



WP4 - Soybean

15 – 16 June 2020
2nd annual online meeting



Funded by European Union
Horizon 2020
Grant agreement No 771367

Main achievements during Y2 in task 4.1

Partners: IFVC, NARDI, SZG

(1) Identification of useful traits

- Yield and yield components (IFVC, NARDI, SZG)
- Morphological and phenological traits (IFVC, NARDI, SZG)
- Seed vigour (IFVC, NARDI)
- Biotic stress (IFVC)



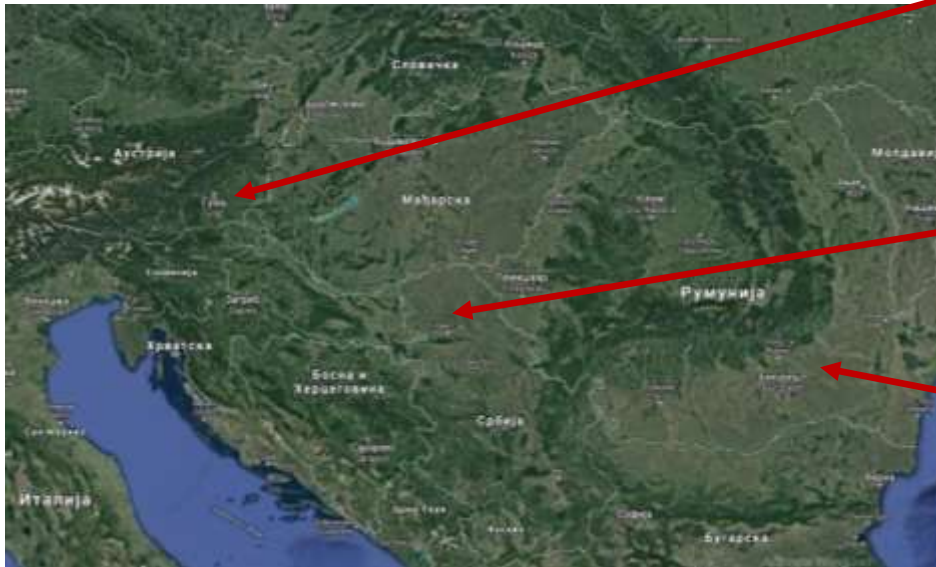
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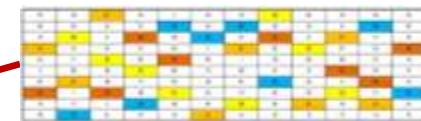
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Task 4.1 Trial network

Partners: IFVC, NARDI, SZG

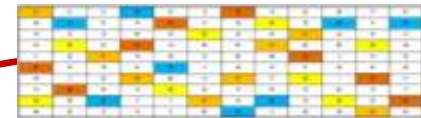


SZG



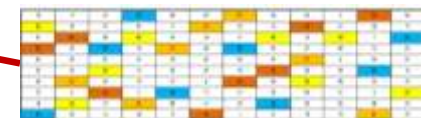
Planting date: 11.05

IFVC



Planting date: 24.04

NARDI



Planting date: 24.04



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NARDI - Early and late soybean genotypes

The 160 **early** and 120 **late** soybean genotypes were sowed in organic field of INCDA Fundulea in one replication, plot size - 6 × 1,5 m



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(2) Soybean genotypes evaluated for tolerance to *Nezara viridula*



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Preliminary trial 2019



Isolation cages with *Nezara viridula* in soybean field



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(2) Soybean genotypes evaluated for tolerance to *Nezara viridula*

(3) Screening of genetic resources to the competitiveness against weeds



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Preliminary trial 2020



Ambrosia artemisiifolia



Abutilon theophrasti



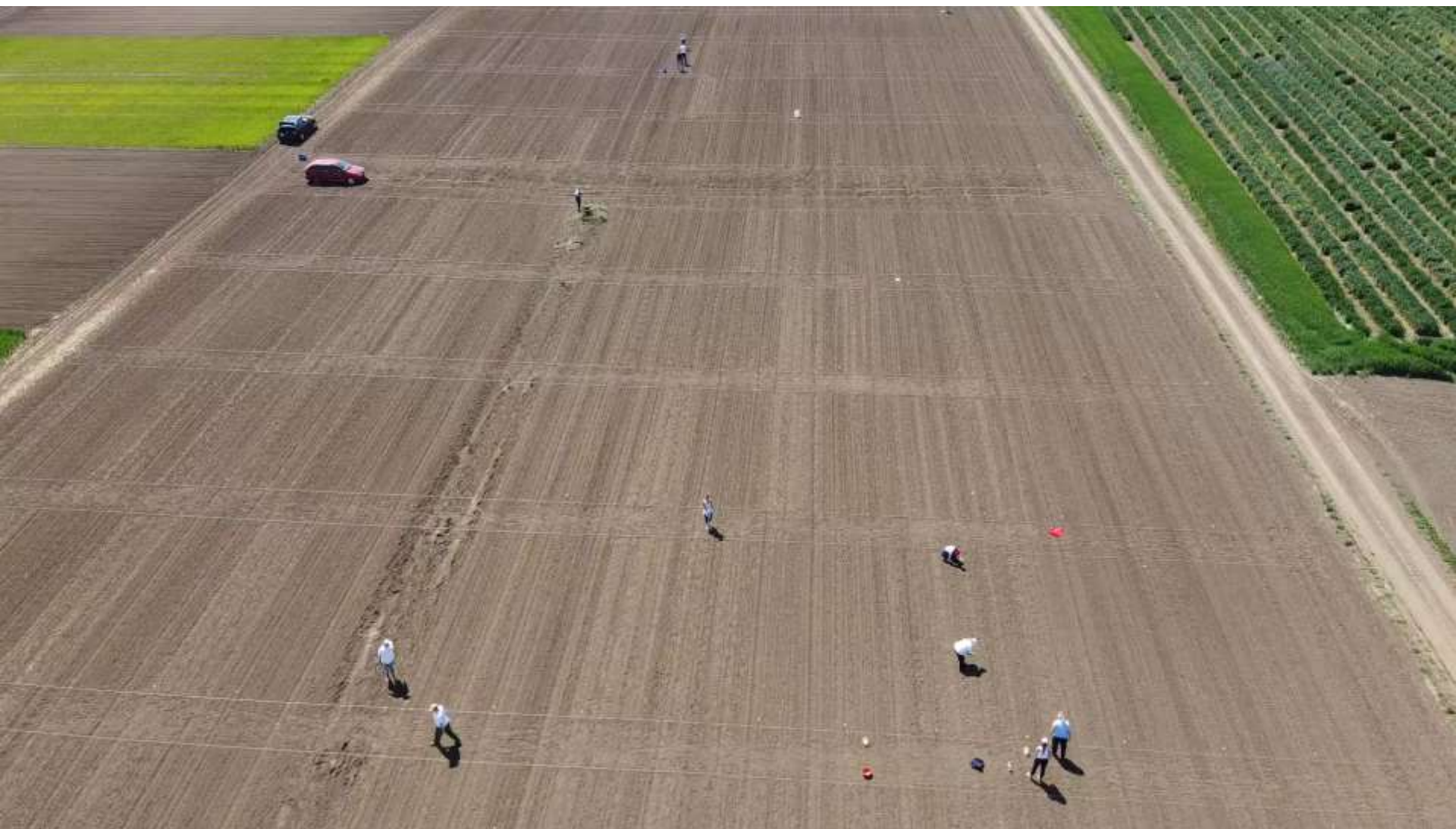
Xanthium strumarium



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(2) Soybean genotypes evaluated for tolerance to *Nezara viridula*

(3) Screening of genetic resources to the competitiveness against weeds

(4) Soybean genotypes evaluated for resistance to stem canker



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Preliminary trial – stem canker



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Plan for Y3 of task 4.1

- Collecting data
- Chemical analysis (NIR) of all samples/plots all trials (IFVC)
- Data analysis
- Second year trial
- Testing soybean genotypes for finding tolerance to *N. viridula* (by the same procedures as in previous years).
- Screening of soybean cultivars with competitive ability towards weeds which are difficult to control by mechanical measures in organic production.
- Screening of resistance to charcoal rot



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Main achievements during Y2 in task 4.2

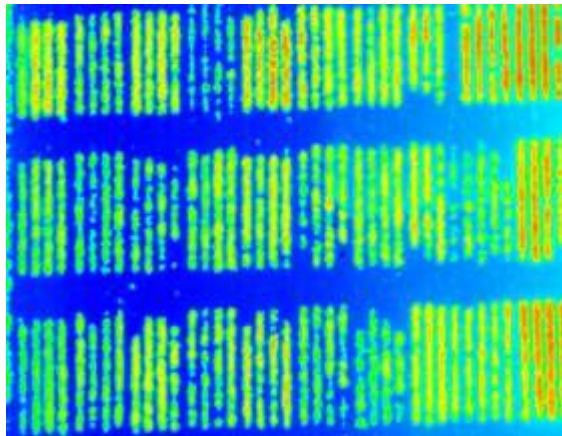
Partners: IFVC, BOKU, NARDI, GEO, SZG

(1) Trials for drought and chilling tolerance

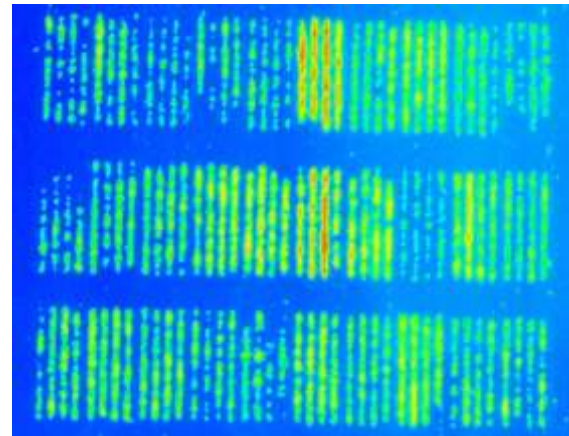
SZG – Chilling tolerance: pigeons destroy trial

NARDI – Chilling tolerance: good start, problems with drought

IFVC – Drought tolerance – good start, first data collected



Well watered



Drought stress

NDVI photo of soybean drought tolerance screening at IFVC



NARDI - Chilling tolerance evaluation

The 18 genotypes were sowed in organic field of INCDA Fundulea in two sowing times (06.04.2020; 24.04.2020), in three replications, plot size - 6 × 1,5 m.p; 4 lab cold-testing methods.

16	8	1	5	11	7	17	10	13
12	18	4	2	9	3	14	6	15
17	4	9	1	7	12	3	14	5
8	13	15	10	16	18	11	2	6
10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9

1. Ovidiu F
2. Camelia F
3. Miruna TD
4. Daciana
5. Columna
6. S7-F14-997
7. Crina F
8. Oana F
9. Fabiana F
10. Steara
11. Eider
12. S9-F08-1674
13. Larisa
14. TEO TD
15. Darina TD
16. Neve
17. Maximus
18. Advisor



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Plan for Y3 of task 4.2



- Collecting data
- Data analysis
- Second year trial and experiments



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Main achievements during Y2 in task 4.3

Partners: BOKU, IFVC

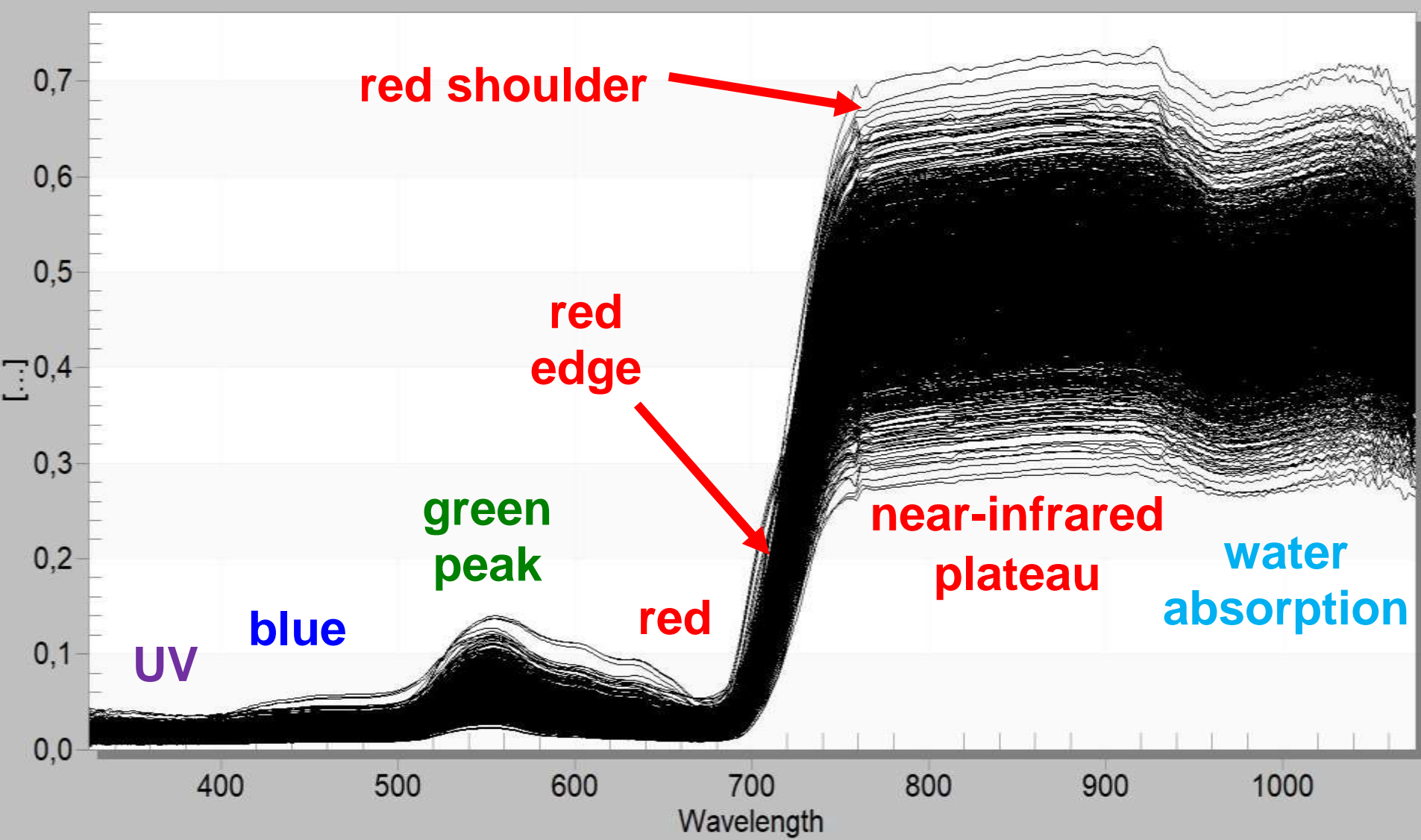
- (1) Phenotyping at one location (Tulln 2019)
- (2) Genotype sets: GQ4X (nodulating-nodulating), ps_2 (high-protein)
- (3) Experimental design: Single-row-plots, lattice designs, two rep
- (4) ASD HandHeld 2 (spectroradiometer)
- (5) SPAD-meter (chlorophyll content)
- (6) NIRS seed analysis: Seed protein/oil/sucrose content



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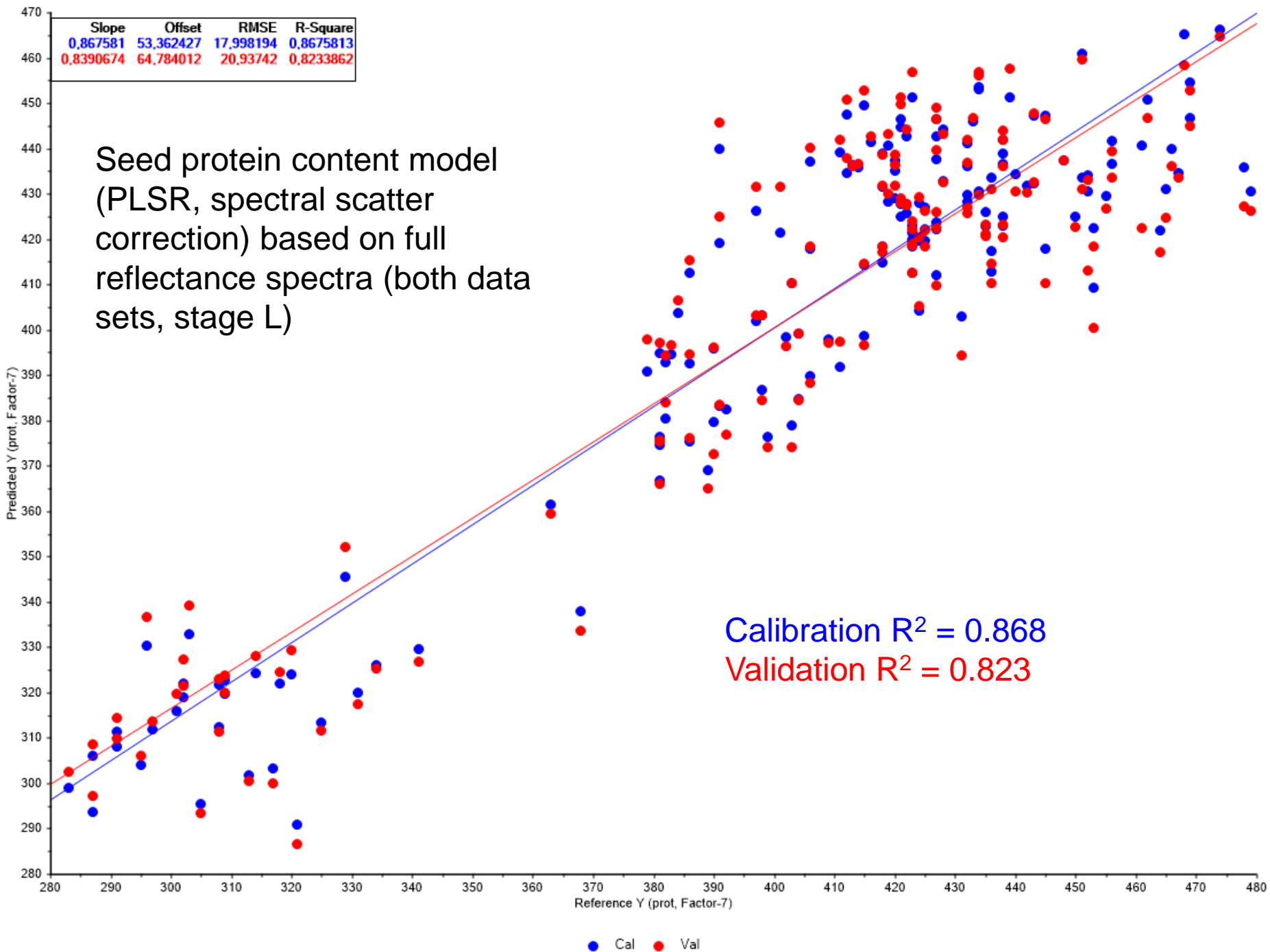


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ASD HandHeld 2 reflectance spectra (325-1075 nm) from soybean leaves





Plan for Y3 in task 4.3

Phenotyping at two locations (Tulln 2020 / Raasdorf 2020)

Genotype sets: GQ4X (nodulating-nodulating), ps_2 (high-protein)

Experimental design: Single-row-plots, lattice designs, two rep

ASD HandHeld 2 (spectroradiometer)

SPAD-meter (chlorophyll content)

PolyPen (PSI)

Multispectral imaging (drone)

NIRS seed analysis: Seed protein/oil/sucrose content



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Main achievements during Y2 in task 4.4

Partners: IFVC, BOKU, NARDI

(1) Identification and selection of markers for screening

- cadmium accumulation (Prof. Dr. Johann Vollmann/BOKU)

SSR marker (Sack149) associated with Cda1 locus related to Cd accumulation aiming to identify low cadmium uptake germplasm.

- *Sclerotinia sclerotiorum* resistance (Dr. Marina Čeran/IFVCNS)

selected 12 SNP markers from conducted GWAS that are in strong association with the length of the lesions caused by *Sclerotinia sclerotiorum* for the screening for resistance.



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Plan for Y3 of task 4.4

- Use informative marker for selection of low Cd uptake lines suitable for organic farming from T4.1 (sampling, DNA extraction, genotyping).
- evaluate efficiency of identified SNP markers in strong association with the *Sclerotinia sclerotiorum* resistance, using IFVC working collection with available molecular data or identify new genomic regions related to resistance.
- identification of markers in strong association with a *Diaporthe* complex tolerance - perform GWAS using phenotypic data from first year field trials (T4.1) and available genotyping data (SNP).



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Main achievements during Y2 in task 4.5

Partners: GS, NARDI, IFVC, SZG, GEO

IFVC – task 4.5

(1) Inoculant trial – preliminary trial

- This preliminary trial gave information about how to select right product (based on different microorganisms and different formulations) for soybean.
- Based on the experience from the preliminary trial in 2019, trial with inoculants was modified in 2020.
- Protocols for trials were made and shared

(2) Cover crop trial – preliminary trial

- Planting of selected cover crops started in 2019 (rye/field pie + oat).
- In April 2020 sowing of soybean was done (24th April).



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GS – task 4.5

(1) Cover crop trial – preliminary trial

- Selection of cover crops (rye/field pie + oat)
- Protocols for trials were made and shared
- Planting of selected cover crops started in 2019
- In April 2020 sowing of soybean was done.



Grasses/small grains



legumes



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GEOKOMI – task 4.5

Preliminary trials

- Both preliminary trials failed
- 1st trial: completely destroyed by grasshopper infestation
- 2nd trial: was sown 2 times
 - 26/2/2020 hand drill – very poor germination (10-15 plants per plot),
 - 08/4/2020 planted by hand)



Important problems with soybean

- Genotype provided seems unsuitable for the semi-arid environment in Crete/Greece
- Poor emergence/early development
- Insect infestation is a major problem post-emergence
- Import of seeds from Serbia is difficult
- Sourcing effective inoculants is difficult
- High consumption of water
 - economic viability is questionable!!!



NARDI – task 4.5

OVIDIU F

Sowing date: 14.04.2020



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Plan for Y3 of task 4.5

- Collection of results from preliminary trials, analysis of collected data
- Seed inoculation with symbiotic N-fixing *Bradyrhizobium* strains will be combined with micronutrient seed coatings (e.g. Mn, Co, Zn, Fe and Se) to further evaluate establishment, seed health/vigour.
- Establishment of cover crop trial (October 2020)/sowing of soybean in April 2021)



Main achievements during Y2 in task 4.6

Partners: SZG, IFVC

(1) First crosses of genotypes with traits, which are beneficial for organic production:

- Branching behaviour
- Good soil coverage
- Good early vigour
- Elevated protein content



Plan for Y3 of task 4.6



- 2020: Growing of F1 plants
- Based on the results of task 4.1, we will make decisions for new crossings in 2021