

המידע במצגת עדיין לא פורסם, בבקשה לא להפיצו הלאה !

אפיון גלי חום קיציים המשפיעים לרעה על יבול ואיכות שמן הזית

גיורא בן ארי
המחלקה לעצי פרי
המכון למדעי הצמח
מכון וולקני



יום העיון ה- 20 בנושא מחקרים
בענף הזית – 23.6.2026

מועצת הצמחים
ענף הפירות
ענף זית



שירות הדרכה והמקצוע
אגף בכיר ענפי צומח
אגף פירות

משרד
החקלאות
וביטחון המזון



מכון וולקני
מינהל המחקר החקלאי



Our research team



Prof. Rina
Kamenetsky



Iris Biton



Hadar Mendelovici



Yair Many



Hagai Cohen



Issac Zipori

Shai
Elkan



Yossi
Fridman



Prof. Alon
Samach



Tahel Wechsler



Ofer Armoni



Idan Flex



Yana Mizrahi

Noam
Weizmann



High temperature environment reduces olive oil yield and quality

Yael Nissim¹, Maya Shloberg^{1,2}, Iris Biton¹, Yair Many¹, Adi Doron-Faigenboim¹, Hanita Zemach¹, Ran Hovav¹, Zohar Kerem², Benjamin Avidan¹, Giora Ben-Ari^{1*}

¹ Institute of Plant Sciences, ARO, The Volcani Center, Rishon LeZion, Israel, ² Institute of Biochemistry, Food Science and Nutrition, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot, Israel

* giora@agri.gov.il

High temperatures summer tolerance			
Cultivar	Fruit weight	Oil accumulation	Oil quality
Barnea	✓	✓	✗
Picholine	✗	✓	✗
Coratina	✗	✓	✗
Koroneiki	✗	✗	✗
Souri	✗	✗	✓

Tzuba

Group A



Groups B-E



Tirat-Zvi

Group F



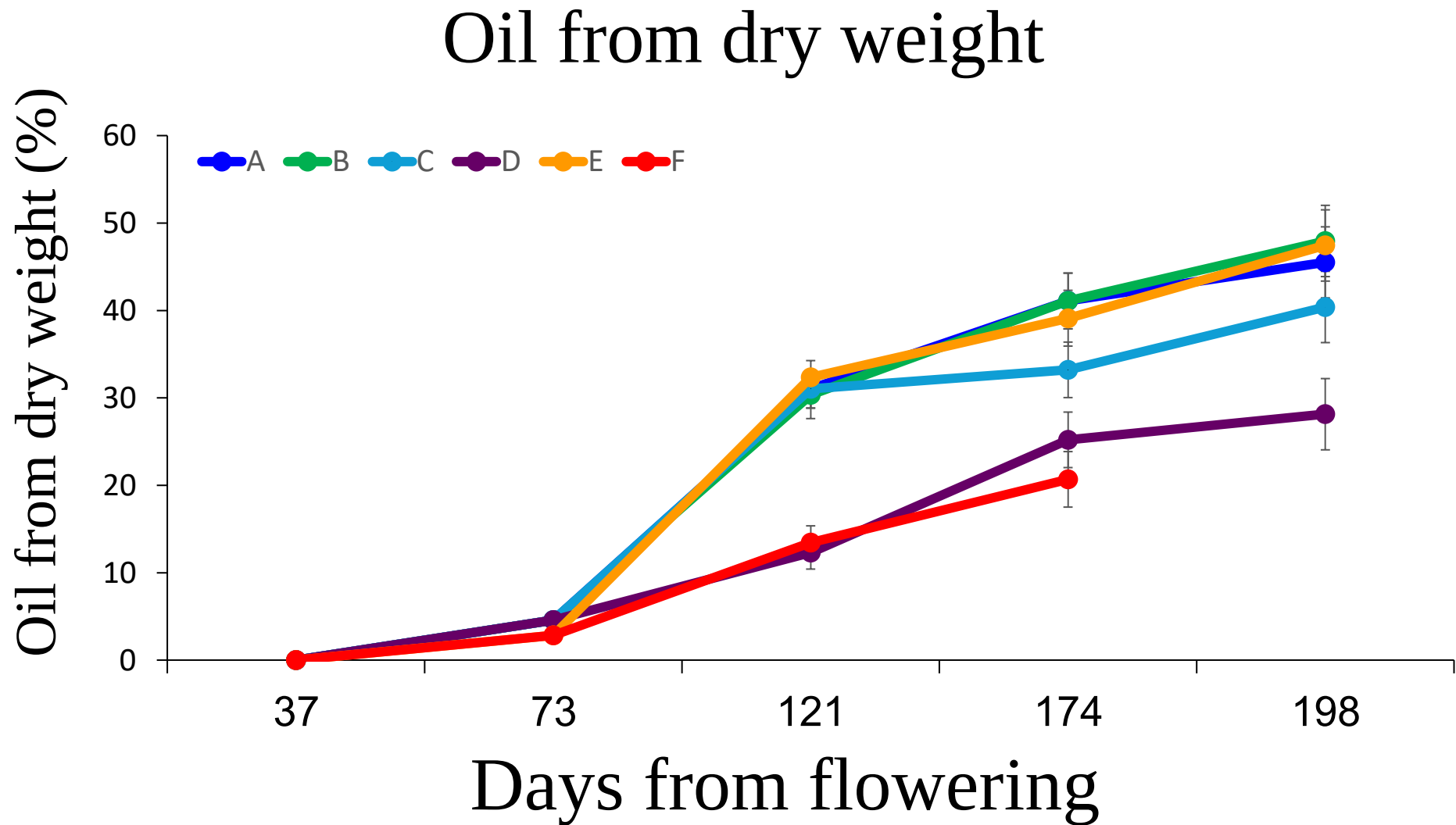
Souri cultivar

Group	May	June		July		August		September		October		
A												
B												
C												
D												
E												
F												
Average Max. temp. MT		35.69	34.12	34.60	33.27	34.21	34.43	34.06	31.68	33.31	32.96	27.93
Average Max. temp. HT		41.39	39.88	39.13	41.33	40.83	40.96	42.07	39.89	39.53	37.71	34.79
Difference		5.70	5.76	4.53	8.06	6.62	6.53	8.01	8.21	6.22	4.75	6.86

Group	May	June	July	August	September	October
A						
B						
C						
D						
E						
F						

Tirat Zvi (HT)

Tzuba (MT)



Group A



Groups B-E



Group F



Group	May	June	July	August	September	October
A						
B						
C						
D						
E						
F						

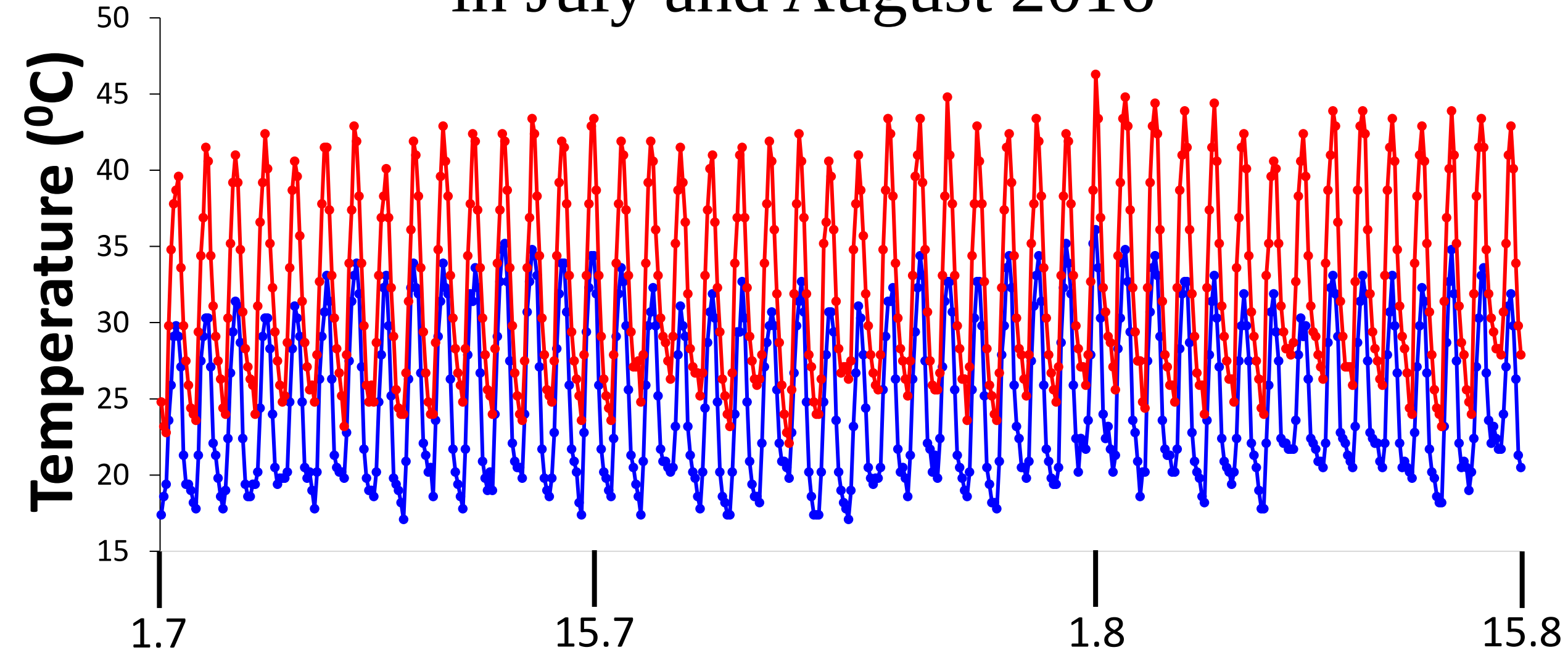
Are the negative effects due to high max day temp or high min night temp?



Tmax affect fruit weight and oil percentage

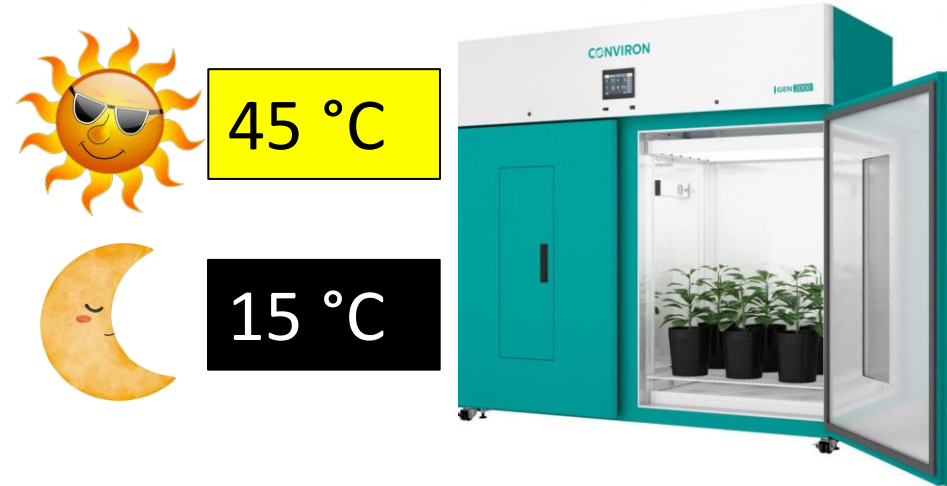
All cultivars			
Variable	Variable	Correlation	P value
Dry fruit weight	Tmax	-0.346	0.0016
Dry fruit weight	Tmin	-0.2782	0.0119
Dry fruit weight	Tmean	-0.3366	0.0021
Dry fruit oil	Tmax	-0.1827	0.1245
Dry fruit oil	Tmin	-0.0897	0.4538
Dry fruit oil	Tmean	-0.1222	0.3067
Only sensitive cultivars			
Variable	Variable	Correlation	P value
Dry fruit weight	Tmax	-0.4356	0.0004
Dry fruit weight	Tmin	-0.362	0.0038
Dry fruit weight	Tmean	-0.4195	0.0007
Dry fruit oil	Tmax	-0.4015	0.0309
Dry fruit oil	Tmin	-0.2414	0.2072
Dry fruit oil	Tmean	-0.3218	0.0887

Temperatures in Tzuba (MT) and Tirat-Zvi (HT) in July and August 2016



Convion GEN2000 Plant growth chamber experiment – 1.7.2024 – 15.8.2024

Max Tirat-Zvi Min Tzuba



Tzuba like



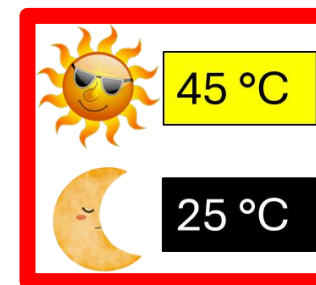
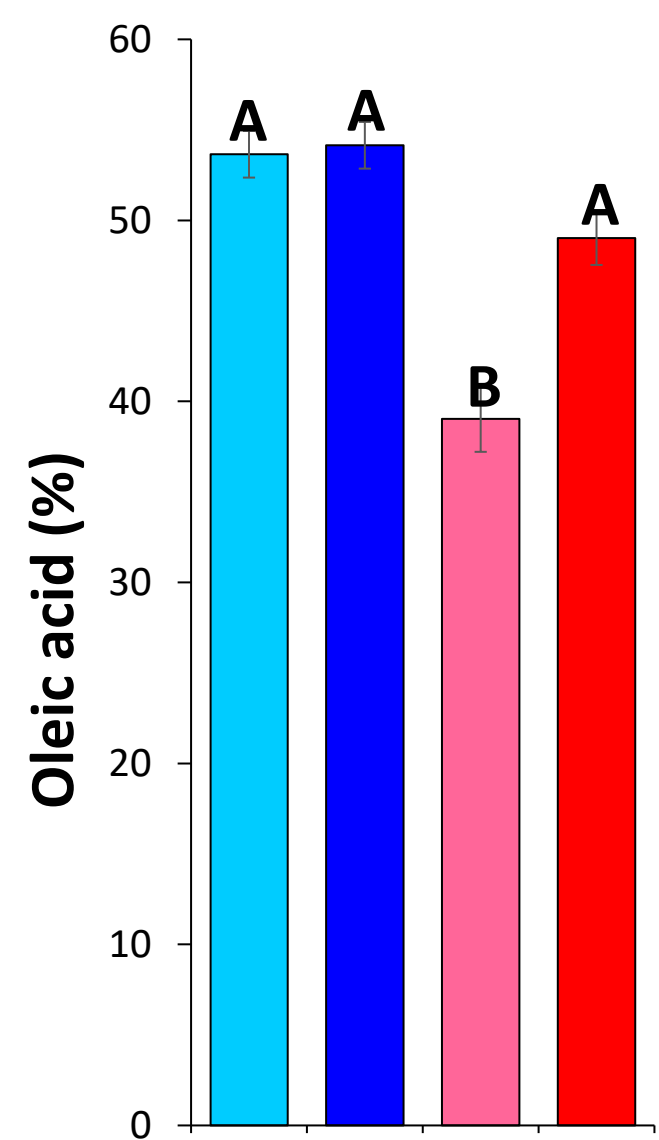
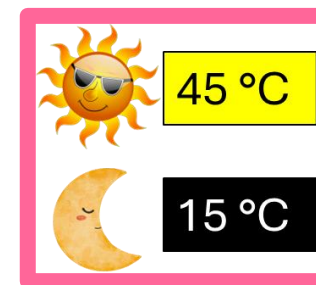
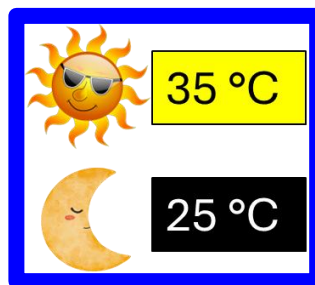
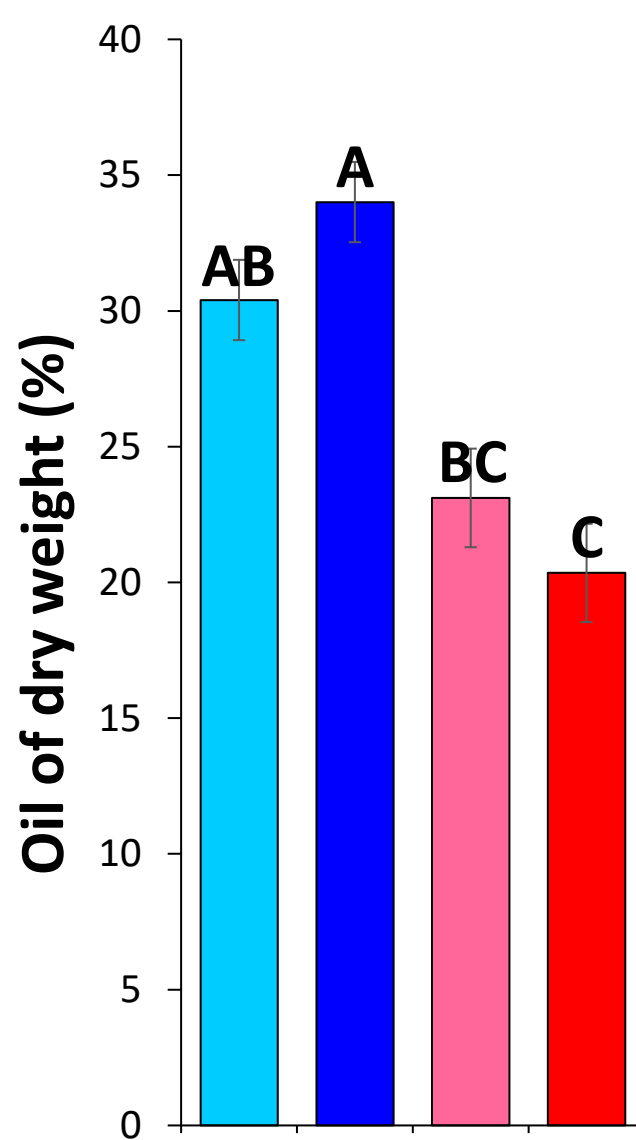
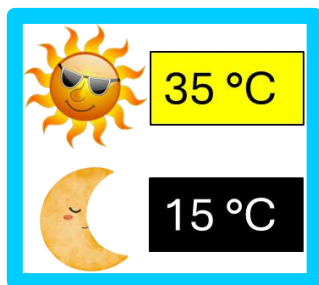
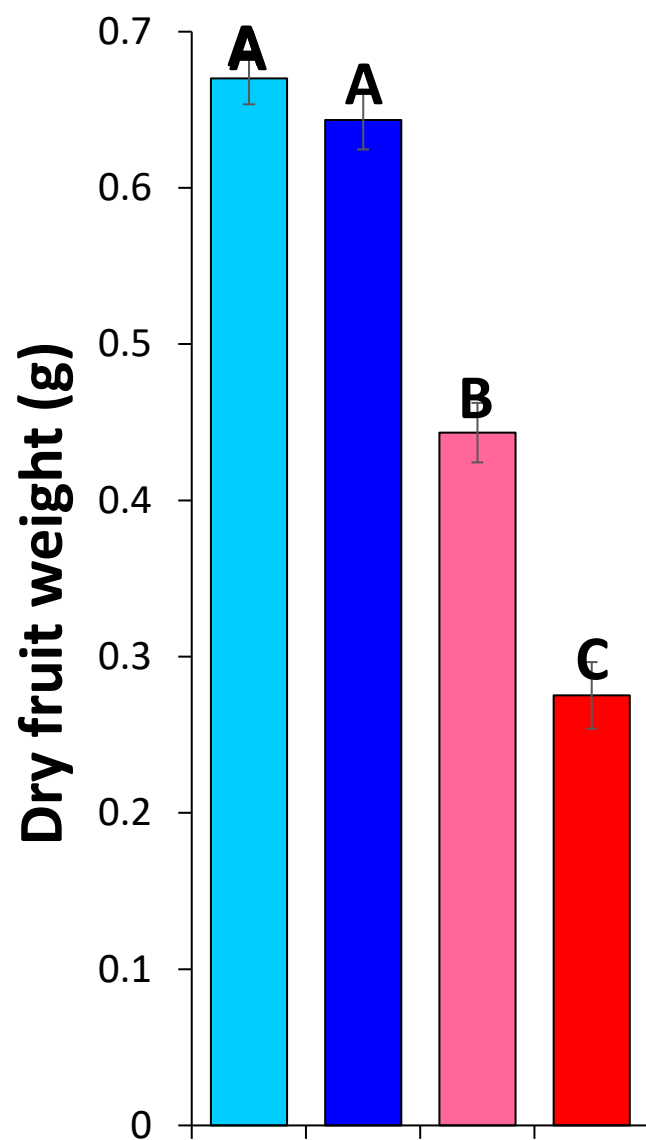
Arbequina

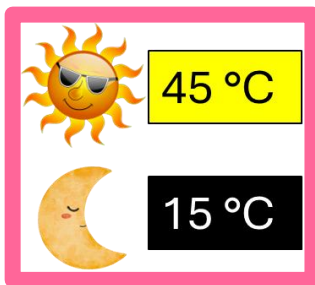
Tirat-Zvi like



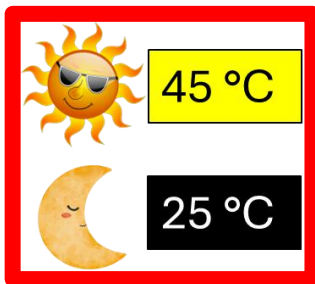
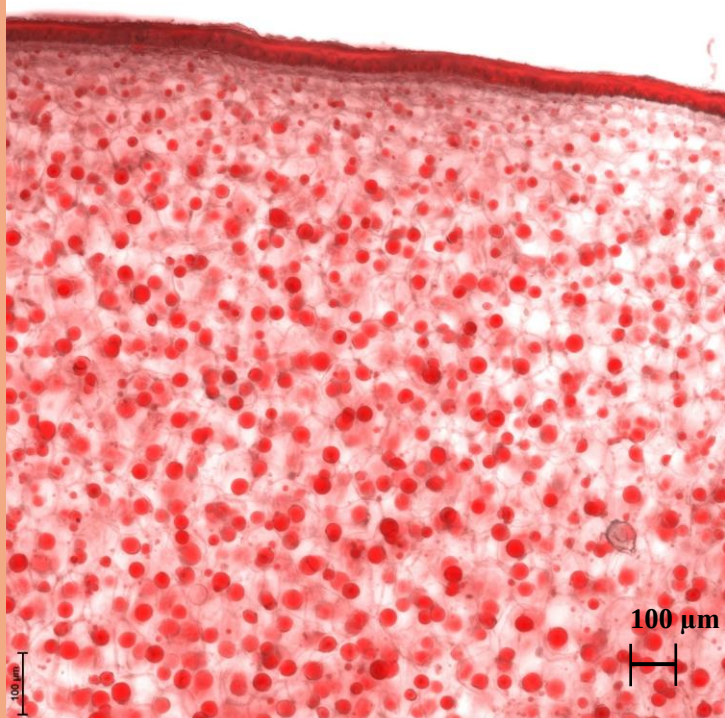
Min Tirat-Zvi Max Tzuba



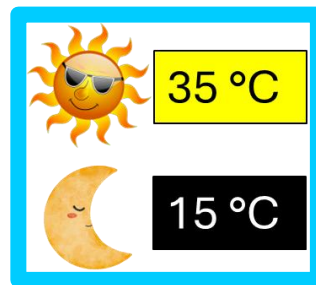
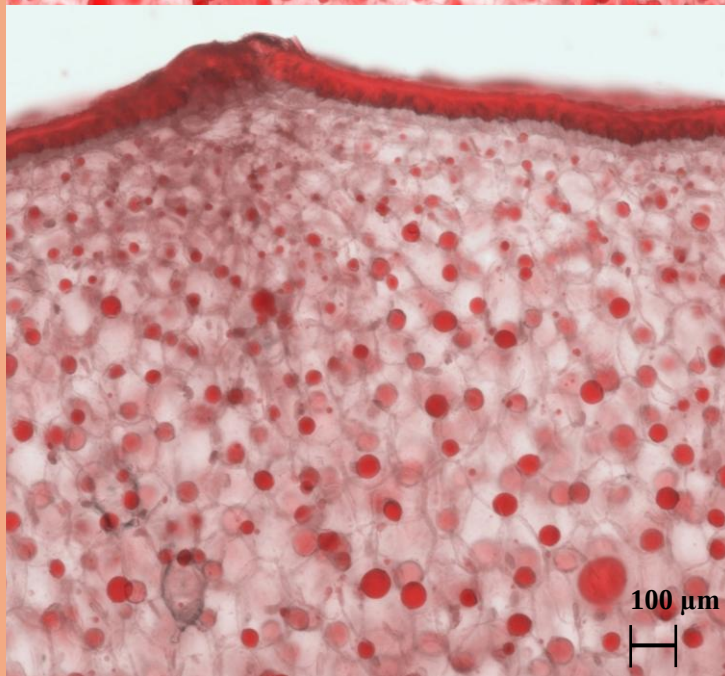




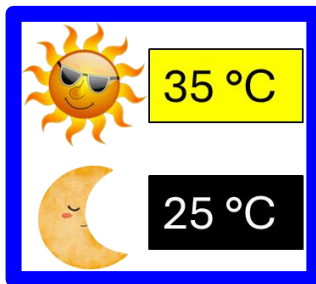
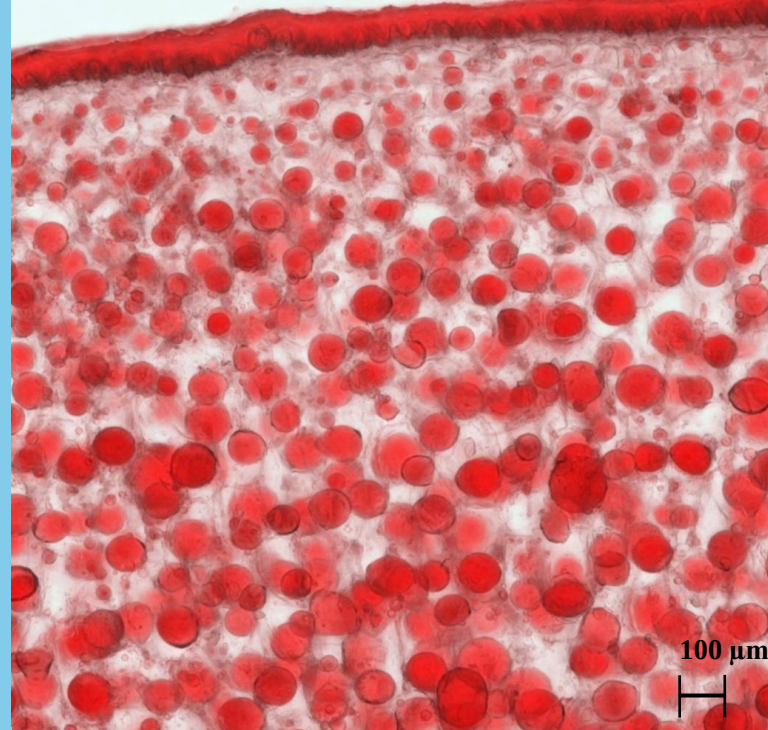
45/15C 14.08



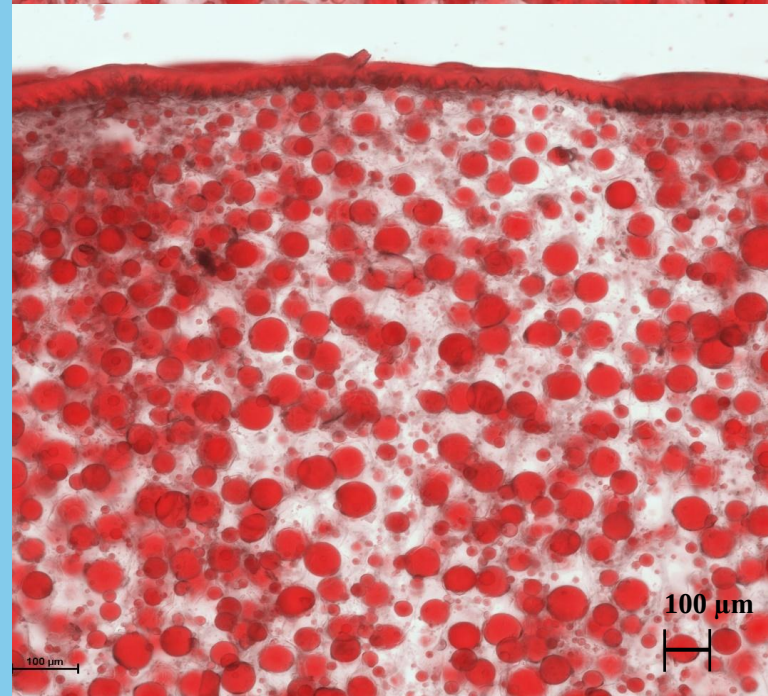
45/25C 14.08



35/15C 14.08



35/25C 14.08

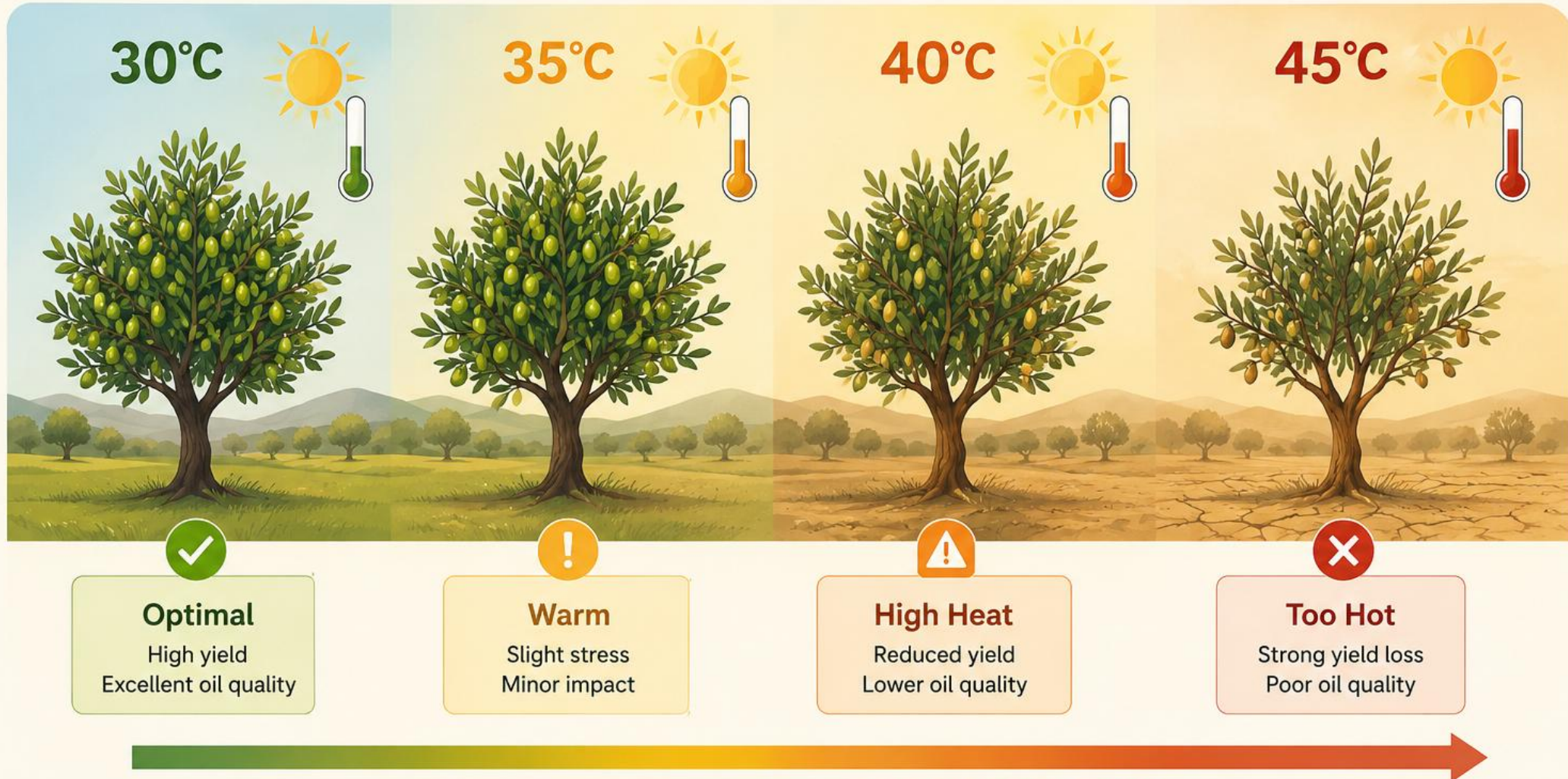


Tmax is the critical parameter that negatively affects oil yield and quality



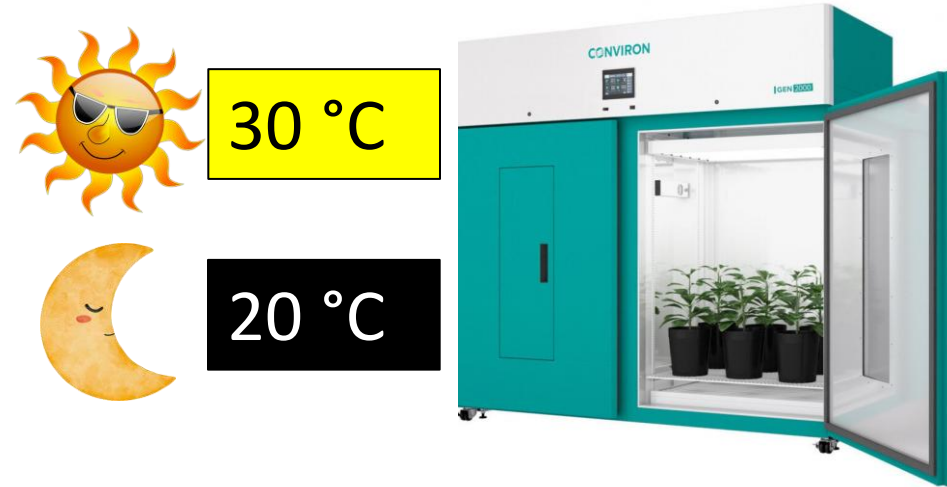
How Hot Is Too Hot?

At what daytime temperature does high heat begin to harm olive yield and oil quality?



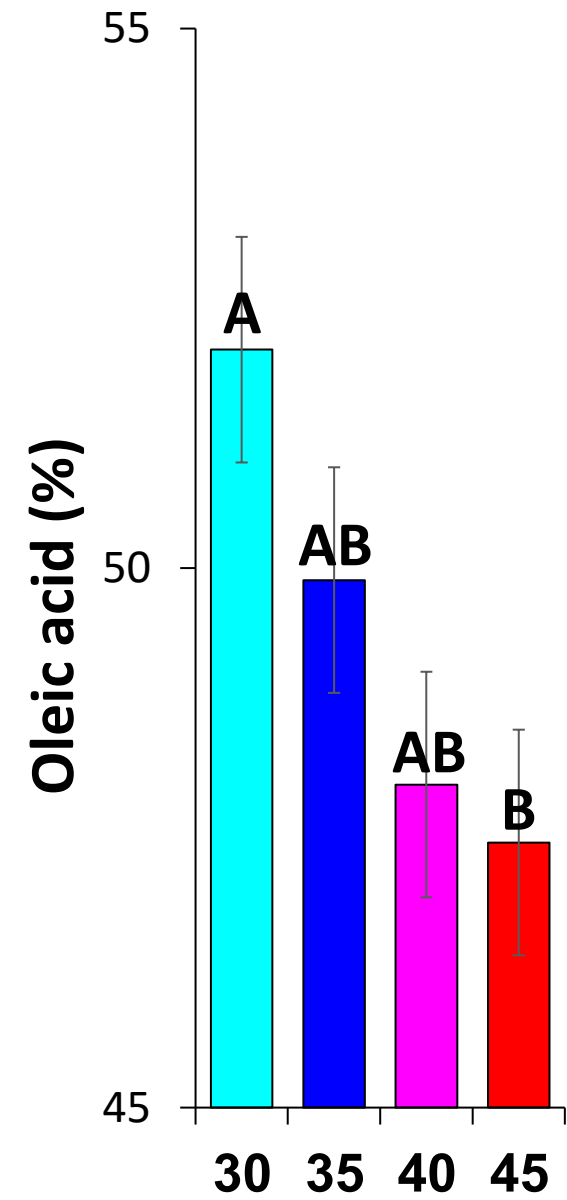
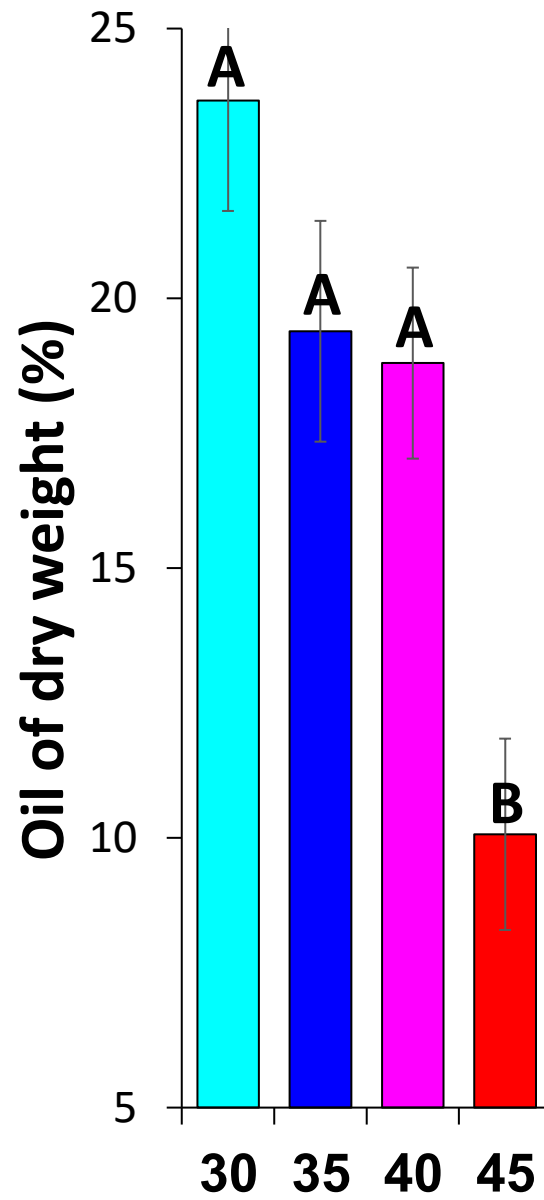
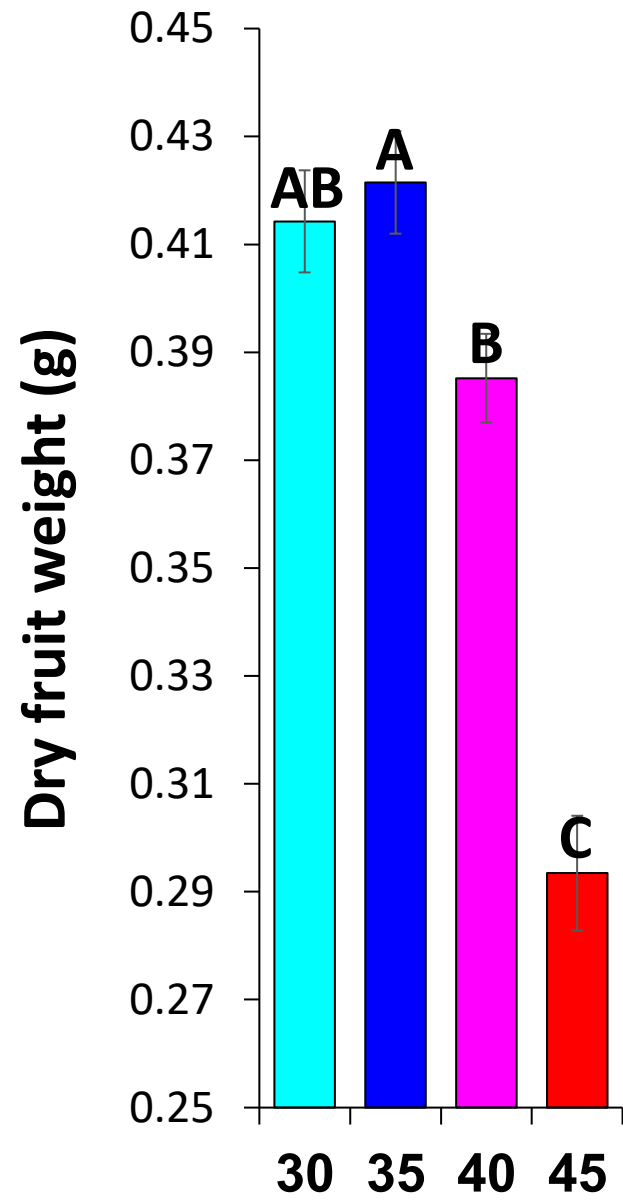
Testing daytime temperatures: 30°C, 35°C, 40°C, 45°C
At what point does heat become harmful?

Conviron GEN2000 Plant growth chamber experiment – 1.7.2025 – 14.8.2025



Arbequina





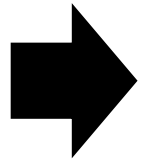
For a sensitive cultivar like Arbequina at July-August:

35 °C – 220
Kg oil / dunam

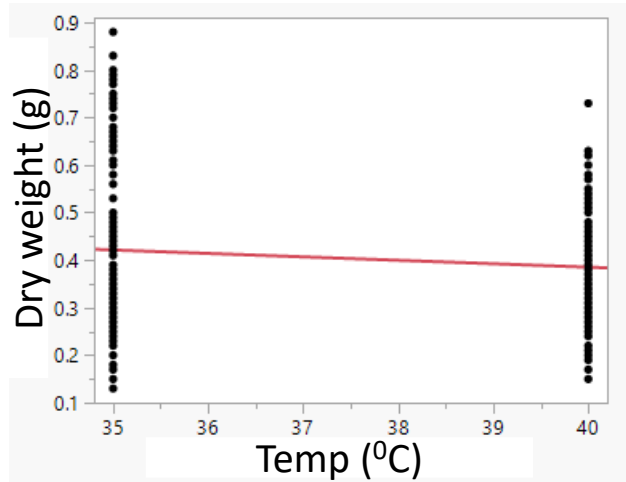
40 °C – 200
Kg oil / dunam

45 °C – 63.5
Kg oil / dunam

35



40

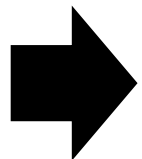


$$\text{Dry weight} = 0.675 - 0.00725 * \text{temp}$$

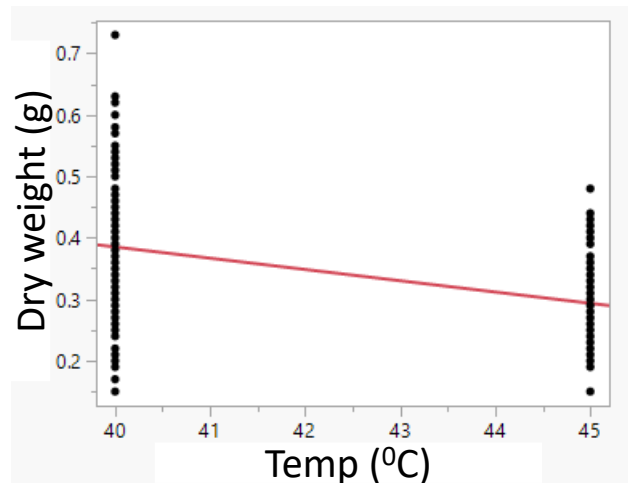
For each
degree,
1.7% of the
yield

70%

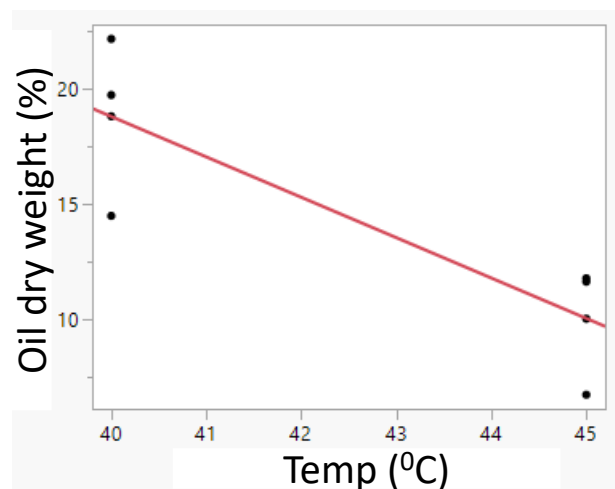
40



45



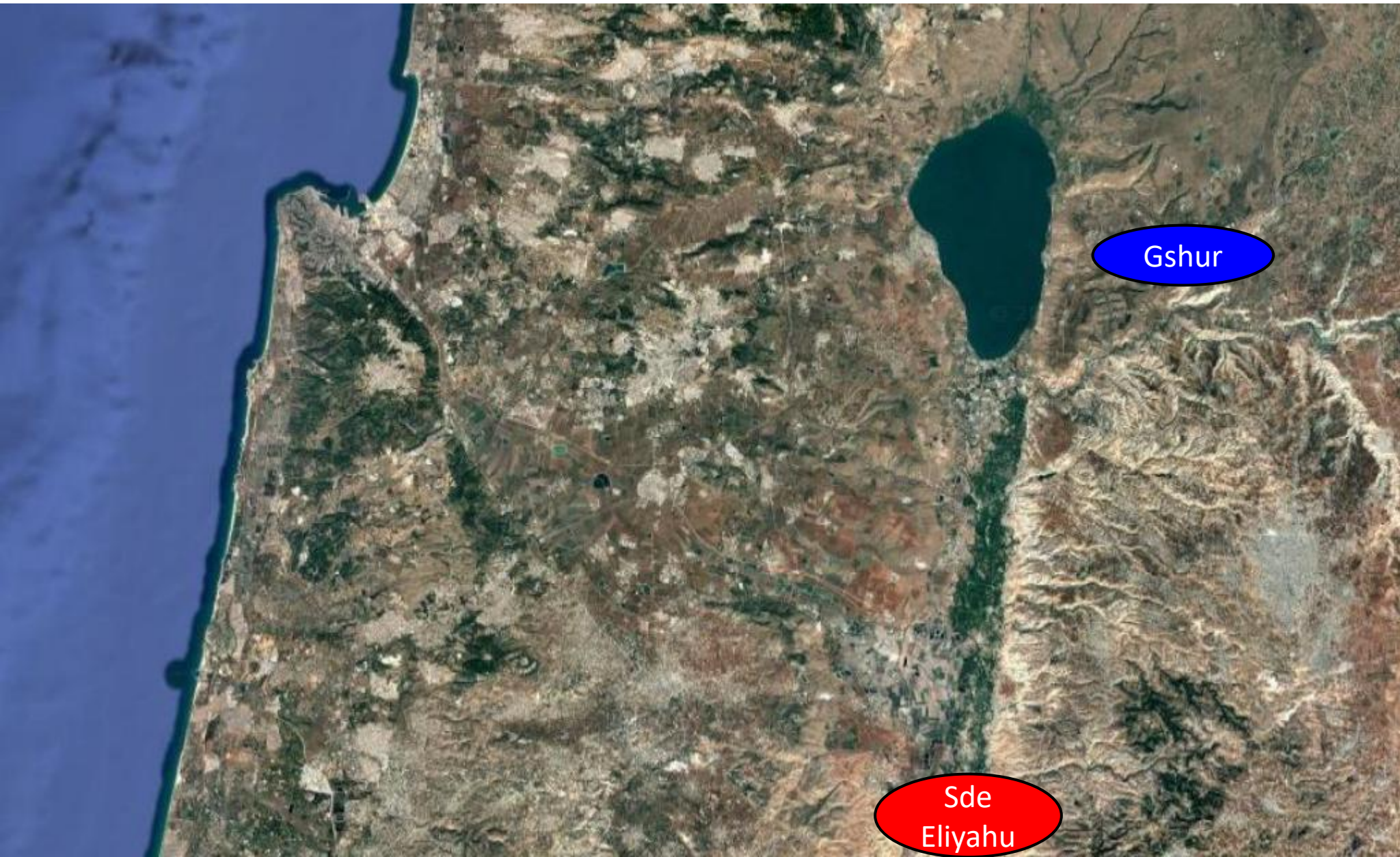
$$\text{Dry weight} = 1.12 - 0.0184 * \text{temp}$$

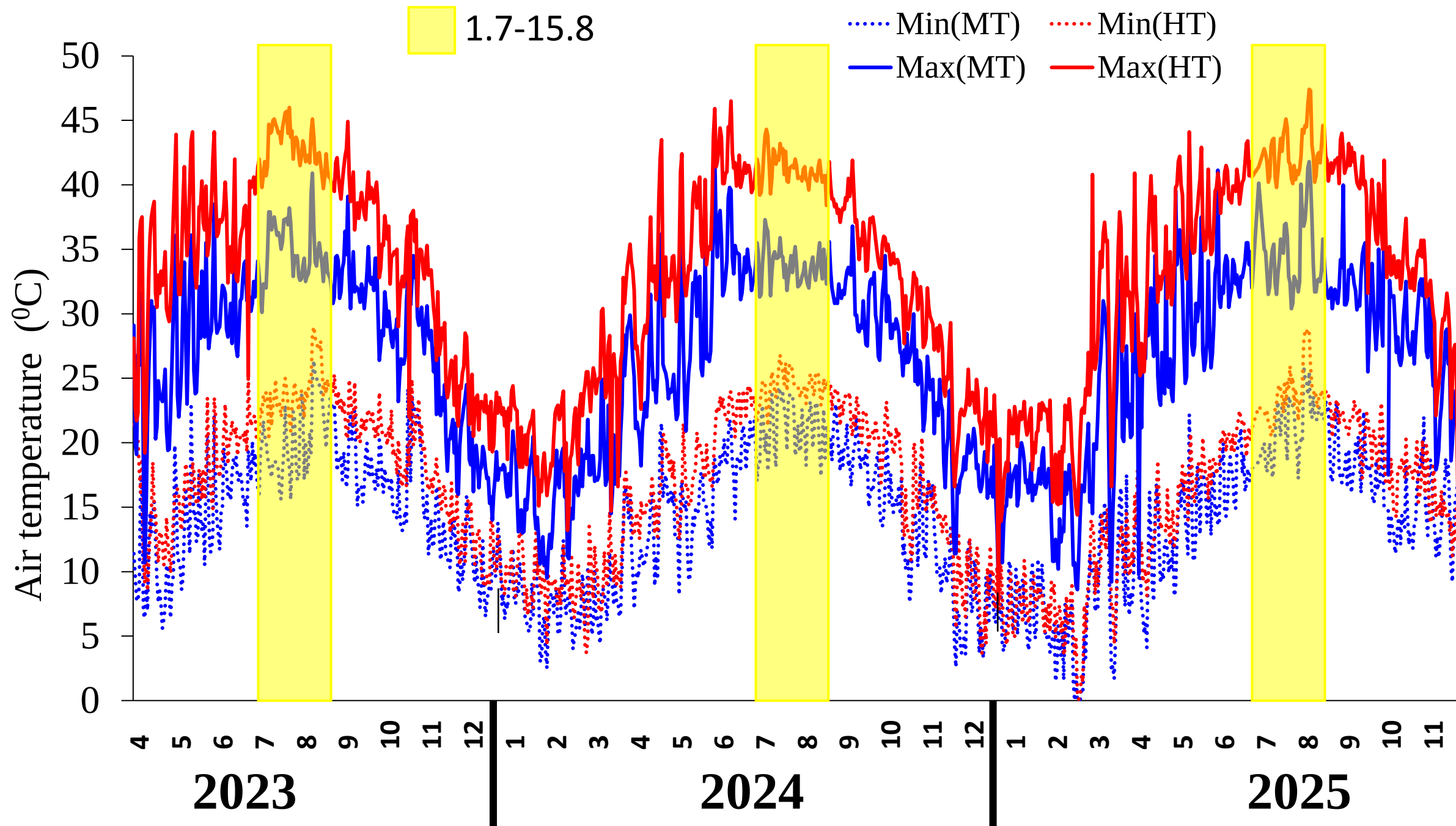


$$\text{Oil} = 88.68 - 1.747 * \text{temp}$$

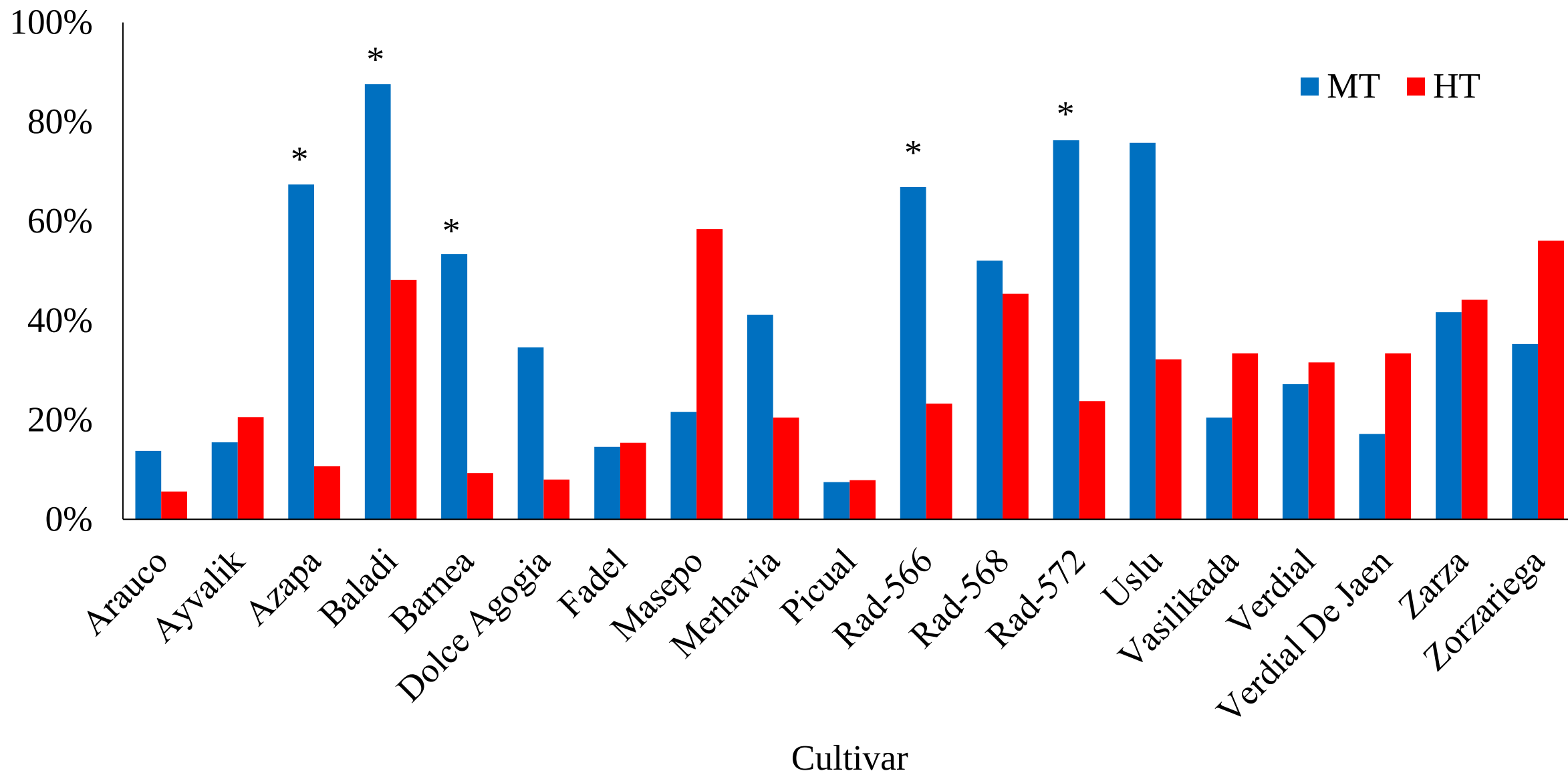
For each
degree,
13.65% of
the yield

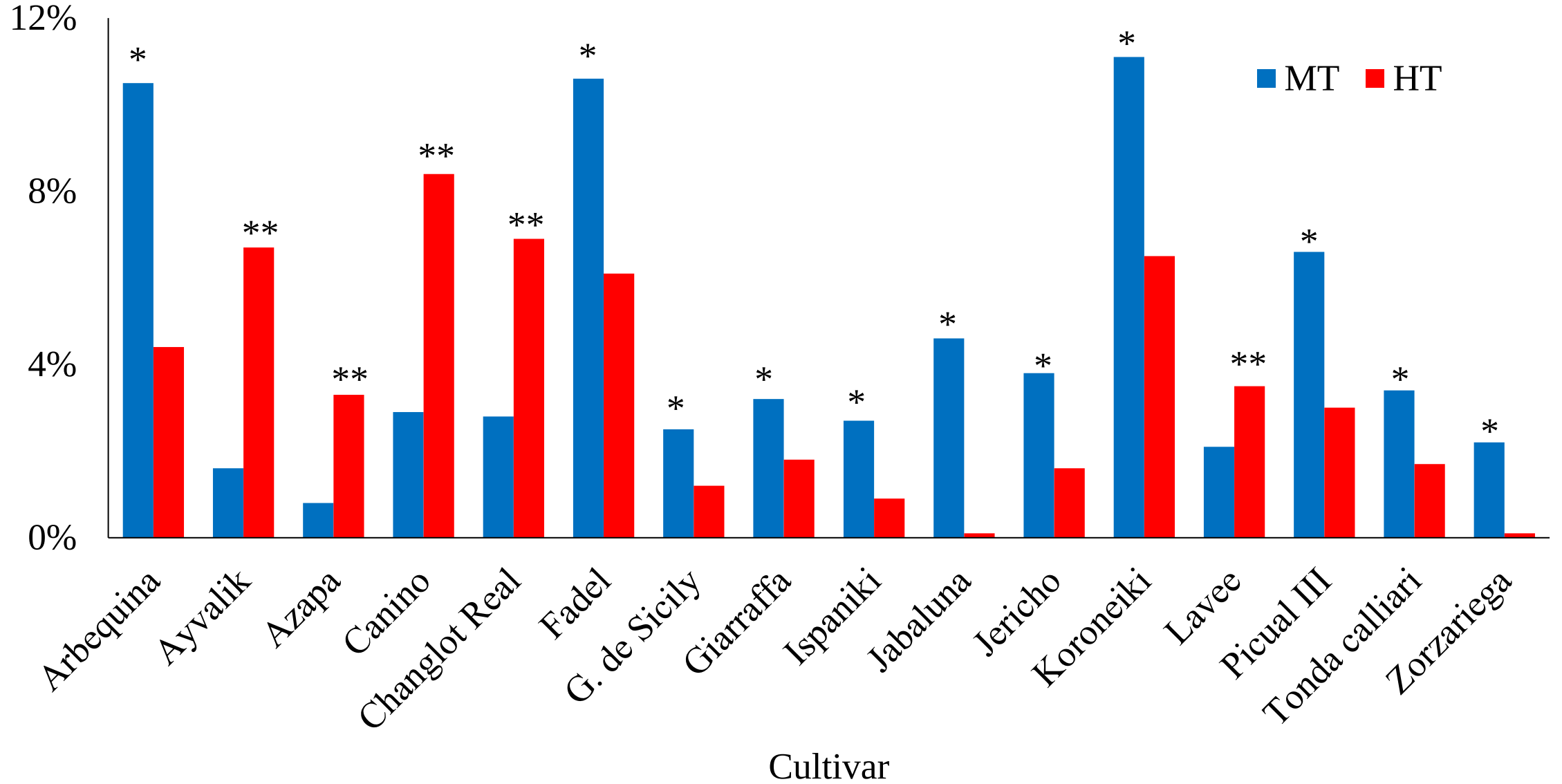
The Israeli germplasm – Planted in 2019

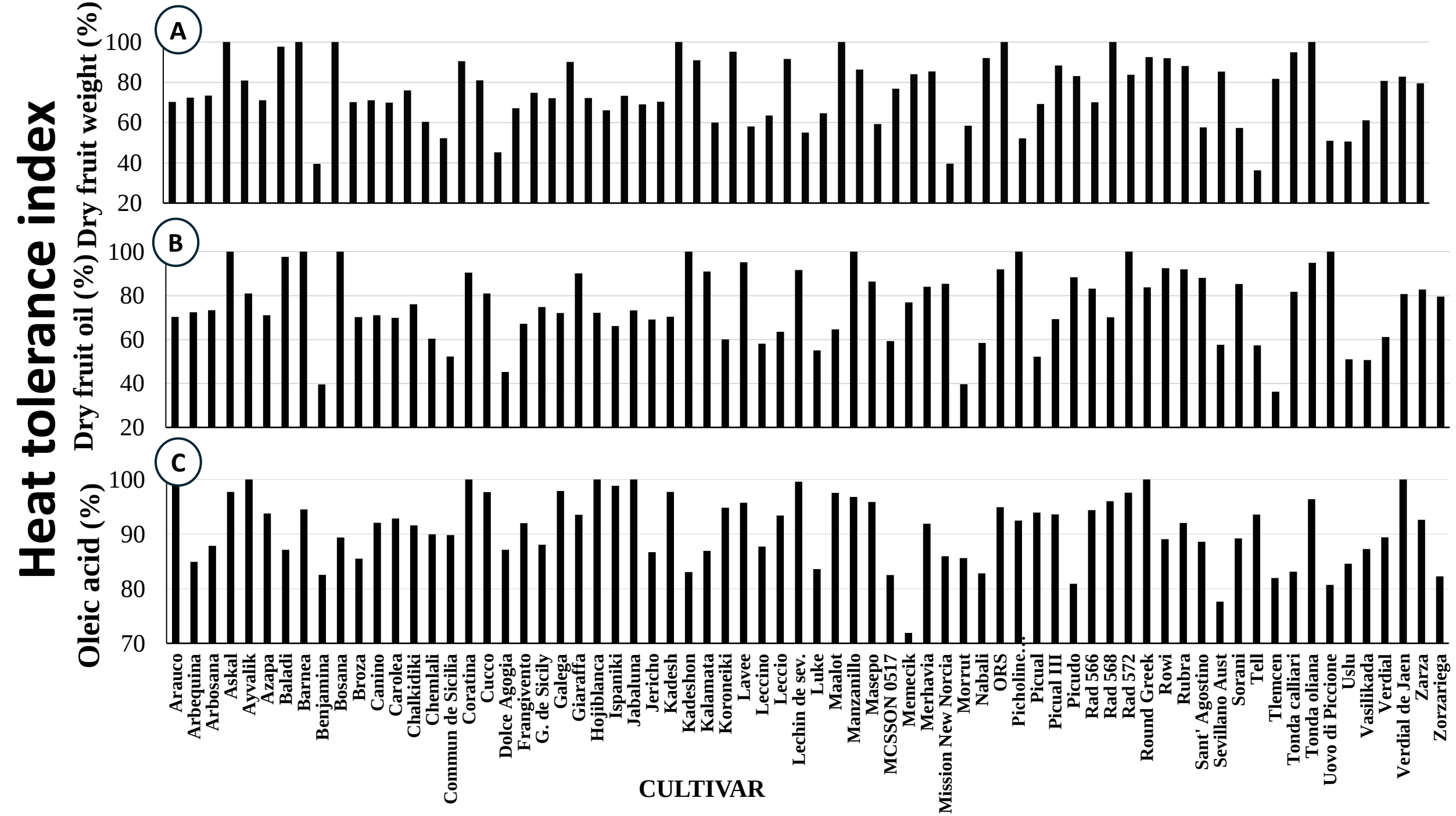




Flowering after an off-year







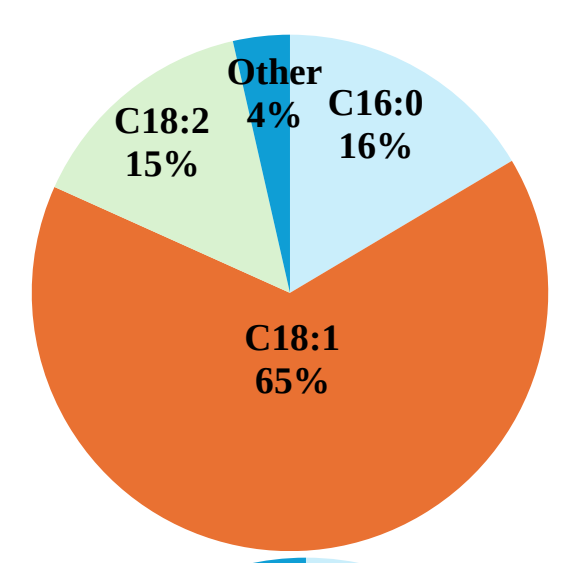
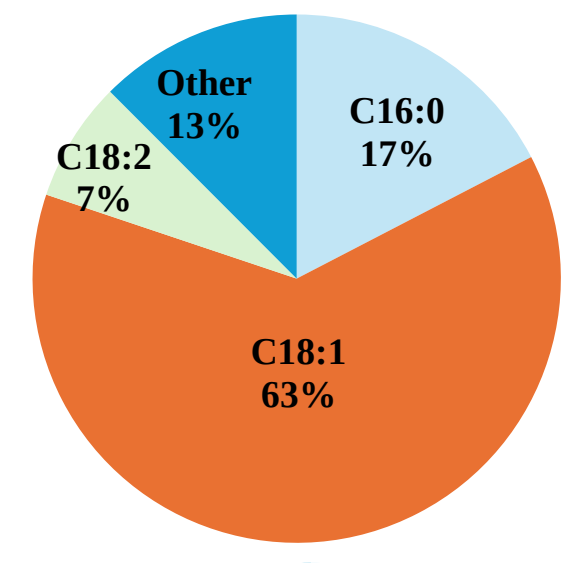
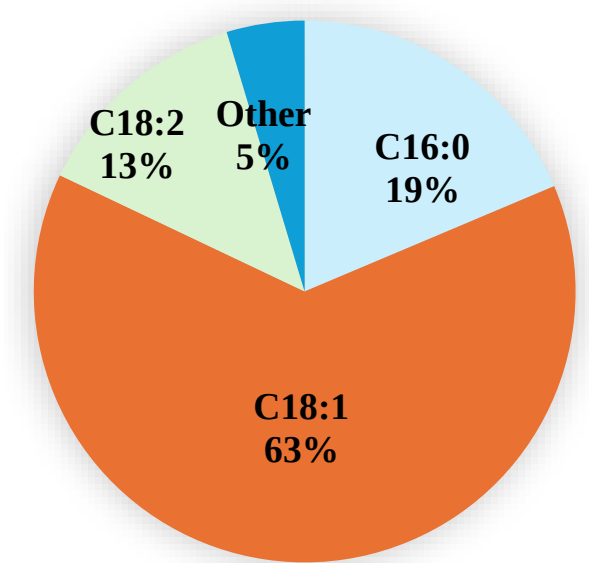
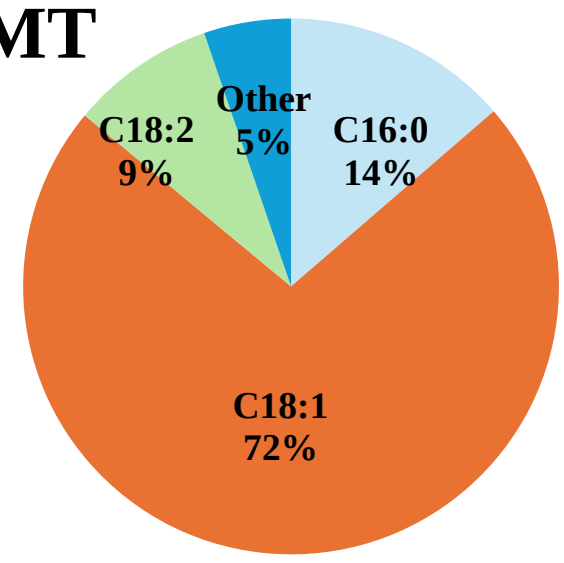
'Askal'

MT

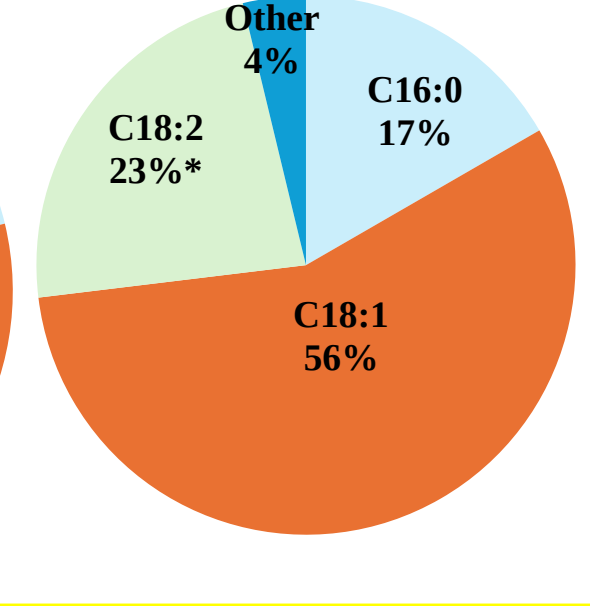
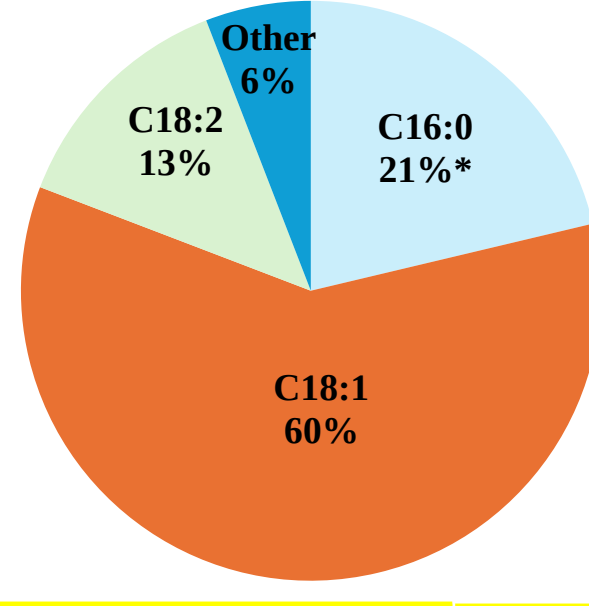
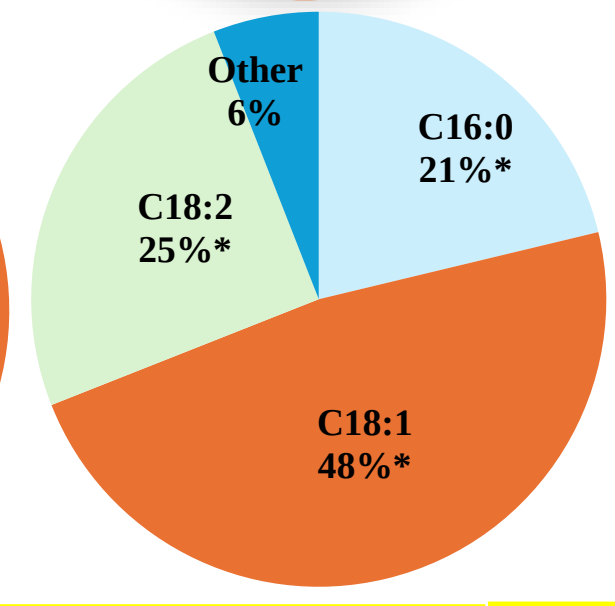
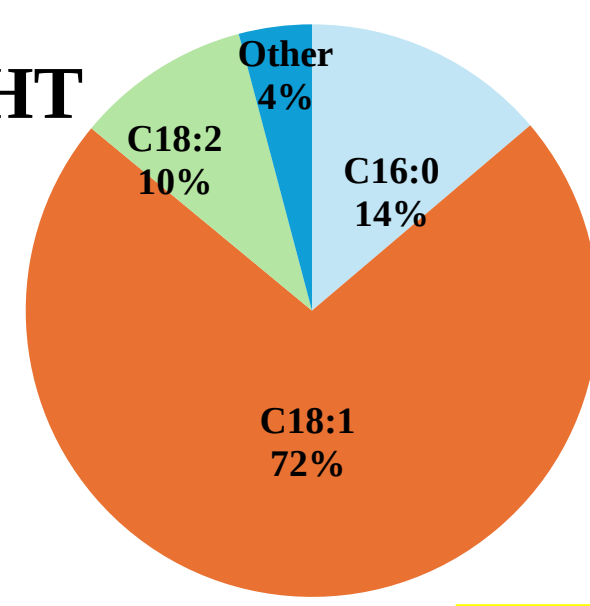
'Arbequina'

'Arbosana'

'Sorani'

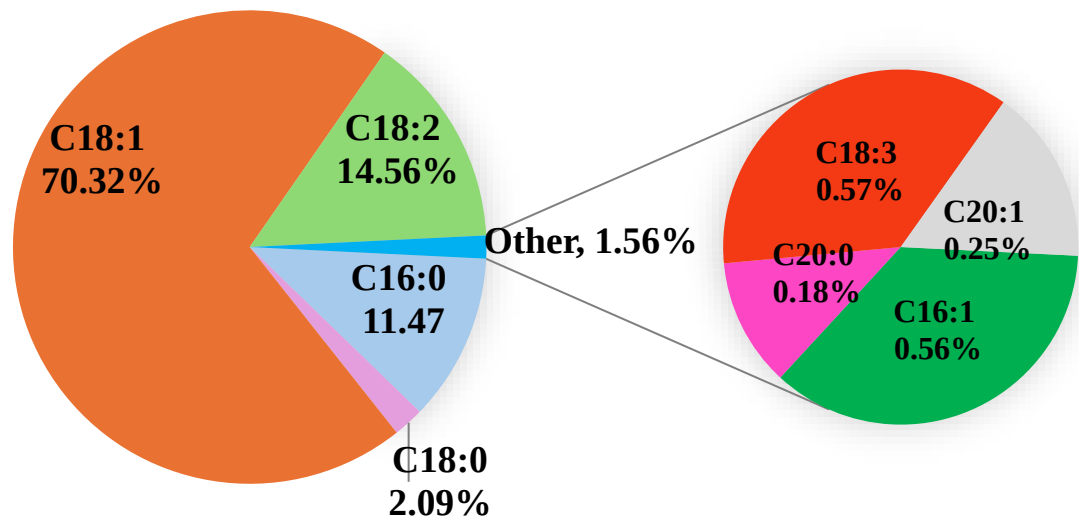


HT

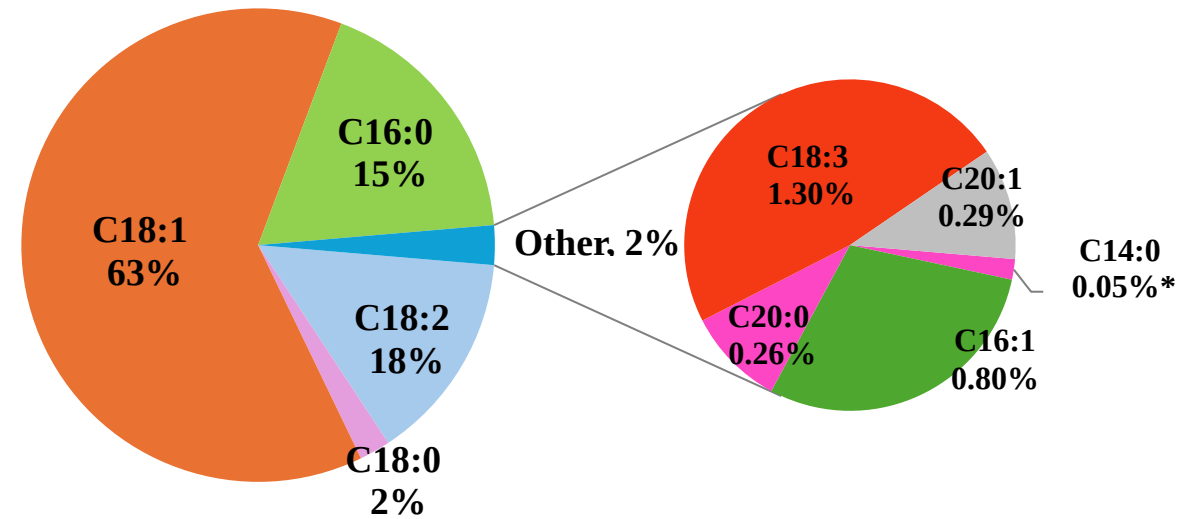


Fatty acid composition			Fatty acid composition			Fatty acid composition - IOC		
Formula	Fatty acid		Formula	Fatty acid		Formula	Fatty acid	%
C18:1	Oleic acid		C16:0	Palmitic acid		C18:2	Linoleic acid	2.50 - 21.00

'Veridal' MT

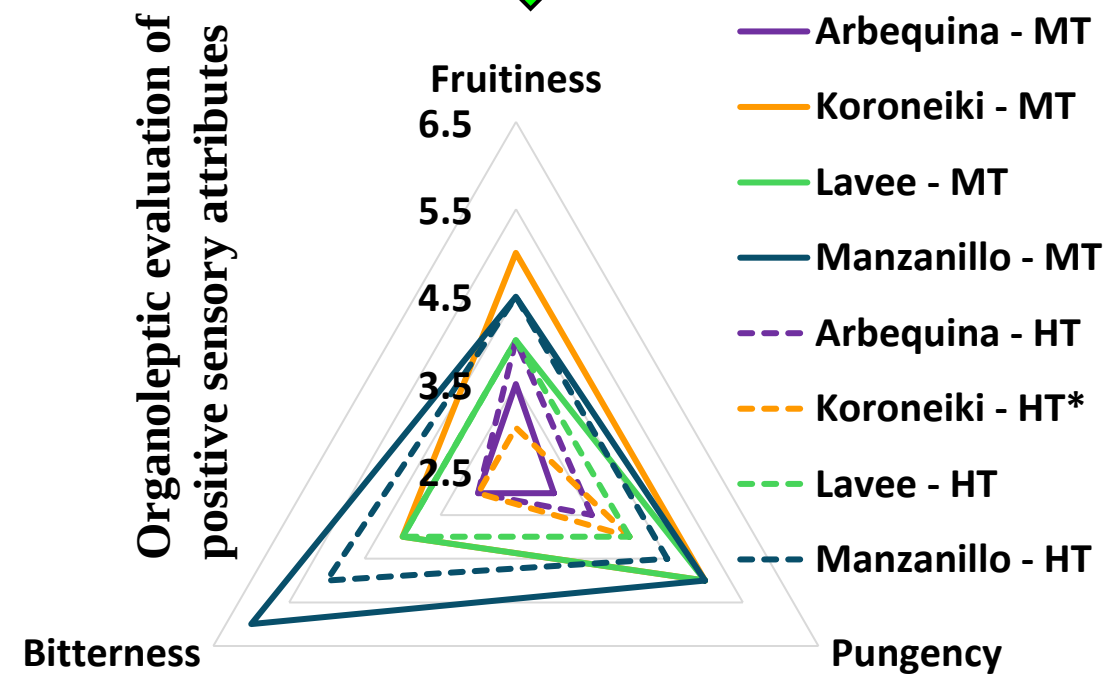
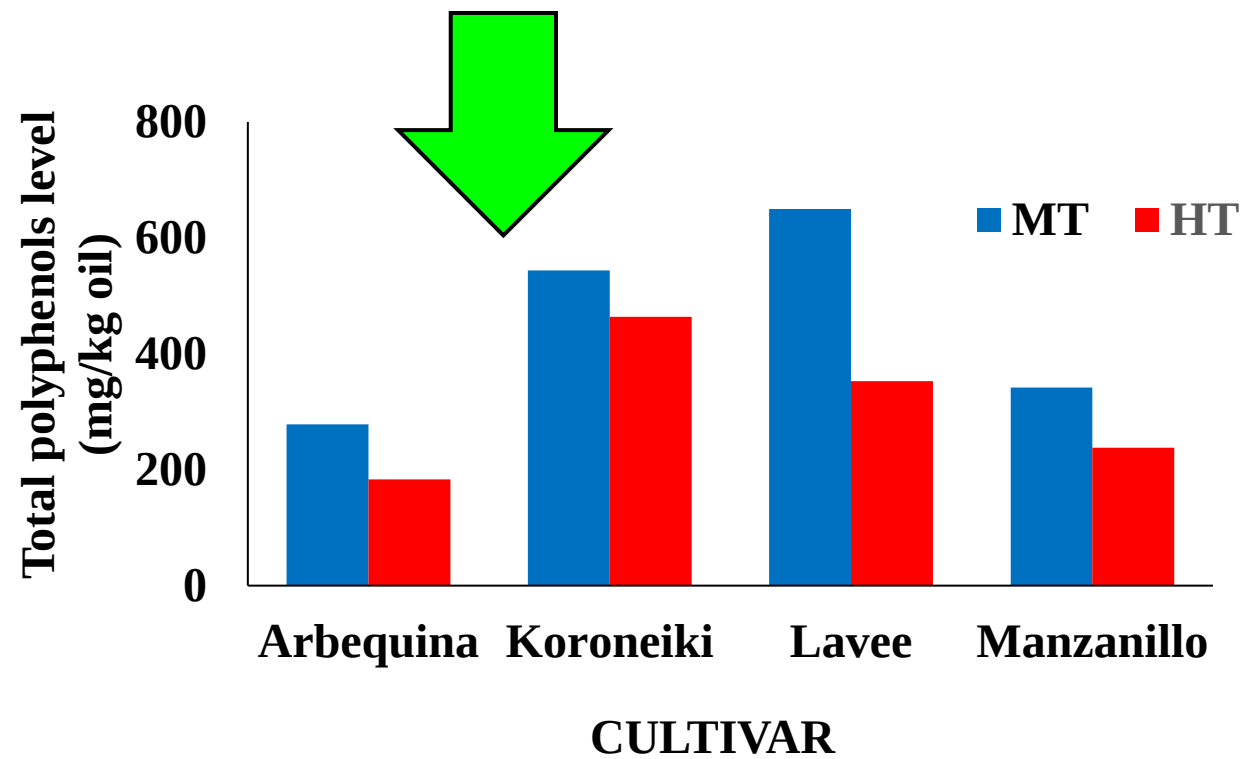
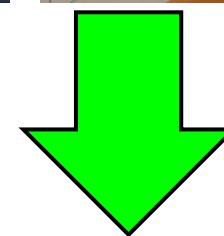
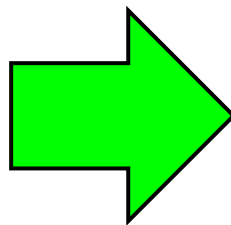


HT

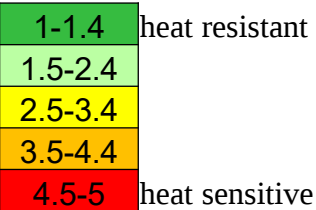


■ Palmitic acid ■ Stearic acid ■ Oleic acid
■ Linoleic acid ■ . *Myristic acid ■ . Palmitoleic acid
■ . Arachidic acid ■ . Linolenic acid ■ . Gadoleic acid

Fatty acid composition - IOC		
Formula	Fatty acid	%
C14:0	Myristic acid	< 0.03
C16:0	Palmitic acid	7.00 - 20.00
C18:1	Oleic acid	55.00 - 85.00
C18:2	Linoleic acid	2.50 - 21.00
C18:3	Linolenic acid	< 1.00



Cultivar	Fruit set	Fruit weight	Oil content	Oil quality	Ranking
Askal					1.0
Rad 572					1.0
Lavee					1.3
Tonda oliana					1.3
Chalkidiki					1.7
Barnea					1.8
Rad 566					1.8
Ayvalik					2.0
Cucco					2.0
Kadesh					2.0
Kadeshon					2.0
Lechin de sev.					2.0
Round Greek					2.0
Bosana					2.3
Jabaluna					2.3
Kalamata					2.3
Manzanillo					2.3
Merhavia					2.3
Picudo					2.3
Uovo di Piccione					2.3
ORS					2.3
Azapa					2.5
Canino					2.5
Galega					2.5
Giaraffa					2.5
Masepo					2.5
Memecik					2.5
Rad 568					2.5
Rowi					2.5
San' Agostino					2.5
Sevillano					2.5
Verdial					2.5
Leccino					2.8
Picual					2.8
Picual III					2.8
Rubra					2.8
Tell					2.8
Zarza					2.8
Arbosana					3.0
Baladi					3.0
Coratina					3.0
Frangivento					3.0
Hojiblanca					3.0
Ispaniki					3.0
Maalot					3.0
Mission					3.0
Picholine Languedoc					3.0
Verdial de Jaen					3.0
Arauco					3.3
Broza					3.3
Jericho					3.3
Morrut					3.3
Uslu					3.3
Leccio					3.3
Chemlali					3.5
Koroneiki					3.5
Nabali					3.5
Sorani					3.5
Tlencen					3.5
Zorzariega					3.5
Carolea					3.8
G. de Sicily					3.8
Lucques					3.8
MCSSON 0517					3.8
Tonda calliari					3.8
Vasilikada					3.8
Benjamina					4.0
Commun de Sicilia					4.0
Dolce Agogia					4.0
Arbequina					4.5



Heat tolerance index - Productivity

Cultivar	Ranking
Askal	1.0
Rad 572	1.0
Lavee	1.3
Barnea	1.8
Kalamata	2.3
Manzanillo	2.3
Picual	2.8
Arbosana	3.0
Coratina	3.0
Picholine Languedoc	3.0
Koroneiki	3.5
Arbequina	4.5

The Israeli
international
olive
germplasm

Thanks

