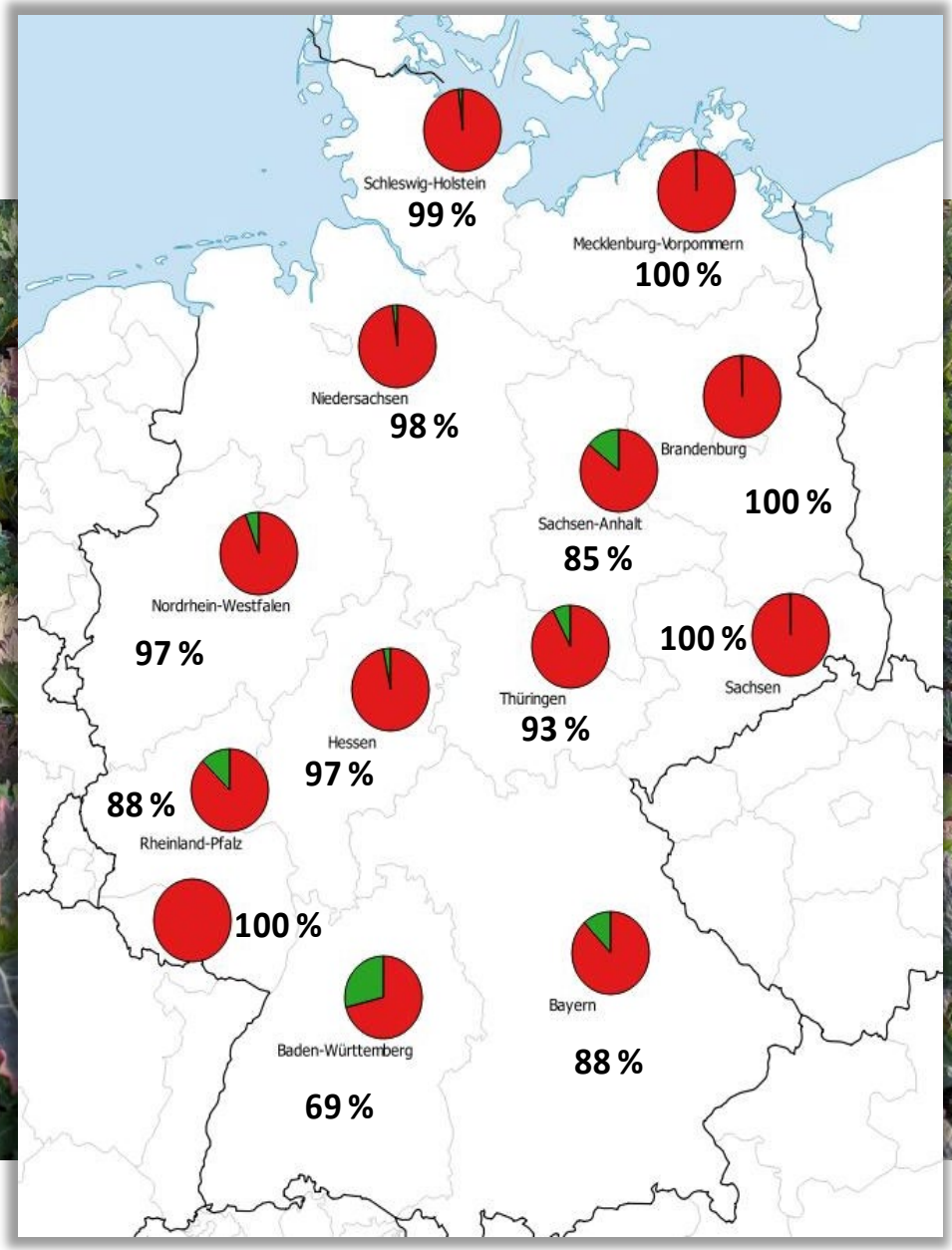
Oilseedrape

Fabaceae

Green
peach
aphid

Turnip yellows virus, its spread and the symptoms

Mark Stevens et al., 2008



Habekuß und Will, 2018

Habekuss und Will, 2018

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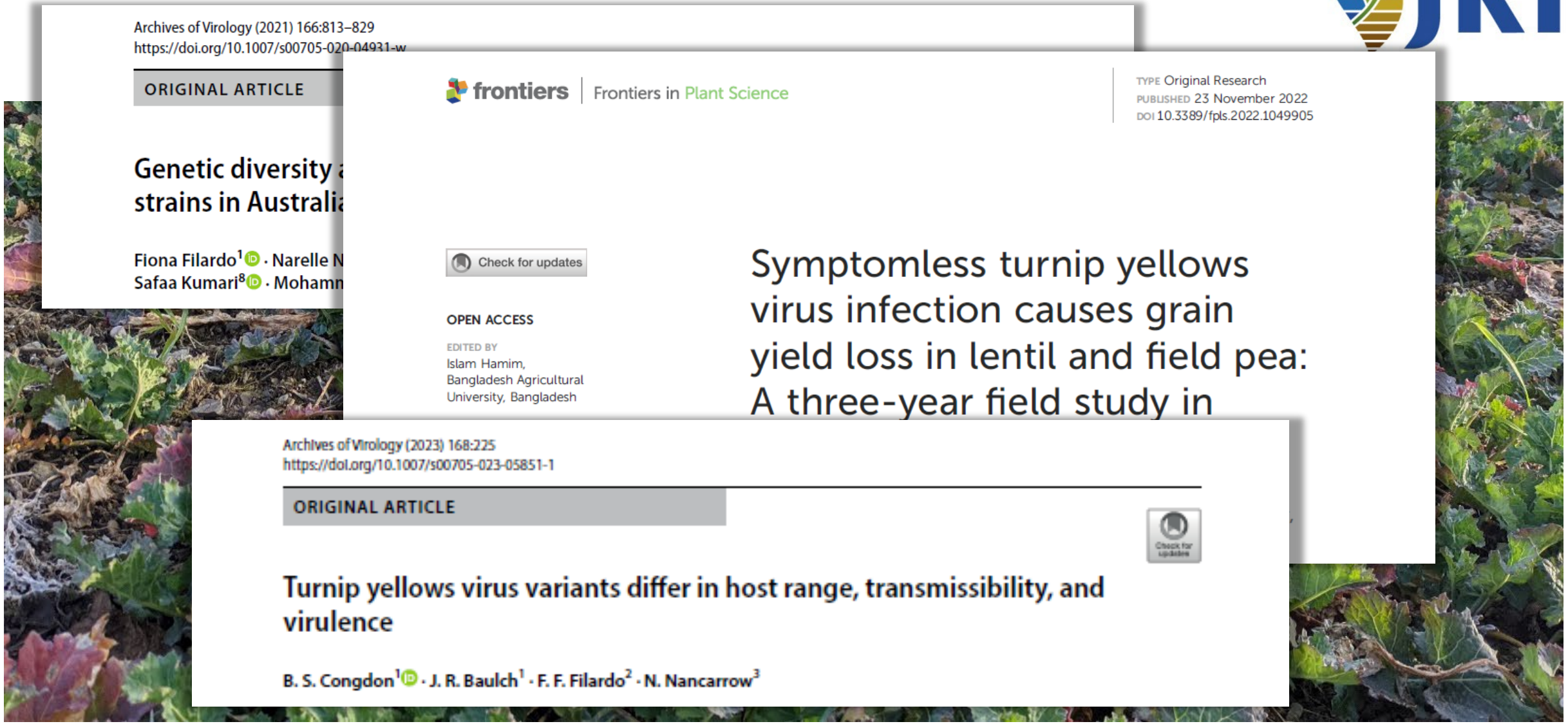
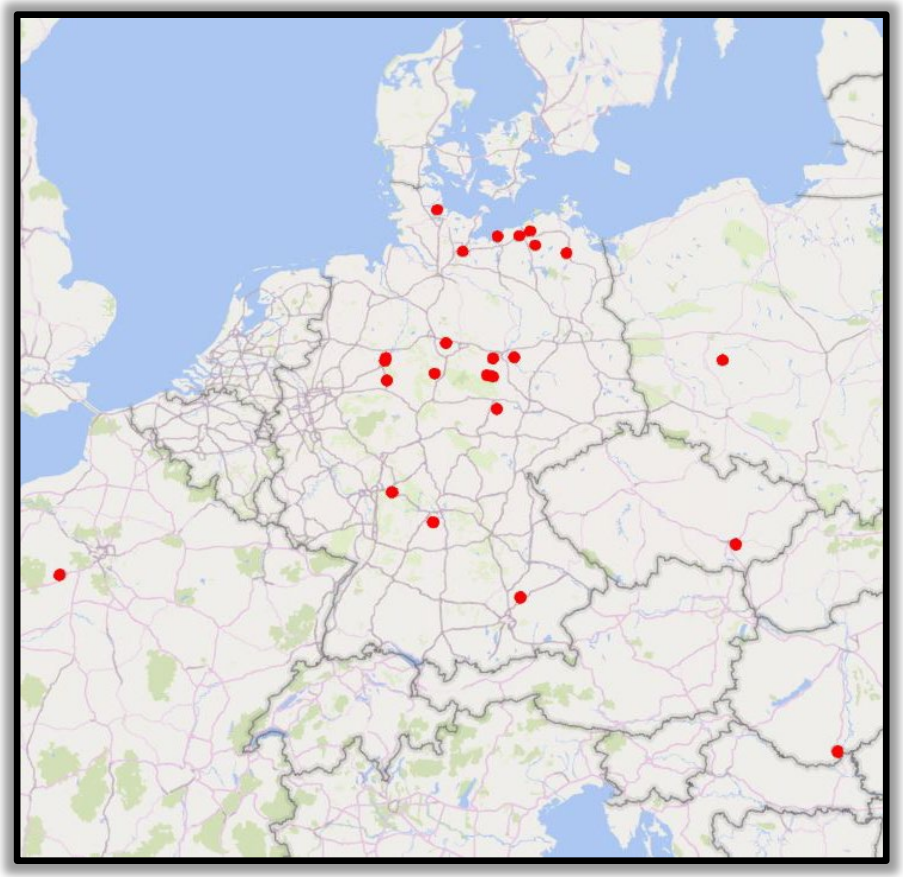
Turnip yellows virus, its spread and the symptoms

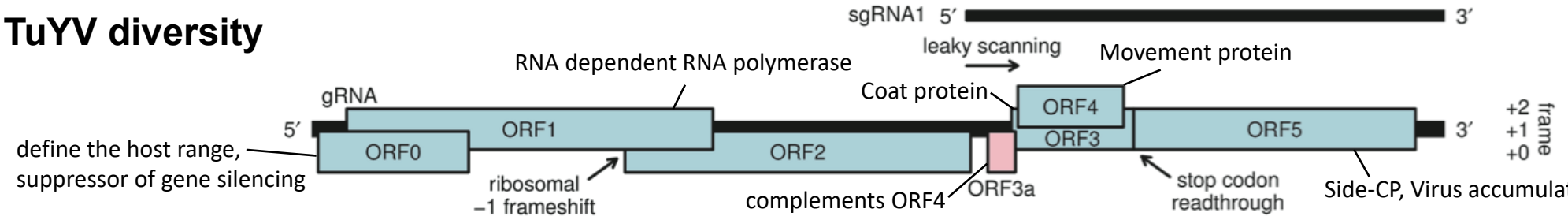


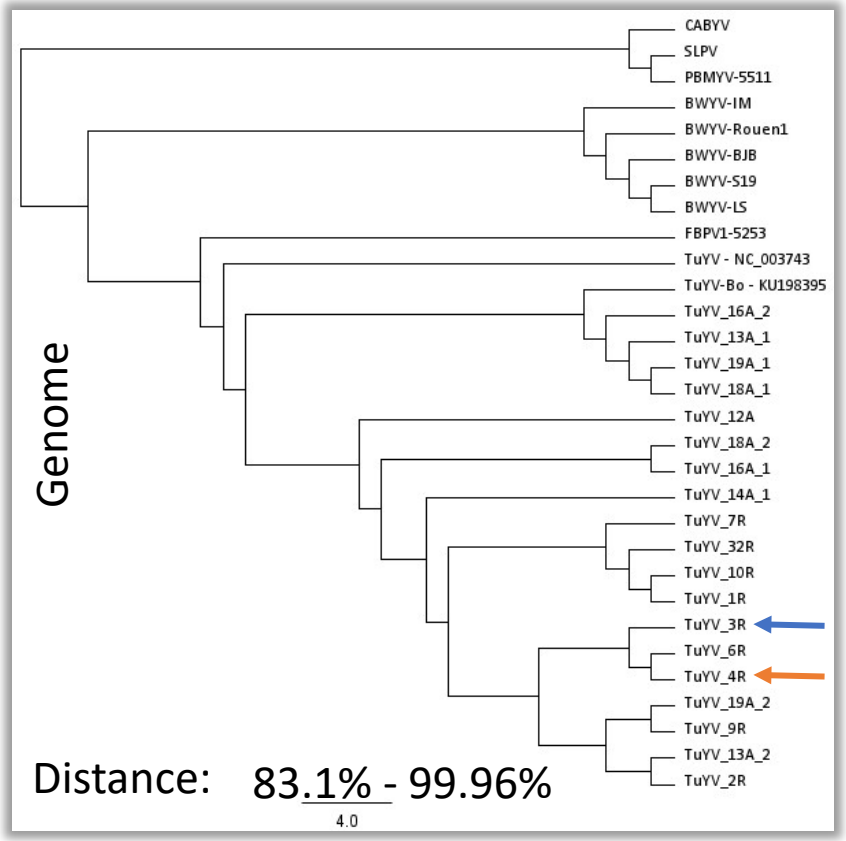
The question: How does TuYV diversity interacts with R54 based TuYV resistance?

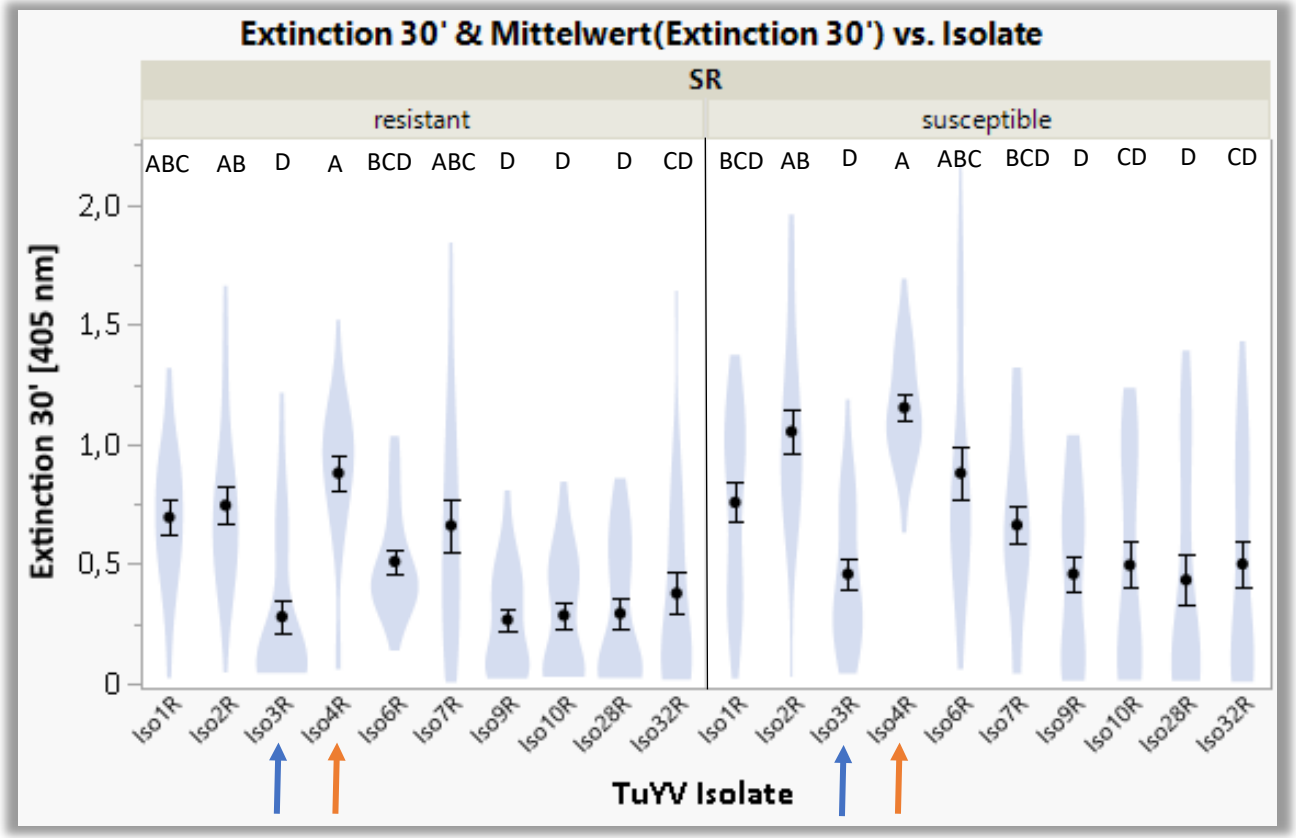
The task: Virus isolates and aphid biotypes of 20 origins were transferred into rearing facilities.



TuYV diversity

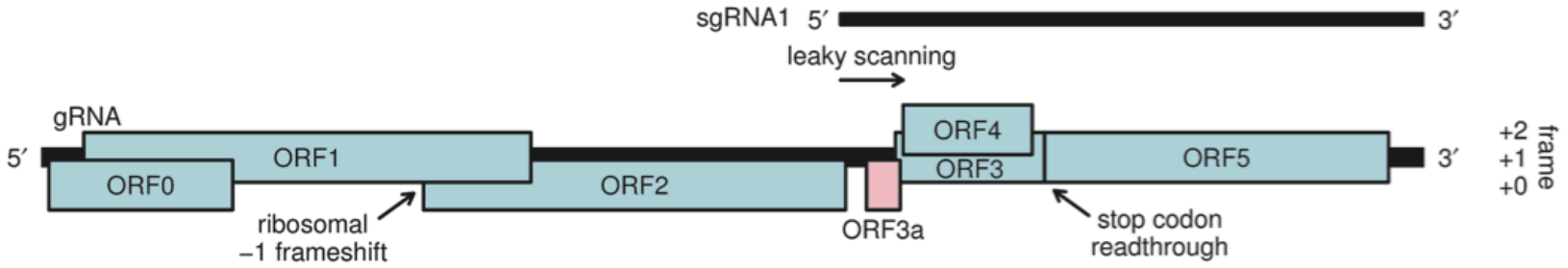


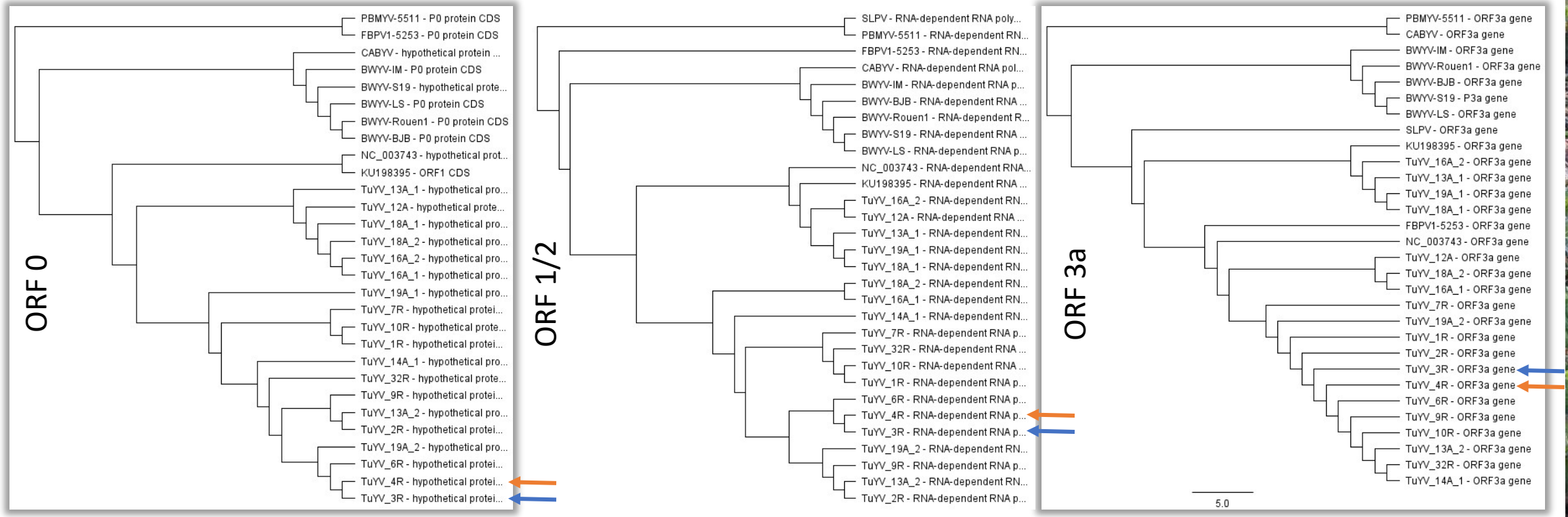




GLM: SR < 0.0001, Isolate < 0.0001. Tukey HSD, p = 0.05

TuYV diversity





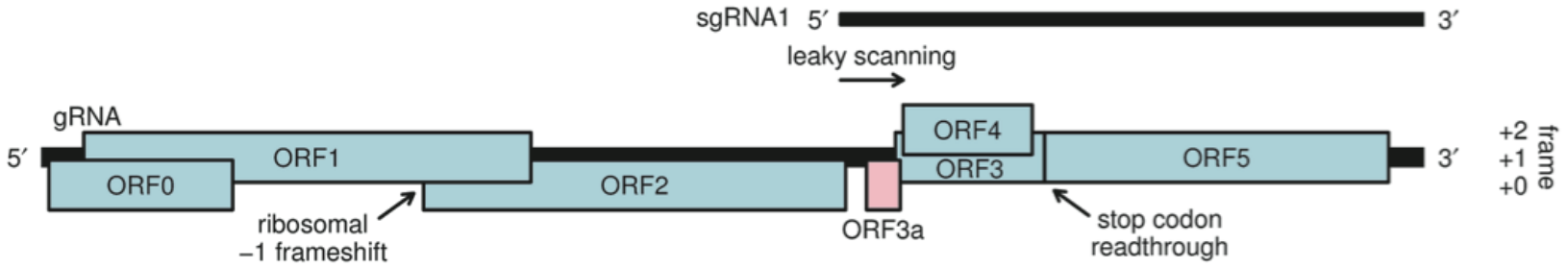
Distance: 86.93% - 99.73%

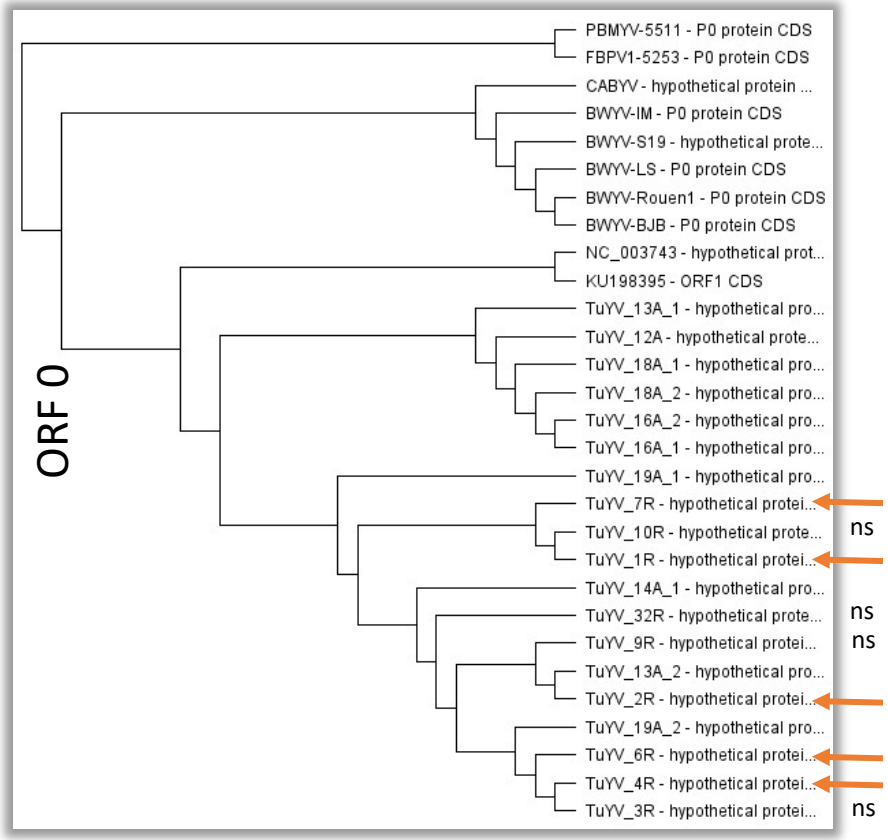
88.77% - 99.92%

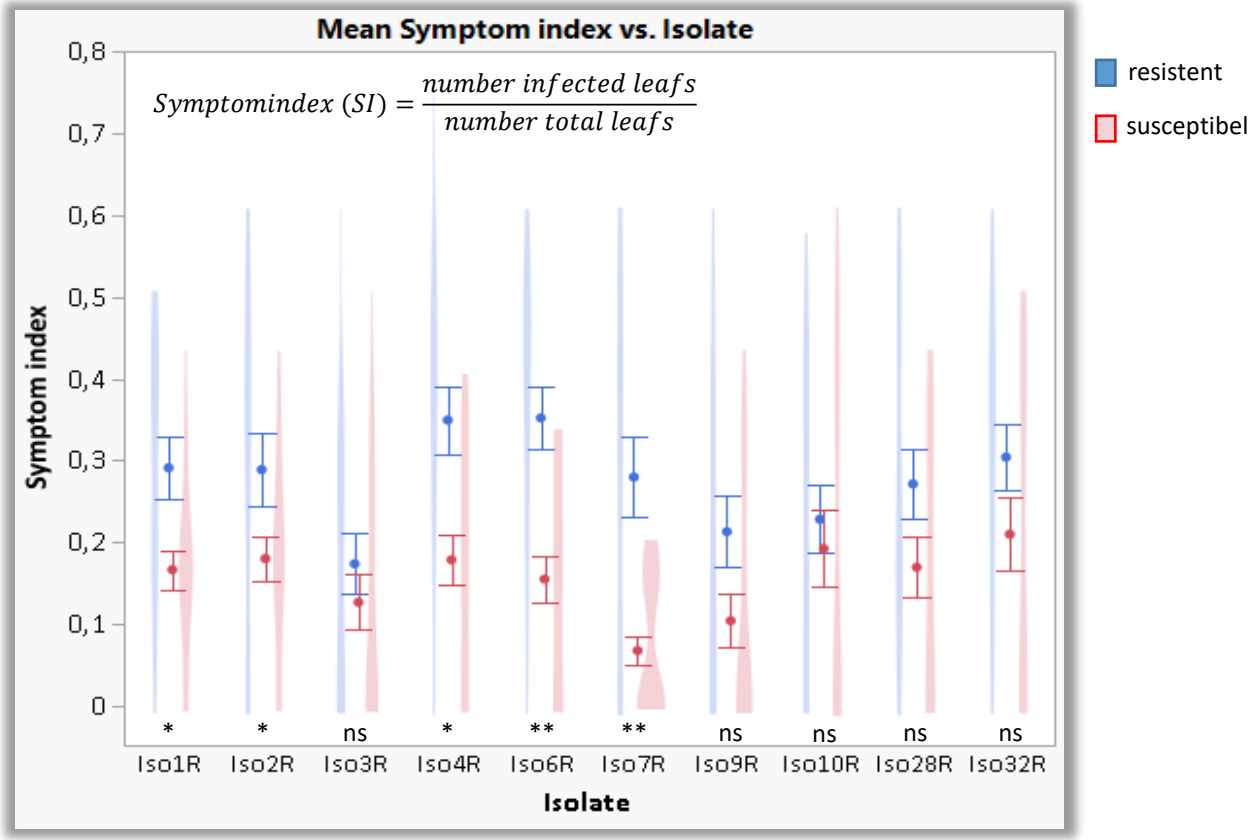
73.91% - 100%

Distance: ORF 4 93.94% - 100%, ORF 5 91.68% - 100%

TuYV diversity



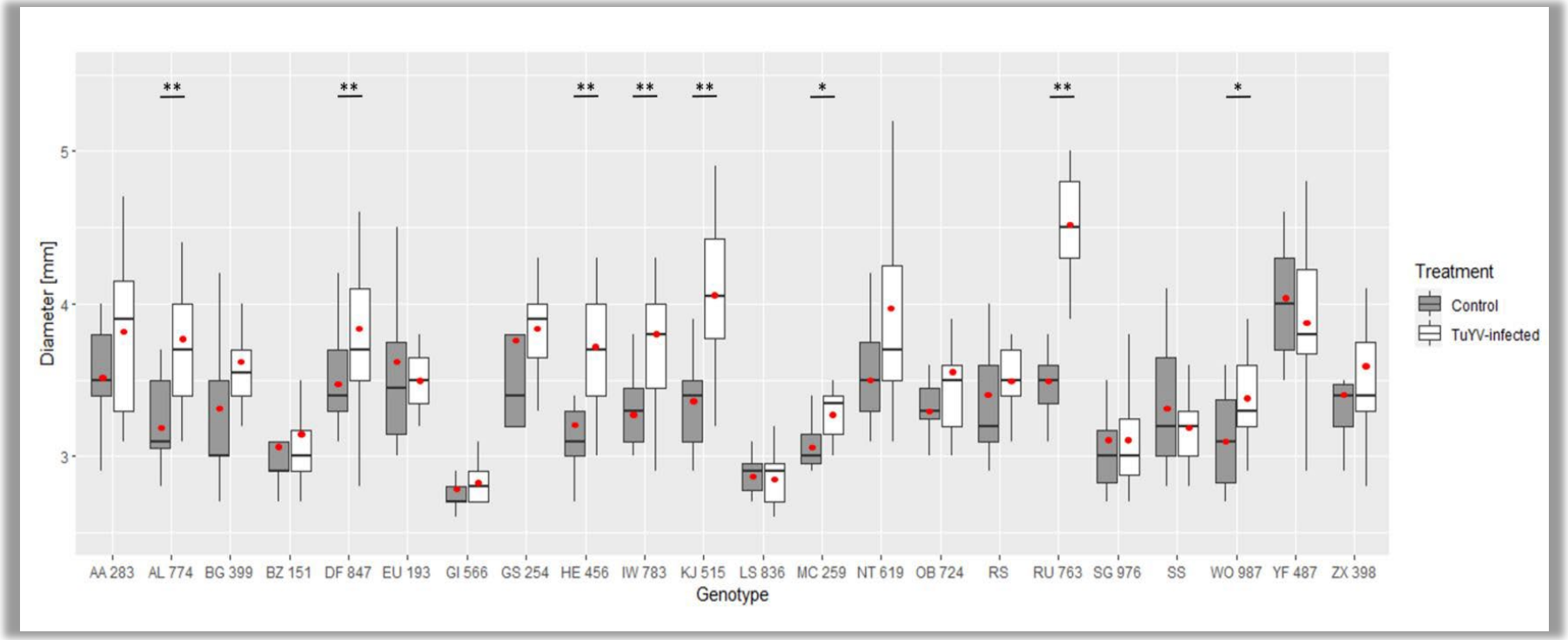




Correlation SI/EXT: Overall r = 0.255 - Resistant r = 0.343 - Susceptibel r = 0.369

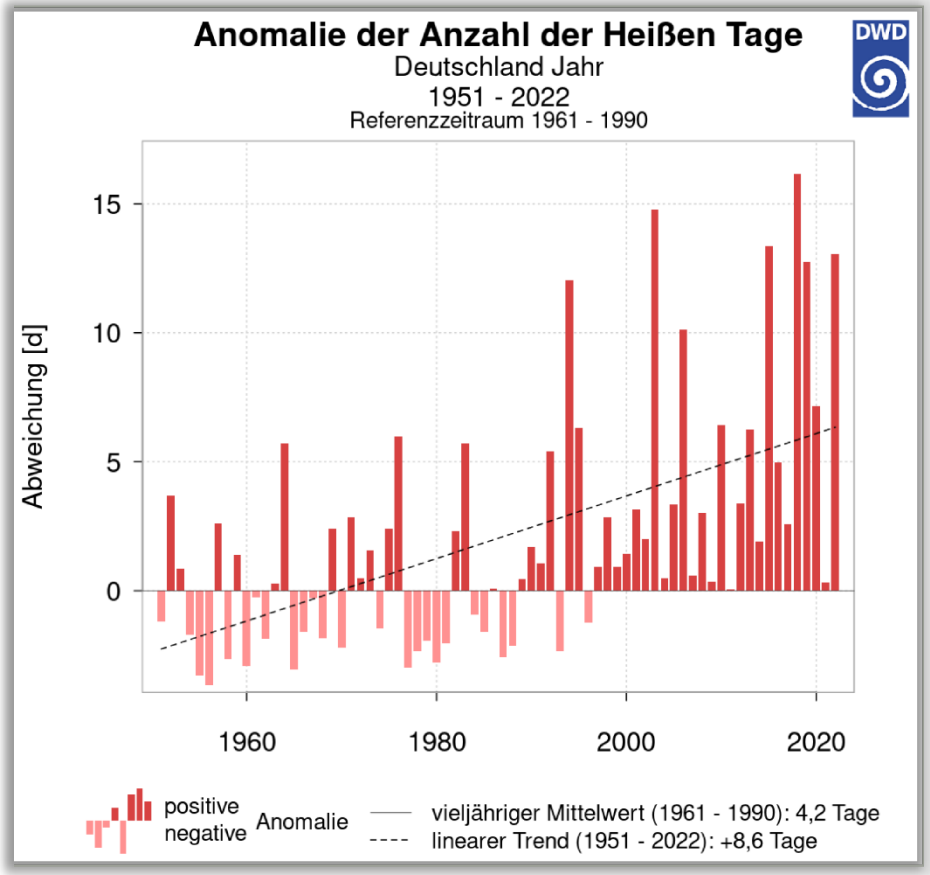
The genetic background of R54 resistant OSR genotypes affects symptom expression

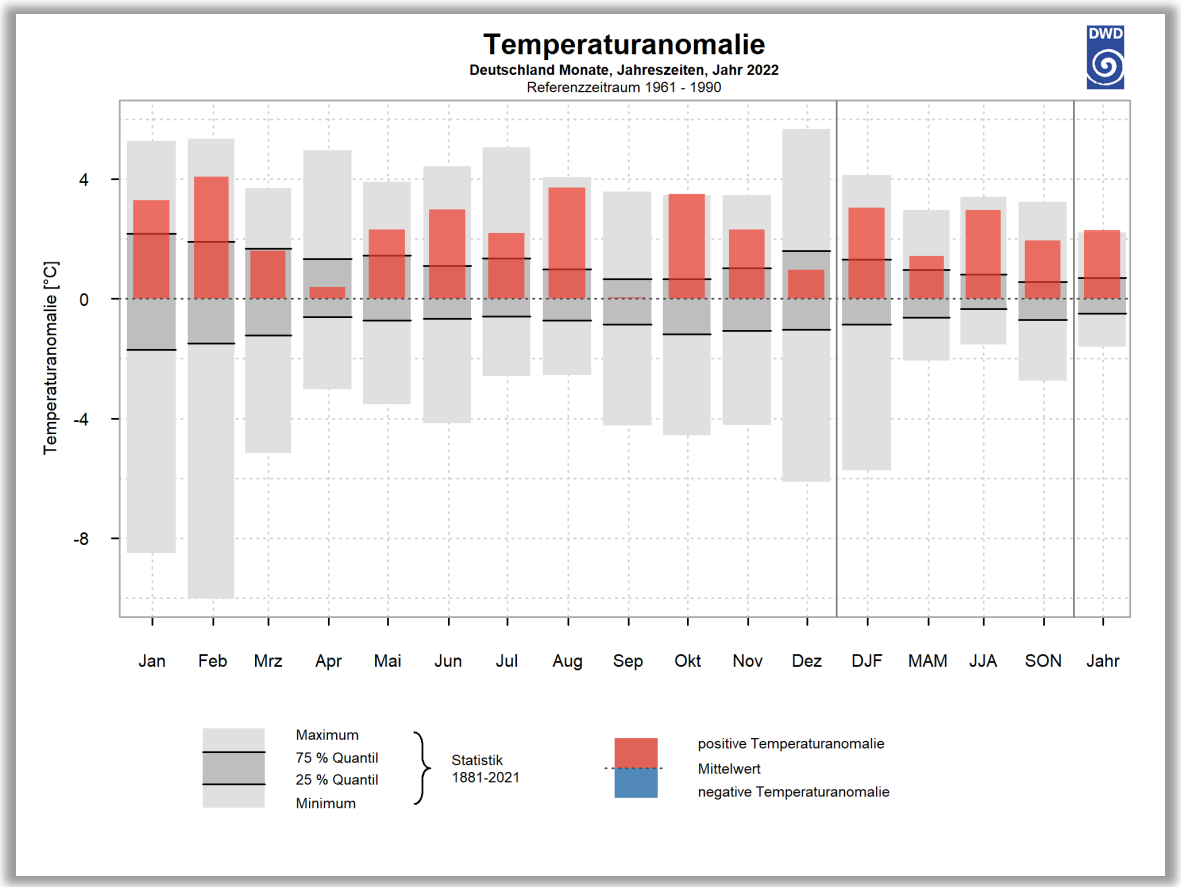
Different oilseed rape genotypes with R54 resistance were challenged by infection with the TuYV isolate 4R and were cultivated under semi-field conditions.



t-Test: p* < 0,05; p** < 0,001. No effects on oil quality were observed.

The question: How does temperature affect R54 based TuYV resistance and infection?



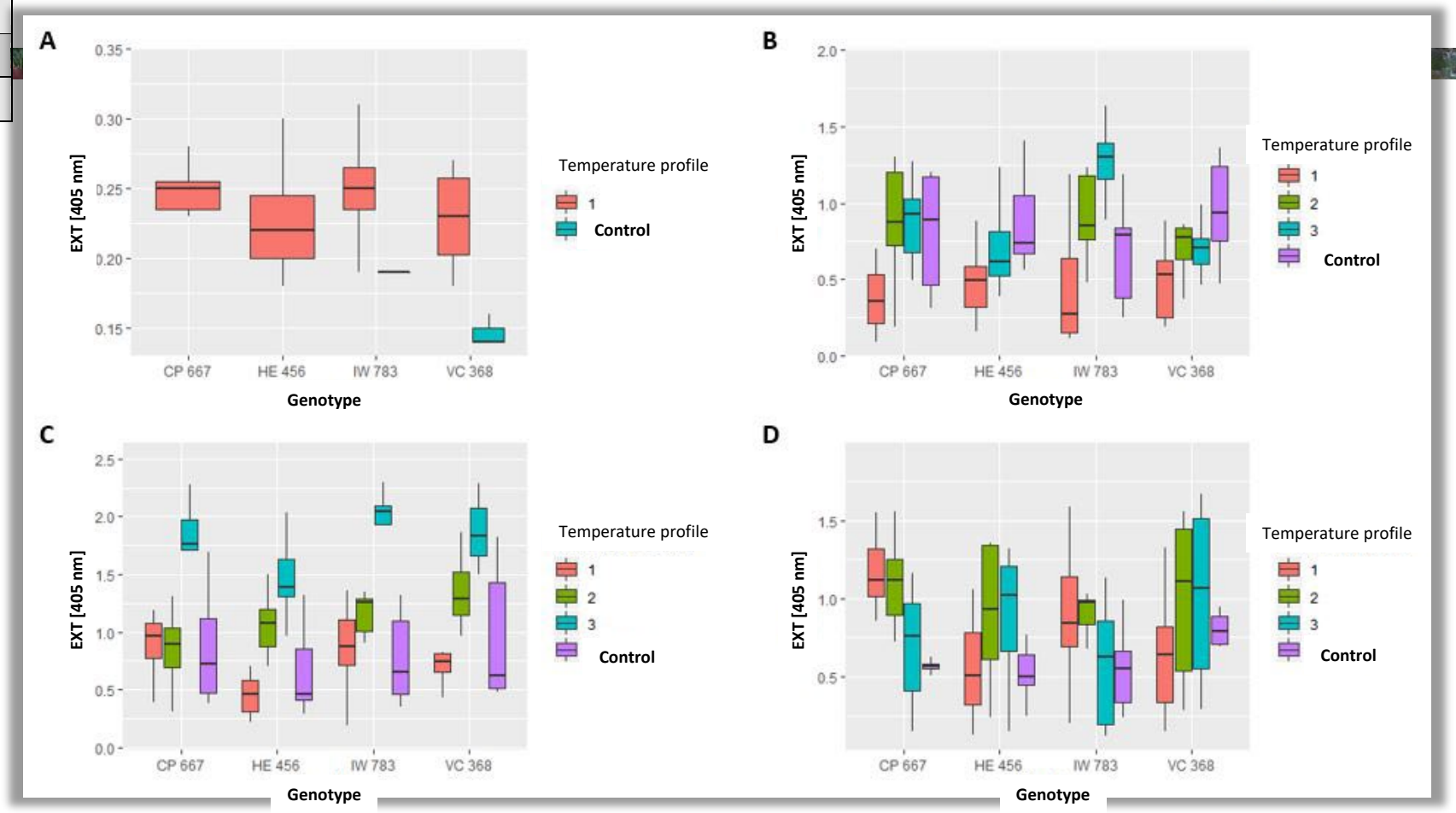


Mean temperature in fall: 10-14°C depending upon the region in Germany.

The question: How does temperature affect R54 based TuYV resistance and infection?

Versuch	Temperaturverlauf
1	14 °C → 12 °C → 10 °C
2	16 °C → 14 °C → 12 °C
3	18 °C → 16 °C → 14 °C
Kontrolle	20 °C

Temperature profiles were chosen that include mean temperature in fall as well as temperature anomalies.



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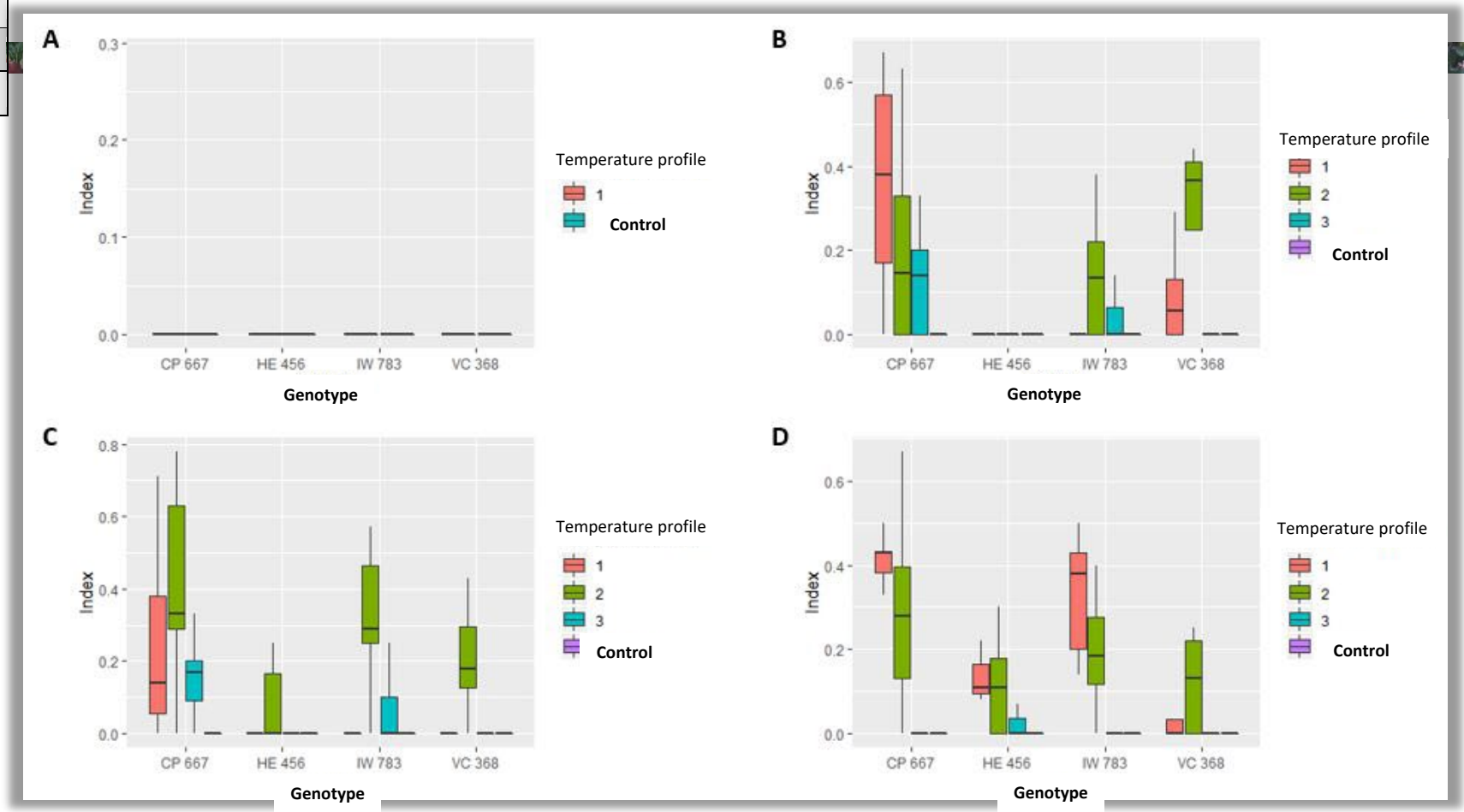

Conclusion

TuYV isolates are genetically diverse and small changes of the nucleotide sequence may affect relative virus titer and symptom expression

The **genetic backgroung** of plant genotypes affects the expression of the R54 resistance.

Increased temperature increases the relativevirus titer and reduces symptom expression.

The team, funders and collaborators

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RAGT2n

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Bundesanstalt für Landwirtschaft und Ernährung

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