

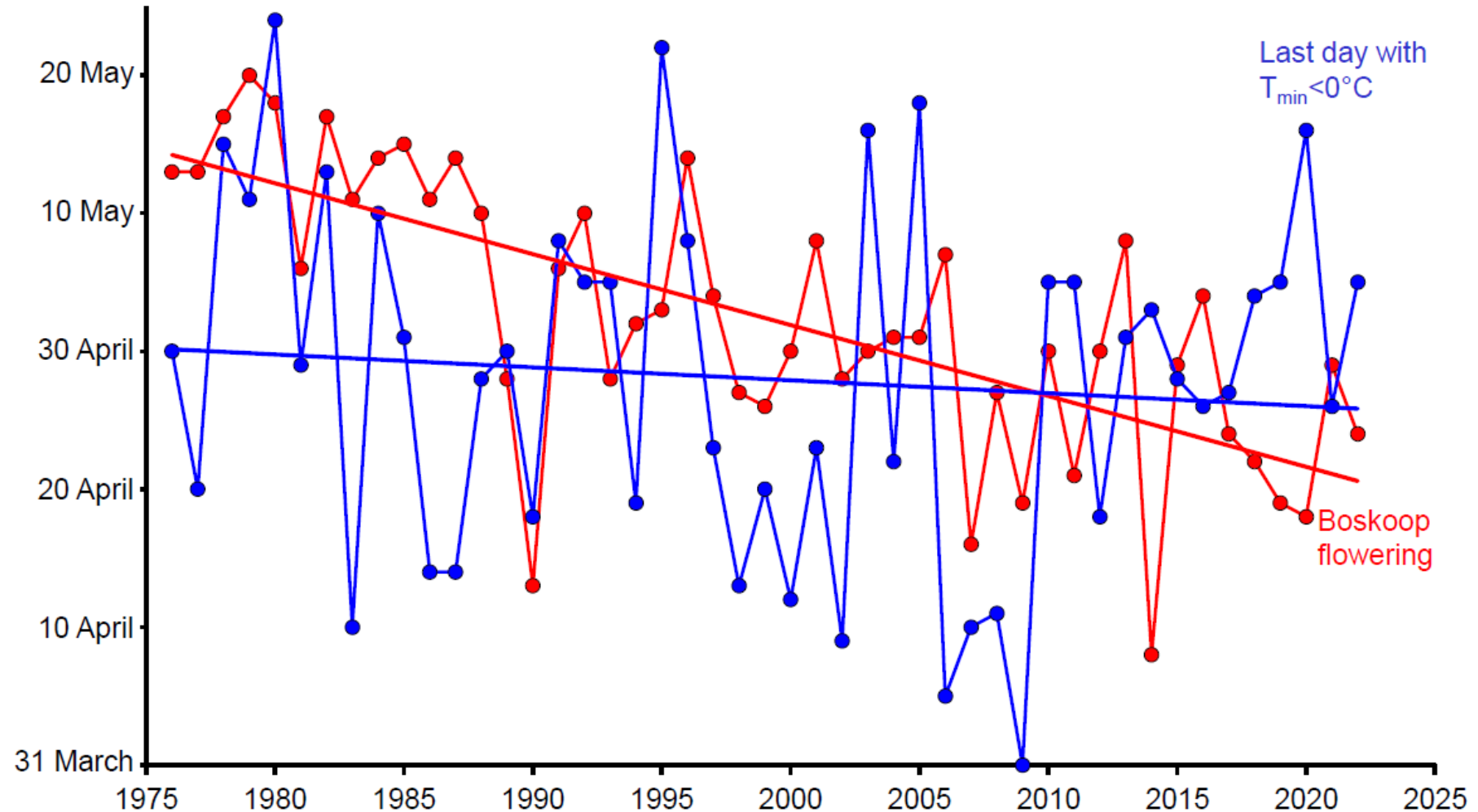
FROSTPROINNO

INNOVATIVE LØSNINGER TIL FORBEDRET BESKYTTELSE AF BLOMSTER MOD SEN FORÅRSFROST I FRUGTPLANTAGER



15-25 irrigation
nights in 2020

Apple blossom and late frost



FrostProInno GUDP Projekt: Innovative løsninger til forbederet beskyttelse af blomster mod sen forårsfrost i frugtplantager. Fokus æbler men også lidt pære og sødkirsebær.

Start 1 august 2023 - slut 31/7 2027 (4 år)

Maximal tilskud: 6.283.631 kr budget total på 8,01 mill kr.

Partnere: Institut for Fødevarer (projektleder Martin Jensen, wp leder: Antonios Petridis), Ålborg Universitet (Majken Pagter), Hortiadvise (Maya og Rasmus), Egeby Frugtplantage (Henning Jensen), Kærsbo Frugtplantage (Jan Jager).

Arbejdspakker:

WP1: Projektledelse/ Martin

WP2: Effekt af kemiske midler/produkter, forsinkelse af blomstring eller antifrost effekt / Majken

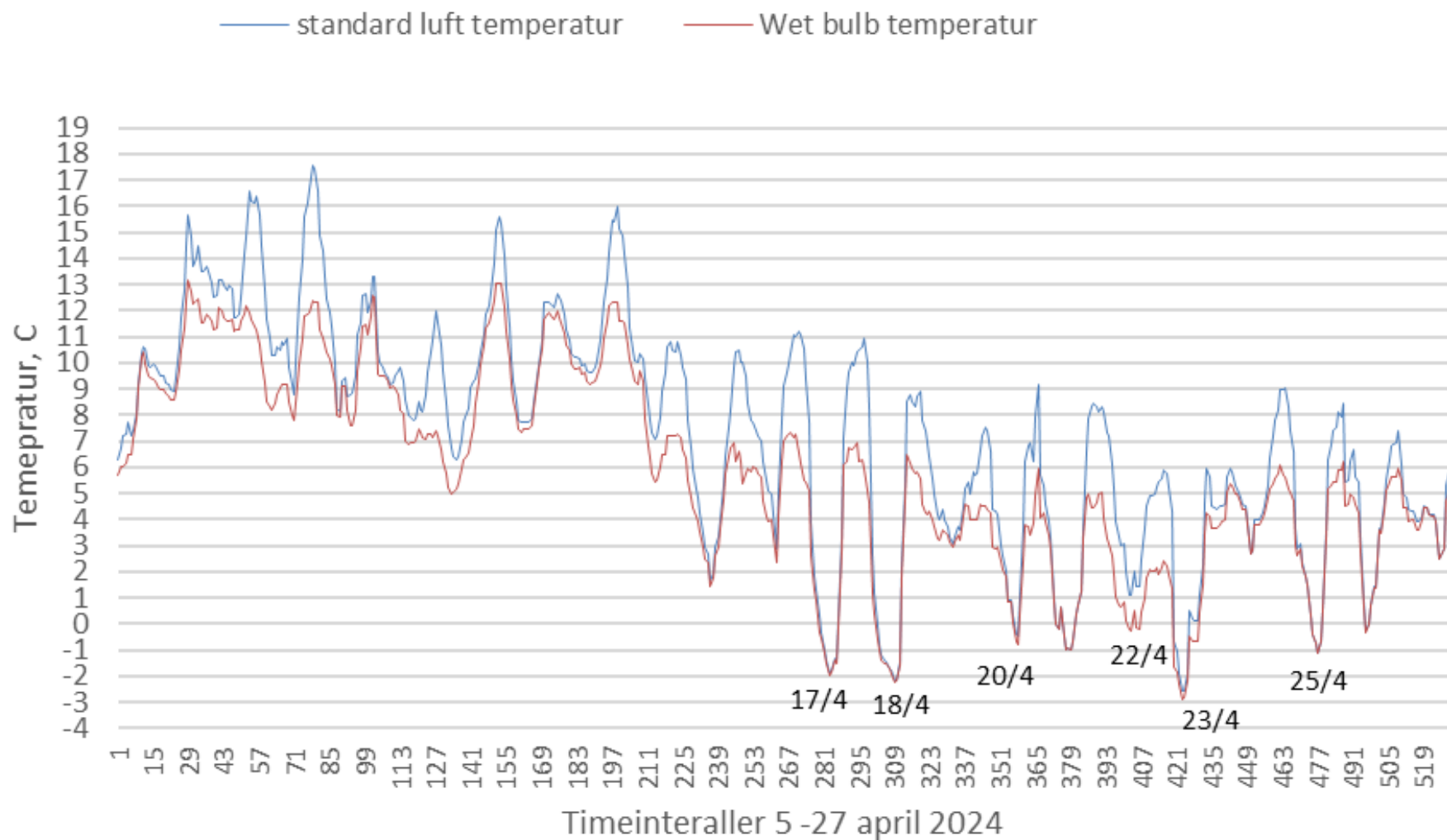
WP3: Fog 'tåge' systemer (sammenhold med vind maskiner og frostvanding/ Martin

WP4: Blomstringstidspunkt og frostfølsomhed af sorter og grundstamme effekter/ Antonios

WP5: Bedre sensorer og temperatur målinger – warning system, level /Martin – Antonios

WP6: Biokemiske, biofysiske indikatorer for frostfølsomhed i knopper/ Majken and Antonios

Frostdage og temperaturmåling i AU AUNING



SENCROP klimastation
– Raincrop + Leafcrop
units, standard
ventileret luft temp og
'blad'temperatur



Sencrop Data til
RIMPRO- skurv varslings

FROSTIE varslingsystem – frost sprinklere

Soilsense- jordfugtighed



Projekthjemmeside ved Institut for fødevarer:

<https://food.au.dk/frostproinno>

Omtale ved AU-AUNING forsøgsstation åbning 8. August 2023

Indlæg Avlerbesøg i AU AUNING 27. juni 2024 / Gartnertidende omtale.

Adskillige **online** input om projektet, forår 2024 f.eks. Hennings erfaring med vindmaskine i 2024 / Maya, Henning.

Poster om forsøg på Symposium 2024/Majken, se hjemmesiden

DMI vejret DR TV 13 december 2024 - indlæg af Majken om FROSTPROINNO

https://www.dr.dk/drtv/serie/vores-vejr_7104

FrostProlInno

INNOVATIVE SOLUTIONS FOR IMPROVED SPRING FROST PROTECTION OF FLOWERS IN FRUIT ORCHARDS

ANTHONIS PERBERG, HANSEN-PEDERSEN, HASTEN & JENSEN
DEPARTMENT OF FOOD SCIENCE, AARHUS UNIVERSITY, AARS FOOD PARK 86.30, AARHUS
 DEPARTMENT OF CHEMISTRY AND BIOCHEMICAL SCIENCES UNIVERSITY FOR ALBORG EAST



In Denmark, late spring frosts damage the flower buds of fruit trees, resulting in severe losses in fruit yield and a reduction in orchard revenue. Climate warming exacerbates the problem because it advances flowering time and accelerates loss of flower-bud freezing tolerance, but the last day of spring frost does not change accordingly. New, efficient, and sustainable frost protection methods are therefore urgently needed, as current methods are either inefficient in protecting fruit trees against late spring frosts or environmentally unsustainable.

FrostProlInno

The project will test and develop new and innovative solutions to protect flower buds and flowers from spring frost with the aim to reduce frost damage and obtain higher and stable fruit yields and thus lower the environmental footprints per produced fruit.

The work is led by AU FOOD and done in close collaboration with Aarhus University, HortiAdvice, Kærbo Fruit Orchard and Egeby Fruit Orchard.

WORK PACKAGES

WP1. Application of frost protective compounds



Vegetable oil



Helatonin

Figure 1: Examples of frost protective compounds applied on fruit trees.

WP2. Testing of fog systems to avoid temperature drop and irradiation frost damage




<https://fogdiagon.eu/en/> <https://www.transveugen.nl/wiki/publog-en/?lang=en>

Figure 2: Examples of fog systems

OBJECTIVES

- Test new frost protection tools - **protective compounds, fog-systems, rootstocks** - that are more efficient and environmentally and economically sustainable and compare to known methods (irrigation, wind machine).
- Examine the use of **microclimate sensors** for better risk prediction.
- Provide better **indicators** of flower bud freezing tolerance for precise warning.

WP3. Frost-tolerant apple cultivars and rootstocks



Figure 3: Grafted apple plants. Experiments could increase frost tolerance of grafted cultivars in early flowering.

WP4. Better microclimate sensors for risk prediction



Figure 4: Microclimate sensors could improve prediction of frost damage risk and lead to timely frost protection decisions.

WP5. Bio-indicators of flower bud freezing tolerance



Figure 5: Freezing tolerance and changes in leaf indicators (e.g., fatty acids) are determined in different phenological stages of apple floral buds.


 AARHUS UNIVERSITY
UNIVERSITETSKAMPUS ØST


 AALBORG UNIVERSITY



KÆRBO FRUGTPLANTAGE


 EGEBY FRUGTPLANTAGE


GROUNDED UNDER PRESSURE