



”Climate change is real and the most urgent threat to the entire species ..and will seriously affect us all”

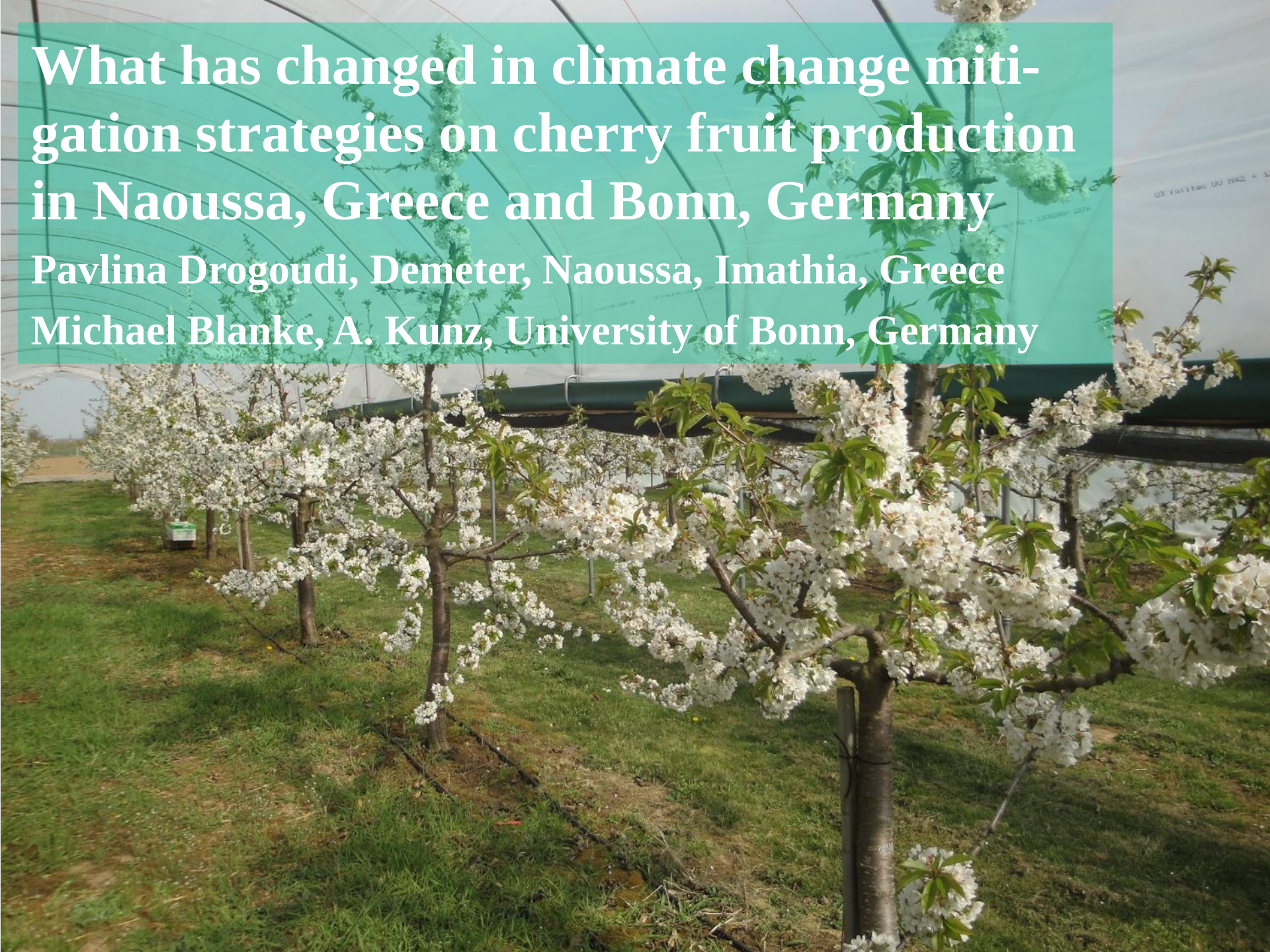
**Leonardo Dicaprio, Oscar Award winner,
Los Angeles, 29 February 2016.**



What has changed in climate change mitigation strategies on cherry fruit production in Naoussa, Greece and Bonn, Germany

Pavlina Drogoudi, Demeter, Naoussa, Imathia, Greece

Michael Blanke, A. Kunz, University of Bonn, Germany

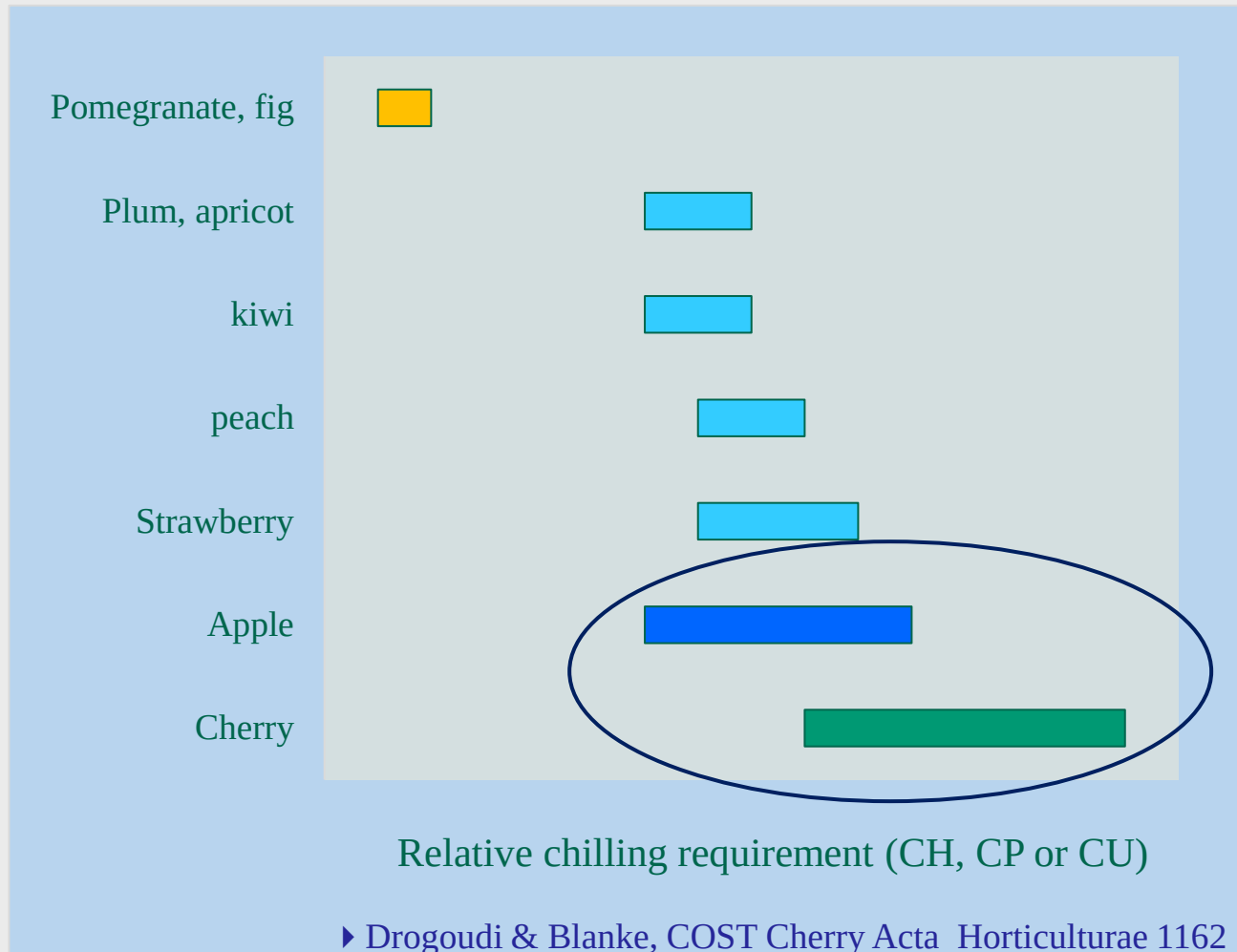


1 Effect of climate change on vulnerability of cherry production Greece-Germany

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- (1) Chilling (warm winter)
- (2) Flower advancement (warm winter)
- (3) Early spring frost (due to 2)
- (4) Late spring frost (not due to 2) - new
- (5) Adverse weather (heavy rain) – new
- (6) Mitigation strategies
- (7) Vulnerability of med growing regions



2 Why cherry - cherry is particularly prone to climate change



► Apple and cherry => **largest chilling** requirement of all fruit crops



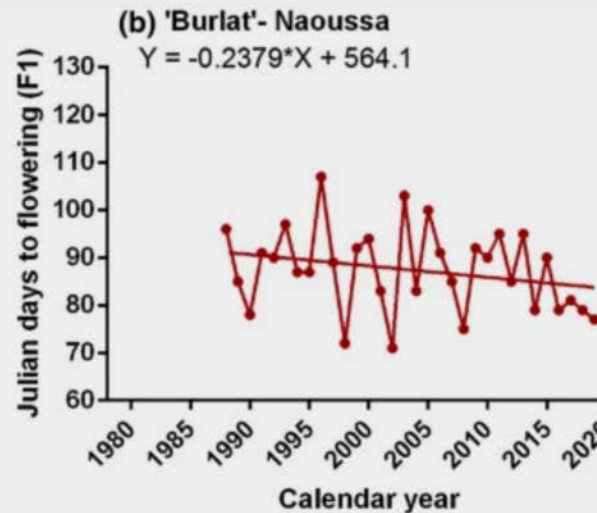
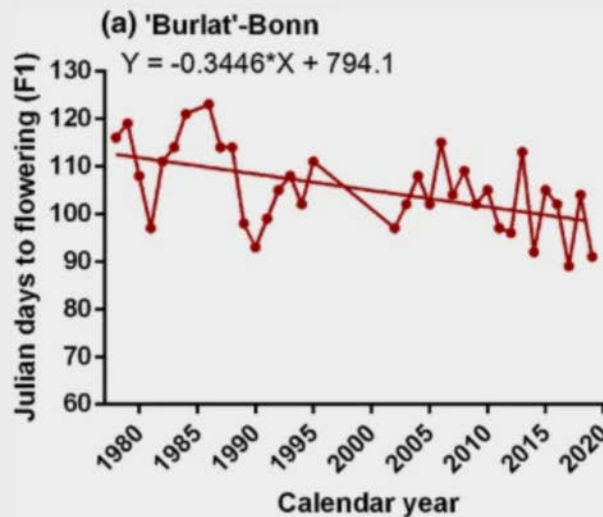
3 Flower advancement (due to warmer winters)

Parameter	Naoussa, Imathia, Greece	Meckenheim, Bonn, Germany
Latitude	37-40°N	50°N
Precipitation	690 mm	600 mm
Altitude	119 m	170 m
Temp (annual mean)	15.7 (+1.3) °C	9.8 (+1.45) °C
Flower cv. 'Burlat'	30 March	12 April
Chilling (CH)	1100-1300 CH	950- 1350 CH



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► Bonn 7 days,
 Naoussa 1-5 days
 cherry flower
 advancement

Drogoudi & Blanke 2020, Effects of climate change on cherry production in...

Euro Med J for Environmental Integration (open access)



4 Risk of frost

- due to warmer winters and flowering advancement

➤ Number of frost days in Bonn

Period	March	April	May
1958 - 2019	4.4	2.5	0.4
1958 - 1987	5.0	2.5	0.5
1988 - 2019	3.8	2.8	0.3



➤ Naoussa

Period	March	April	May
1984-2000	4.8	0.5	0
2001-2019	1.3	0.3	0

► risk of frost at Bonn remains, because frost coincides with earlier flowering, but higher than at Naoussa





5 What has changed-what is new?

- Spring frost after flowering:
Cherry, apple, apricot
- Night temperatures in May 2020
dry bulb -0.5°C to -1°C
wet temperature -1.5°C to -2°C
- applies to
cherry,
apricot,
apple,
plum



5 What has changed- what is new?

- **No** wind machines, because..
- **No** overhead sprinklers, because..



© photos M. Blanke, Bonn



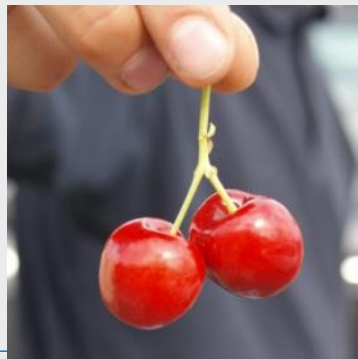
5 What has changed- what is new?

- **No** wind machines, because..
- **No** overhead sprinklers, because..
- **New mitigation strategies**
 - paraffin candles
 - under canopy sprinklers



6 Adverse weather during flowering and fruiting can cause

- Pollen stick together
- Insufficient bee activity
- Insufficient pollination
- Fruitlet abscission I
- double pistil- 'doppio'
- Small fruit
- Low yield
- Fruit cracking



7 Summary- Climate resilience and vulnerability

Climate impact	Bonn, Germany	Naoussa, Imathia
Chilling	NO (fulfilled)	No (fulfilled)
Flower advance	7 days	1-5 days
Frost coincides	Yes	No
Risk of frost	Yes	No
Pollination	OK	Yes
Risk of late frost	Yes	No
Drought and heat	Yes	No
Heavy rain	No	Yes



- Cherry production in both Bonn, Germany and Naoussa, Imathia, fairly climate resilient unlike med climate
- Similar climate for the Pilon apple region.. or the plum island Skopelos



Epharisto Ευχαριστώ

- for your attention,
- Kostas & team for the invite & the COST Cherry Project FA 1104
- many coworkers and those recording weather data for 40 years
- “Project“ ResearchGate: “Forcing sweet cherry“

Further reading

- ▶ Drogoudi & Blanke, 2020. Effects of climate change.. Euro Med J for Environmental Integration (open access)
<https://doi.org/10.1007/s41207-020-0146-5>
- ▶ Climate change, modeling and phenology. COST Acta Hort 1058 (ISHS)
- ▶ Cherries, a CABI book, UK, 2018

