Mecklenburg-Vorpommern

Landesforschungsanstalt für
Landwirtschaft und Fischerei

Joint Research project: Causal investigation of sea buckthorn dieback and development of counter-measures 2020 - 2023

Daniela Kuptz, Dr. Kai-Uwe Katroschan, Dr. Frank Hippauf

23.11.2021

Joint research project

Mecklenburg-Vorpommern Research Centre for Agriculture and Fisheries (LFA), Centre of Horticultural Crop Production, Gülzow

→ **The role of abiotic factors in crop vitality of sea buckthorn**

State Office for Agriculture, Food Safety and Fishery Mecklenburg-Vorpommern (LALLF), Plant Protection Service, Rostock

→ **Monitoring of wild habitats and evaluation of plant protection measures**

Federal Research Centre for Cultivated Plants (JKI), Institute for Plant Protection in Fruit Crops and Viticulture, Dossenheim

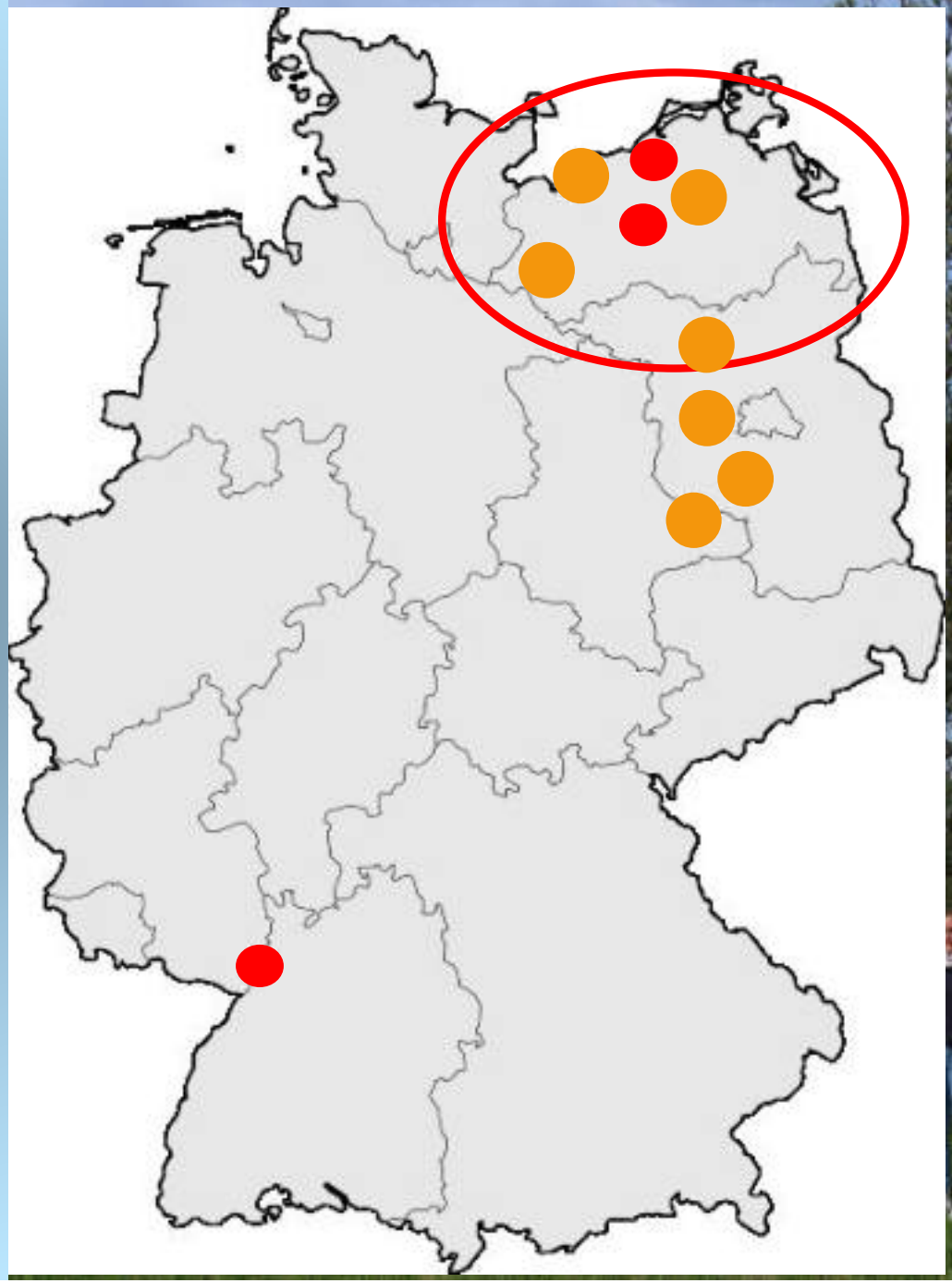
→ **Identification of pathogens**

Gefördert durch:

Bundesministerium für Ernährung und Landwirtschaft

aufgrund eines Beschlusses des Deutschen Bundestages

FNR Fachagentur Nachwachsende Rohstoffe e.V.

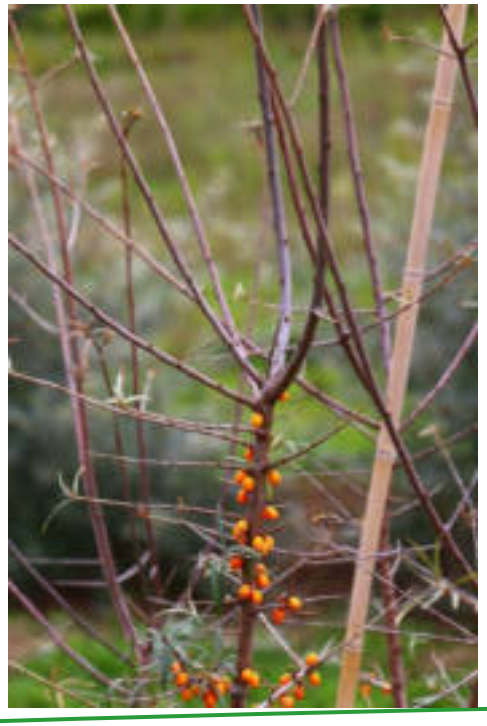


Typical symptoms of sea buckthorn dieback










Wild habitats along the German coastline of the baltic sea in 2018

Vital

Dead

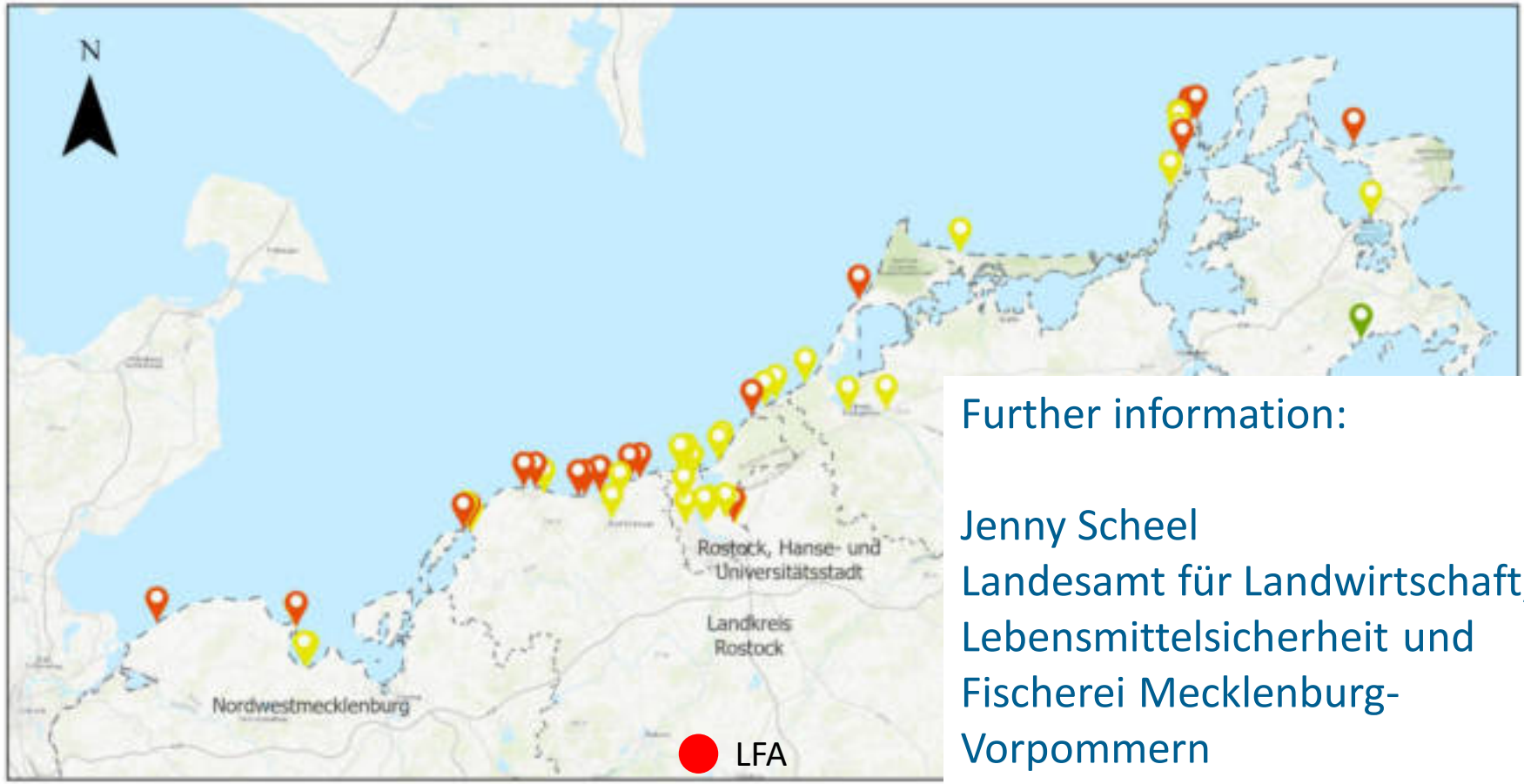
Not vital

Not registered

0 5 10 20 km

Datum: 12.11.2021
Bearbeiterin: Jenny Scheel
CRS: ETRS 1989 UTM Zone 33N
EPSG: 25833

Wild habitats along the German coastline of the baltic sea in 2021

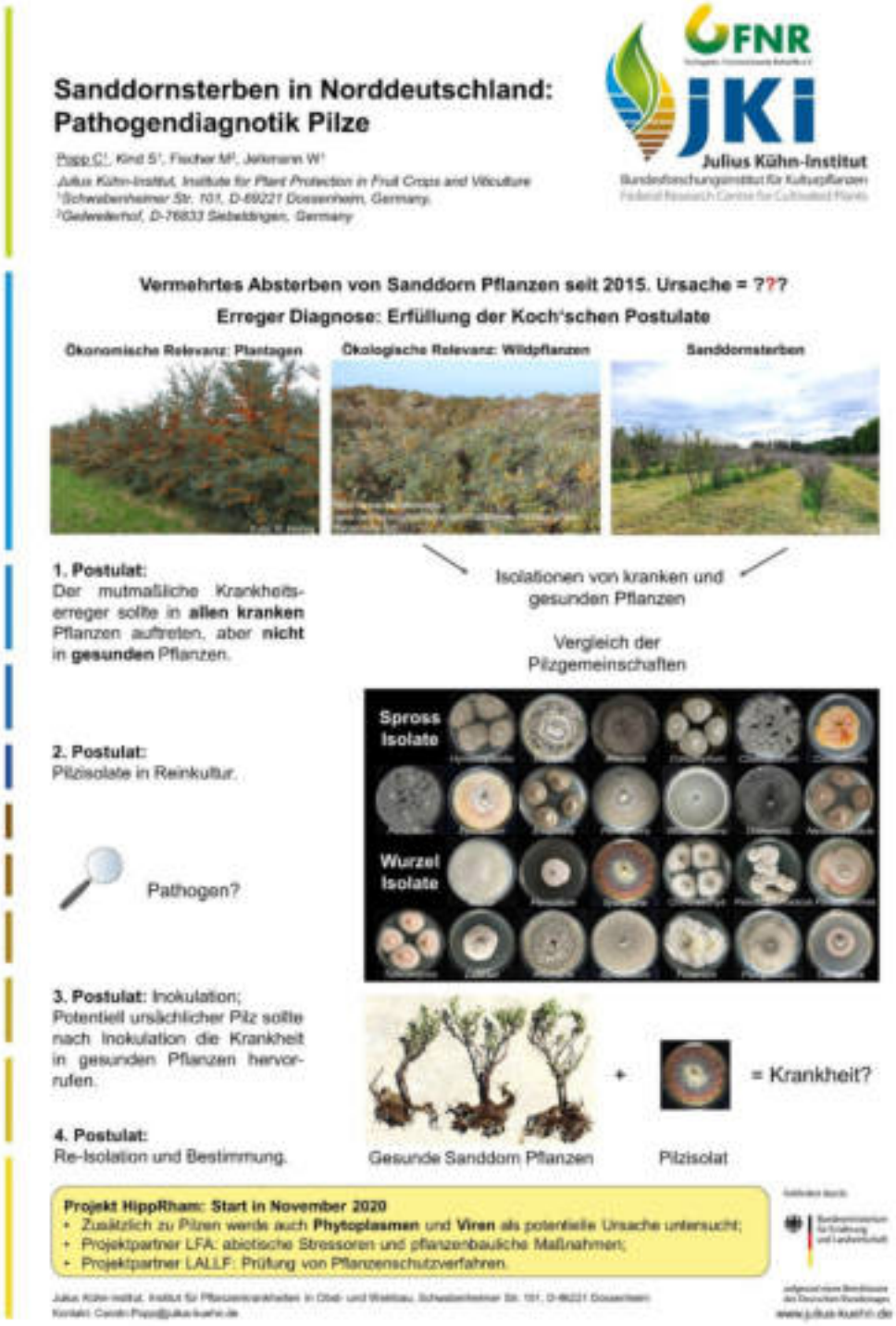


Vital
Dead
Not vital

Further information:

Jenny Scheel
Landesamt für Landwirtschaft, Lebensmittelsicherheit und Fischerei Mecklenburg-Vorpommern
Thierfelderstraße 18
18059 Rostock

Jenny.Scheel@lallf.mvnet.de



Further information:

Dr. Carolin Popp
Julius Kühn-Institut
Schwabenheimer Straße 101
69221 Dossenheim

carolin.popp@julius-kuehn.de

Agenda

LFA

1. Irrigation trial (field experiment), Gülzow

2. Fertilizer trial (pot experiment), Gülzow

3. Variety trial (field experiment), Ludwigslust

4. Aerial photography

Irrigation trial

Research question

How do different irrigation intensities affect growth, yield and health of sea buckthorn Hippophae rhamnoides ‘Habego’?

Data collection and measurements

During the season: soil moisture tension, amount of irrigation, rainfall, weather data

harvest: above-ground biomass (wood, leaves, branches), SPAD, berry fresh and dry weight, quality parameters“

Irrigation trial

5 irrigation treatment

T 1 = without sprinkler

T 2 = 20 l/h sprinkler

T 3 = 40 l/h sprinkler

T 4 = 60 l/h sprinkler*

T 5 = 80 l/h sprinkler

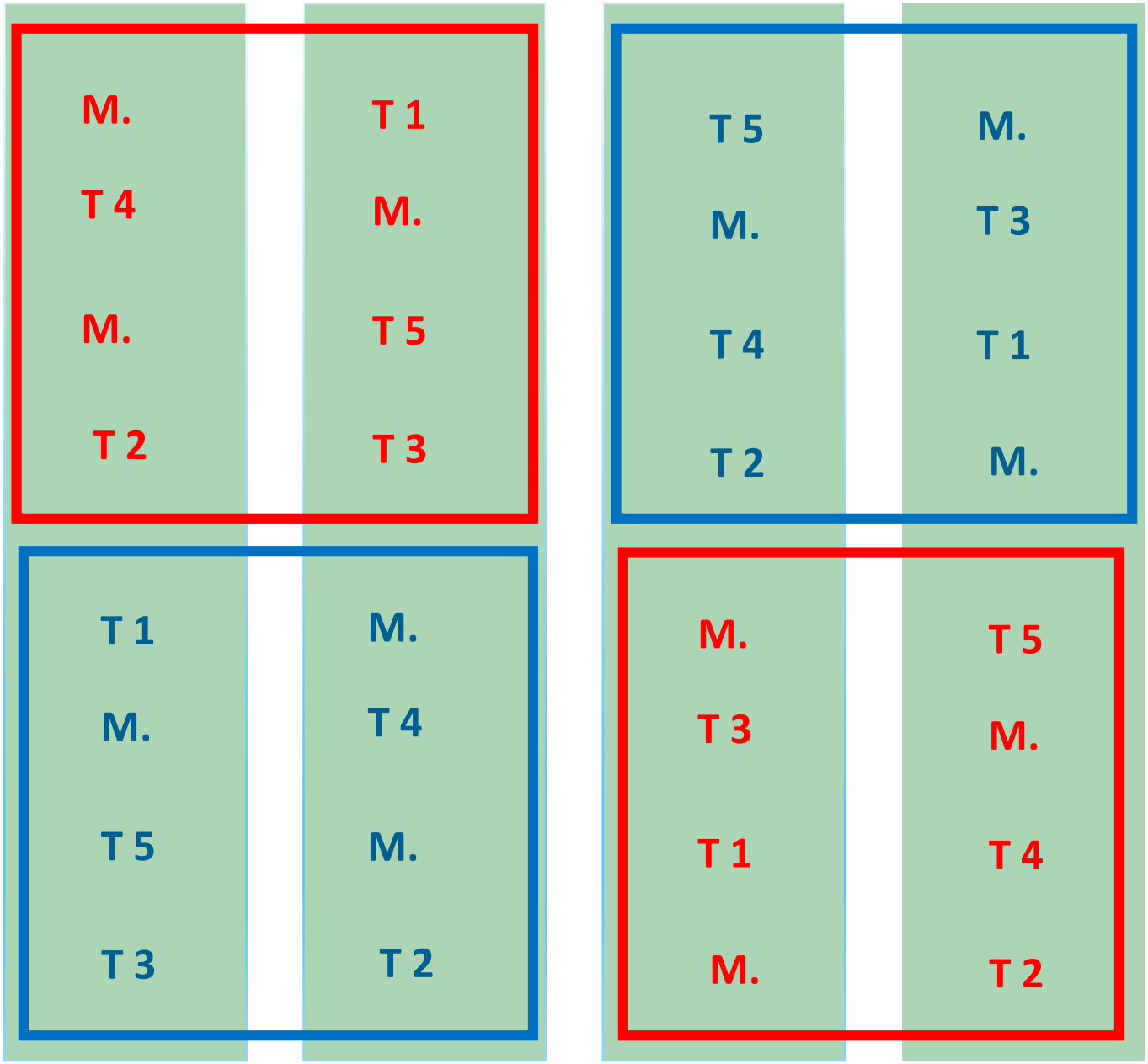
same number and duration of irrigation events
but different irrigation water amounts per event

Measurement of soil moisture in 3 different depths

15 cm, 30 cm and 45 cm

loamy sand

*irrigation scheduling based on treatment 4
(critical soil water tension: 30 kPa in 30 cm soil depth)



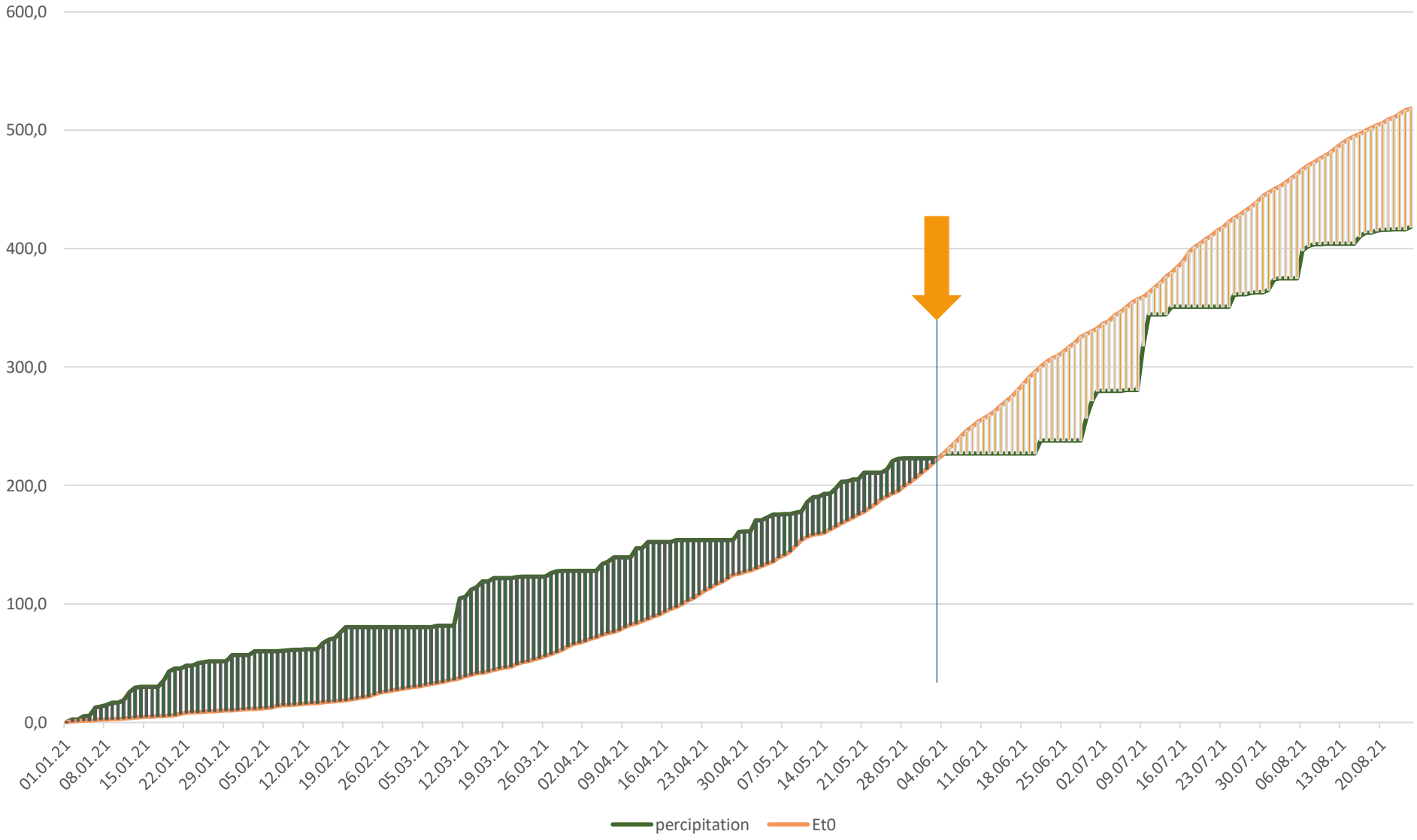
planting April 2019

planting March 2020

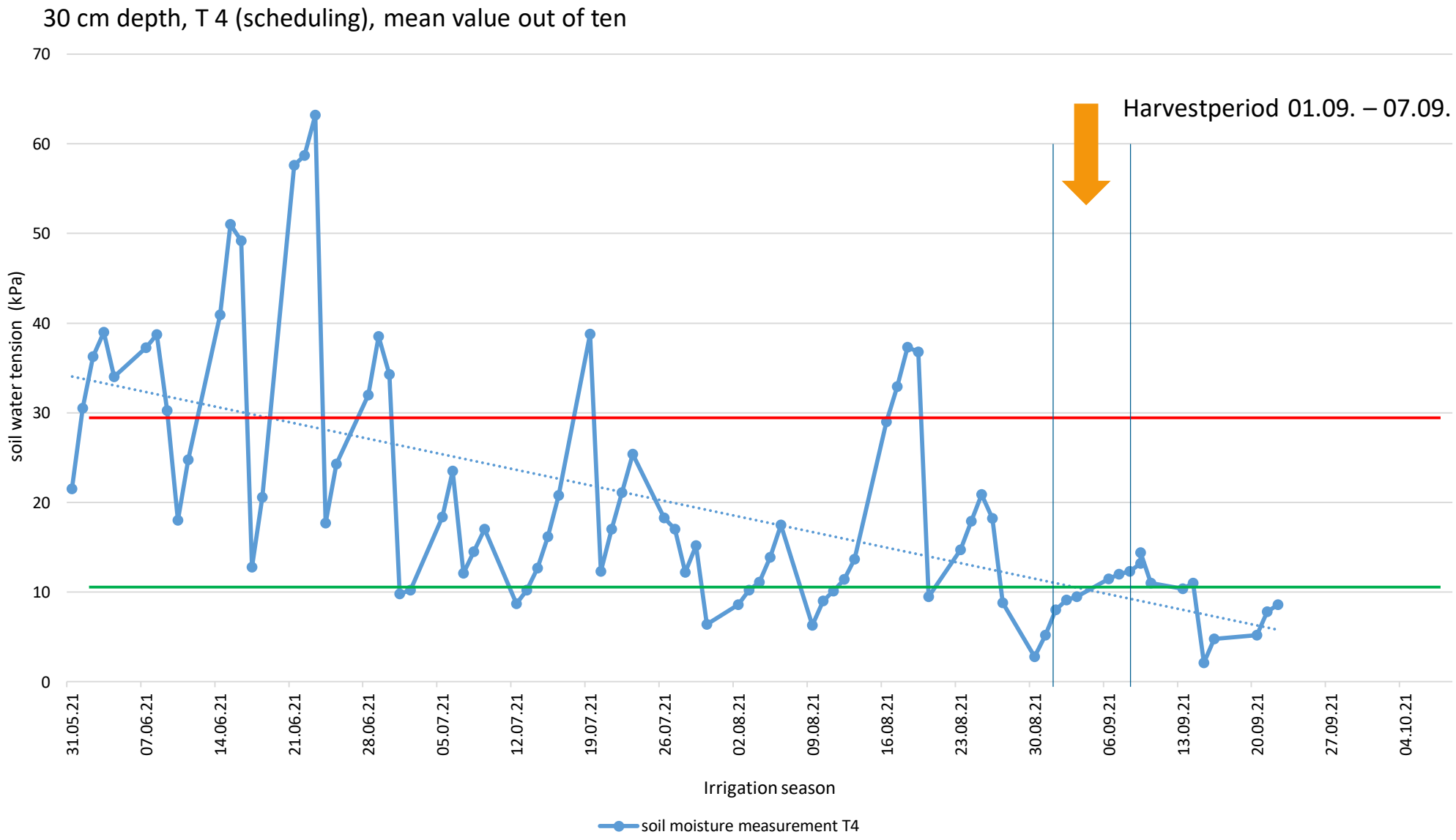
- 5 treatments
- 5 plants per treatment including 2 boarder plants
- Males in row integrated as plots (male/female ratio 3:5)

Accumulated precipitation and ET_0 (reference evapotranspiration FAO 56*) 01.January to 25. August 2021 at the experimental site

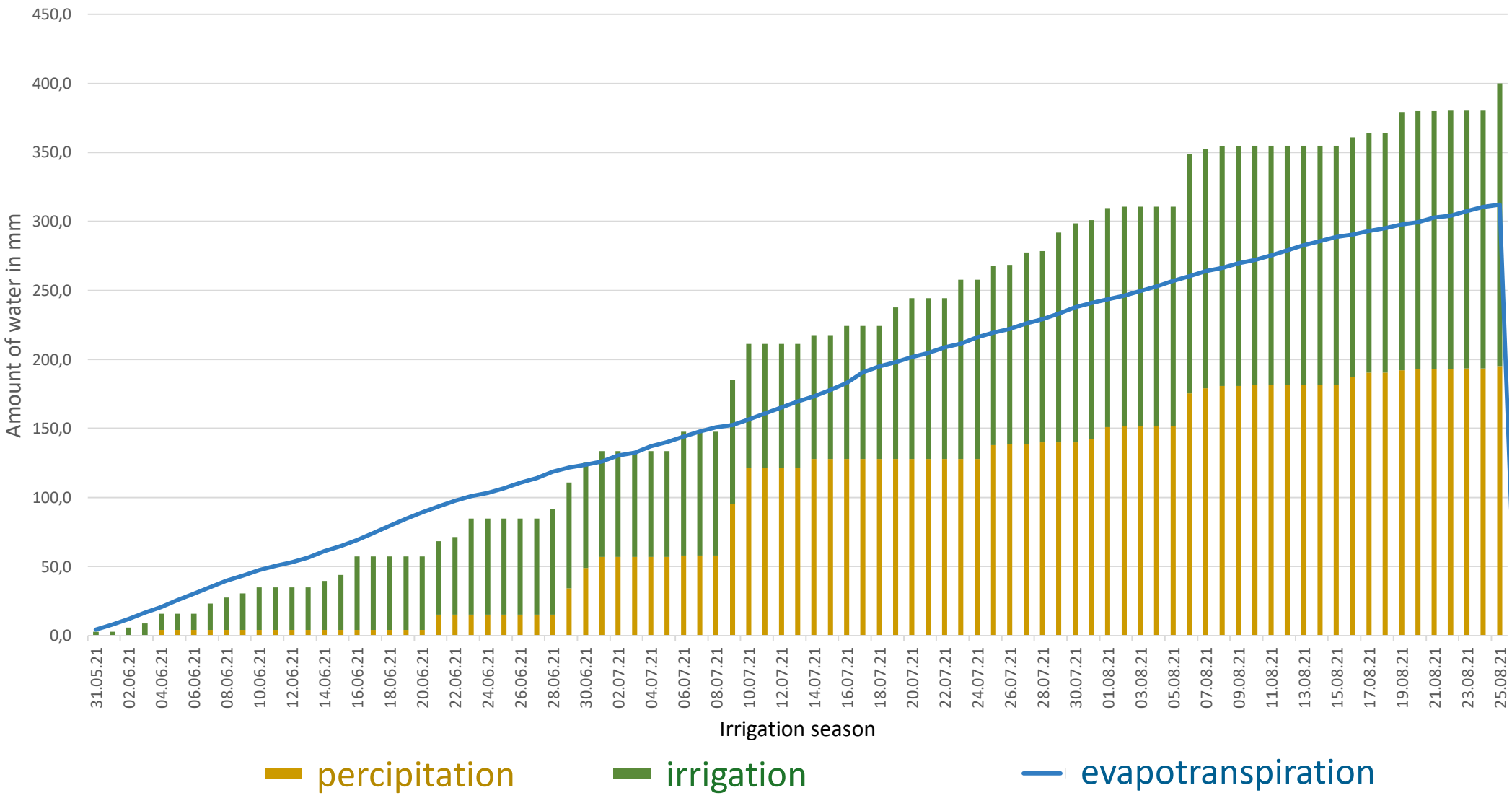
*www.fao.org



Soil moisture measurements, 31st of May – 04th of October 2021



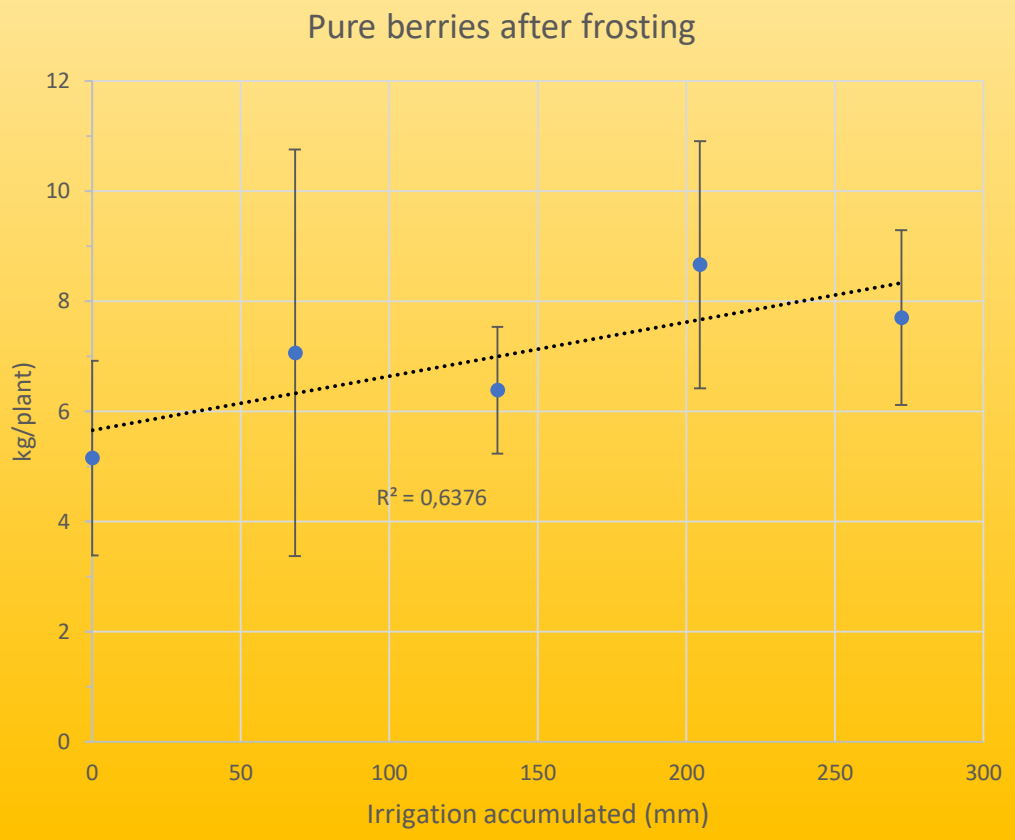
precipitation + irrigation

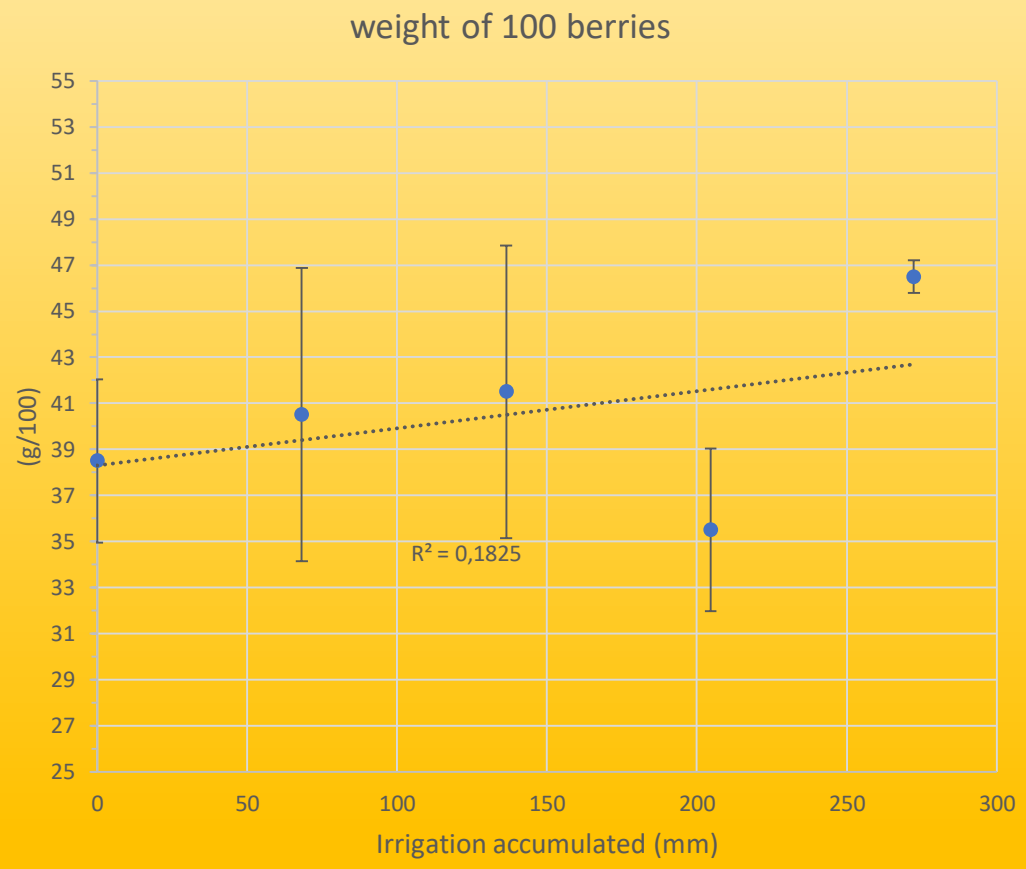


Yield parameters – vegetative biomass

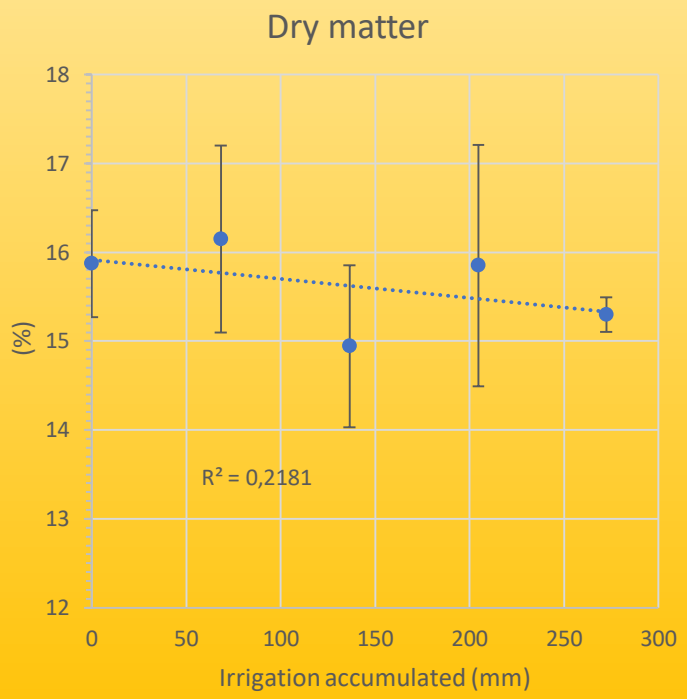
n = 2 (3 plants per repetition)

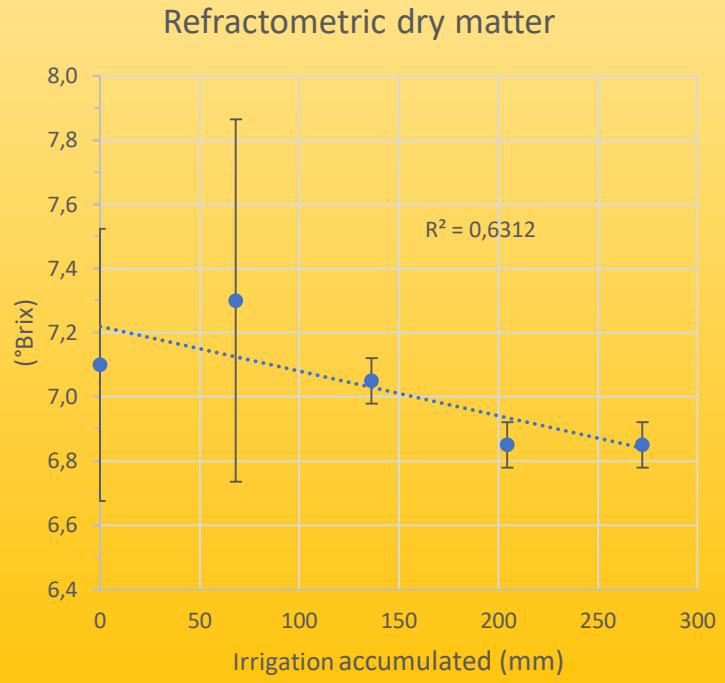
Berry yield

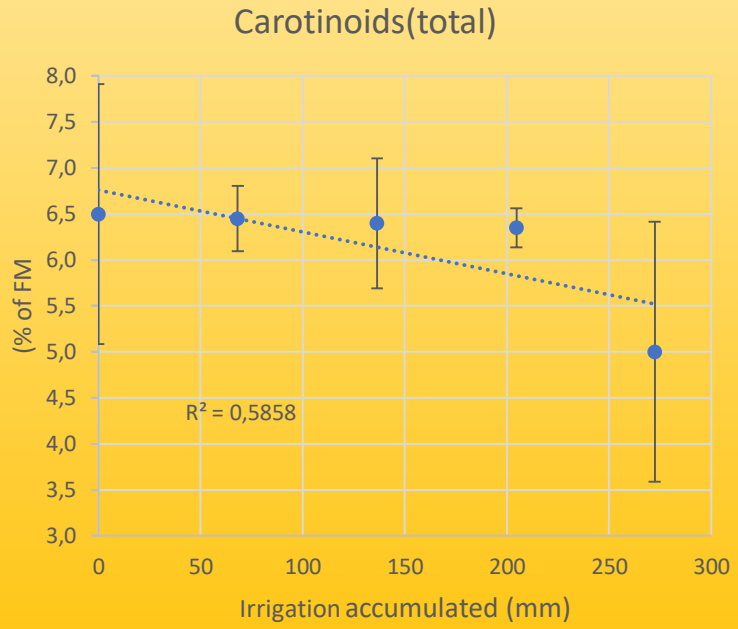

Pure berries after frosting
kg/plant)
12
10
8
6
4
2
0
0
50
100
150
200
250
300
Irrigation accumulated (mm)
R² = 0,6376


weight of 100 berries
(g/100)
55
53
51
49
47
45
43
41
39
37
35
33
31
29
27
25
0
50
100
150
200
250
300
Irrigation accumulated (mm)
R² = 0,1825

Berry yield


Dry matter
18
17
16
15
14
13
12
(%)
R² = 0,2181
0
50
100
150
200
250
300
Irrigation accumulated (mm)

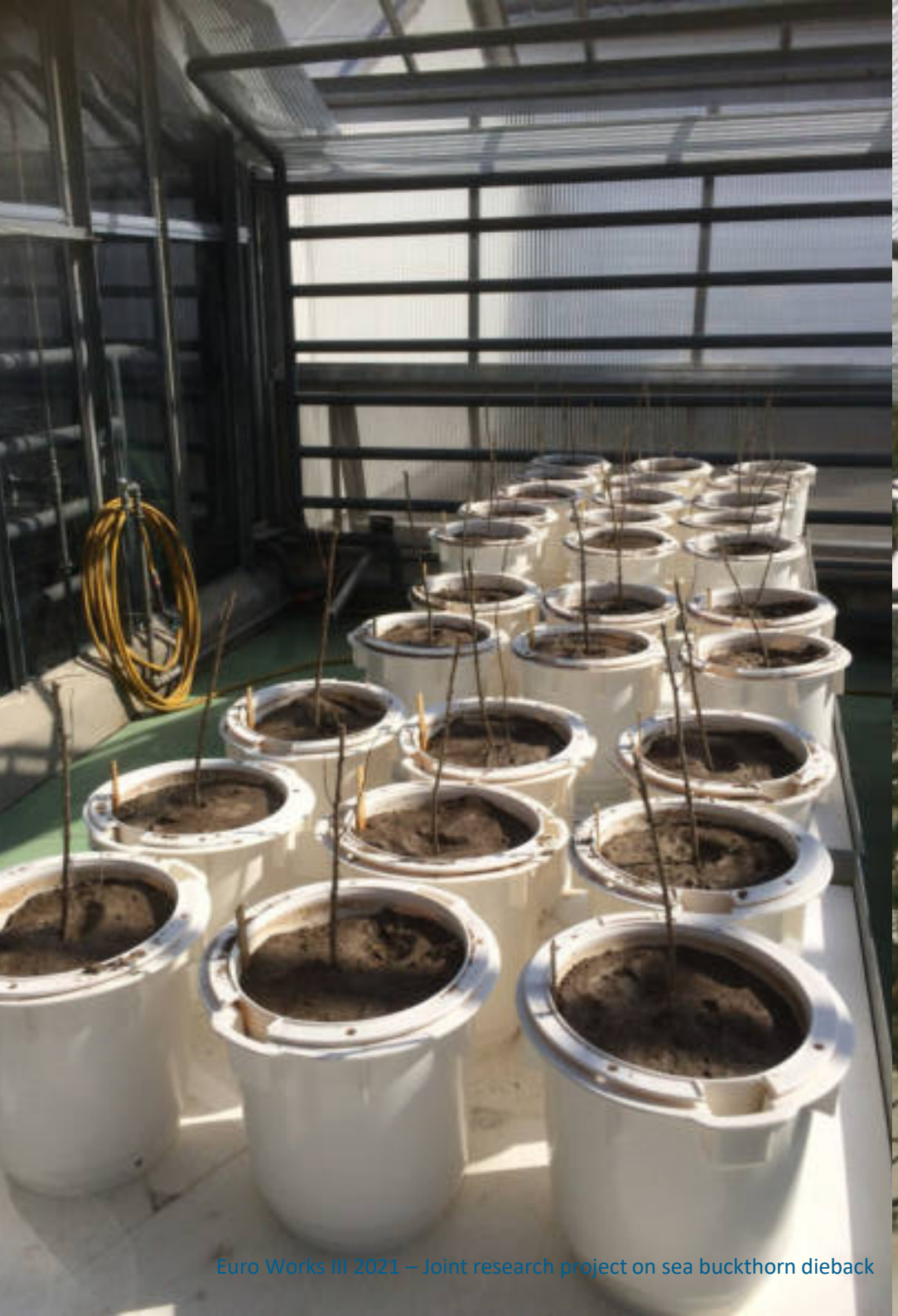

Refractometric dry matter
8,0
7,8
7,6
7,4
7,2
7,0
6,8
6,6
6,4
(°Brix)
R² = 0,6312
0
50
100
150
200
250
300
Irrigation accumulated (mm)


Carotinoids(total)
8,0
7,5
7,0
6,5
6,0
5,5
5,0
4,5
4,0
3,5
3,0
(% of FM
R² = 0,5858
0
50
100
150
200
250
300
Irrigation accumulated (mm)

Fertilizer Trial
16 weeks vom April to August
2 different soils:

- Soil of infected field
- Soil of field without seabuckthorn

3 different types of sulfur fertilizer,
120 plants of the cultivar ‘Leikora‘
fertilizer application in amounts corresponding to 60 kg S/ha (incorporated in 15 cm soil depth)



Yield parameters

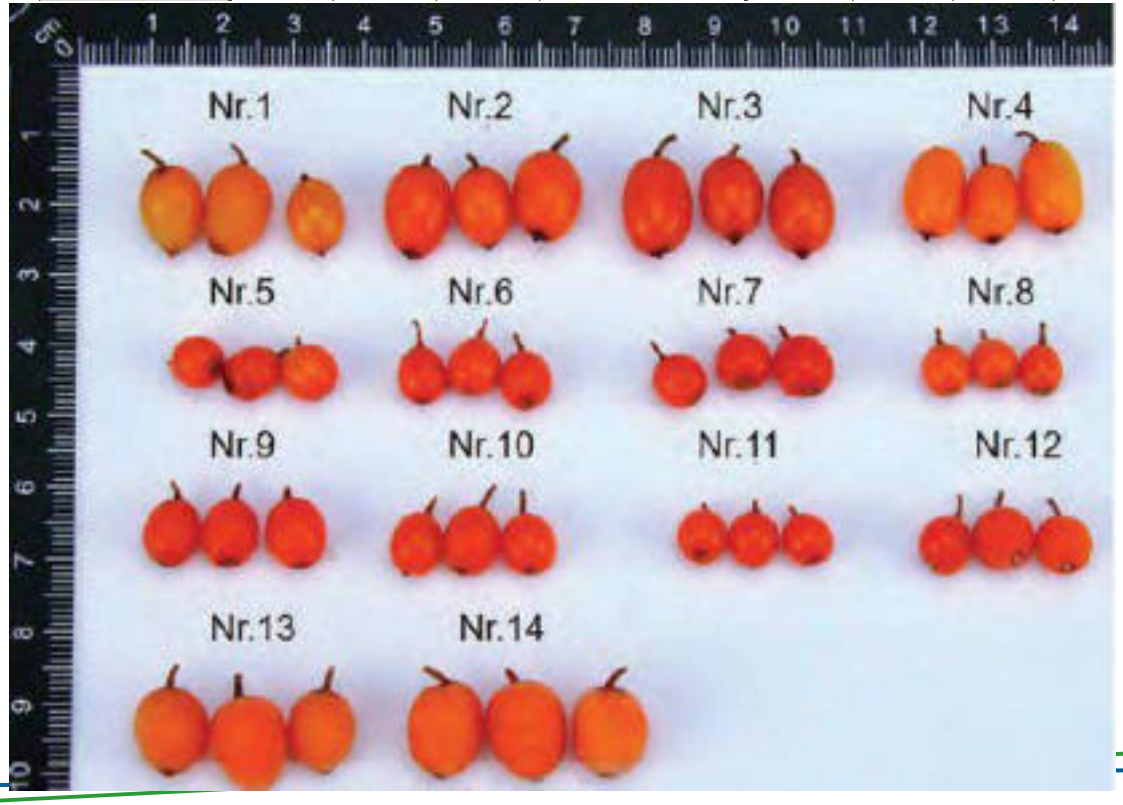
fertilizer	treatment	total weight of plant	leaf chlorophyll content (SPAD value)	Frankia root nodules (no./plant)
		(g)	(SPAD)	(pcs)
without	1.4	197,9	46,5	39,5
without	2.4	282,5	46,9	32,0
Kieserit	1.1	191,4	50,4	42,1
Kieserit	2.1	303,9	50,4	30,9
Patentkali	1.2	185,3	48,1	34,3
Patentkali	2.2	340,5	50,6	19,6
Kalisop	1.3	184,3	51,0	34,3
Kalisop	2.3	288,8	51,4	26,6

Typ of fertilizer	**S**	**MgO**	**K_2O**
Kieserit	20 %	25 %	
Patentkali	17 %	10 %	30 %
Kalisop	18 %		51 %

Befliegung Ludwigslust
am 16. Juni 2021
‘ Askola‘, alter Bestand

Variety trial in Ludwigslust – Hippophae rhamnoides ssp. fluviatilis (alpin varieties)

Art Pollmix	P 1	P 3	P 4	P 5	P 1	P 3	P 4	P 5	P 1	P 3	P 4	P 5	P 1	P 3	P 4	P 5	P 1	P 3
2	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix
10	Habego	Alp 13	Alp 11	Alp 4	Alp 14	Alp 6	Alp 12	Alp 3	Alp 1	Alp 12	Alp 11	Habego	Alp 4	Alp 3	Alp 13	Alp 4	Alp 6	Alp 1
2	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix
10	Alp 14	Alp 12	Alp 6	Alp 3	Alp 1	Habego	Alp 11	Alp 13	Alp 4	Alp 14	Alp 3	Alp 13	Alp 6	Alp 1	Alp 11	Habego	Alp 12	Alp 14
2	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix	Pollmix



Thank you for your attention