Preventing heat stress in dairy farm

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Global warming: more than a perception
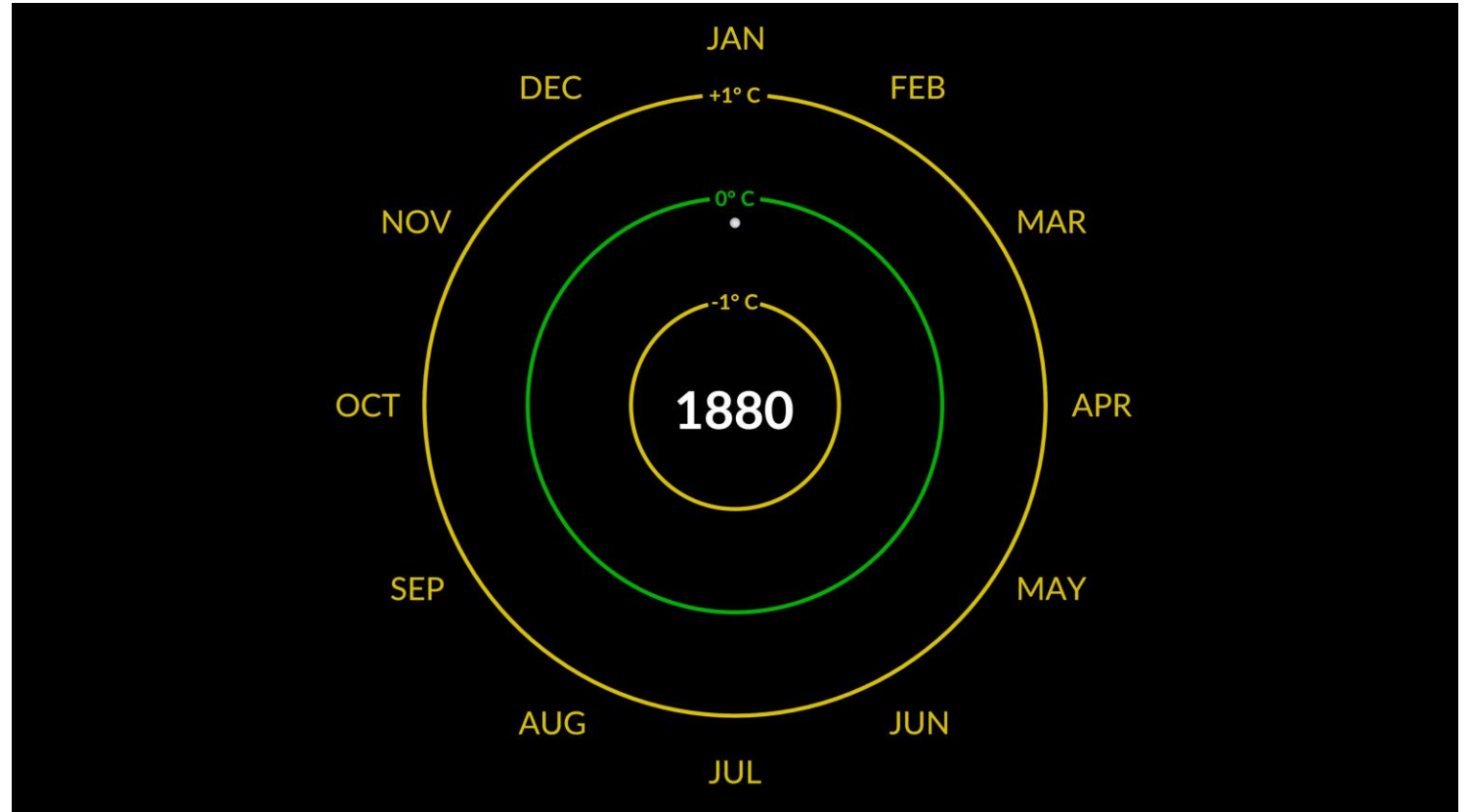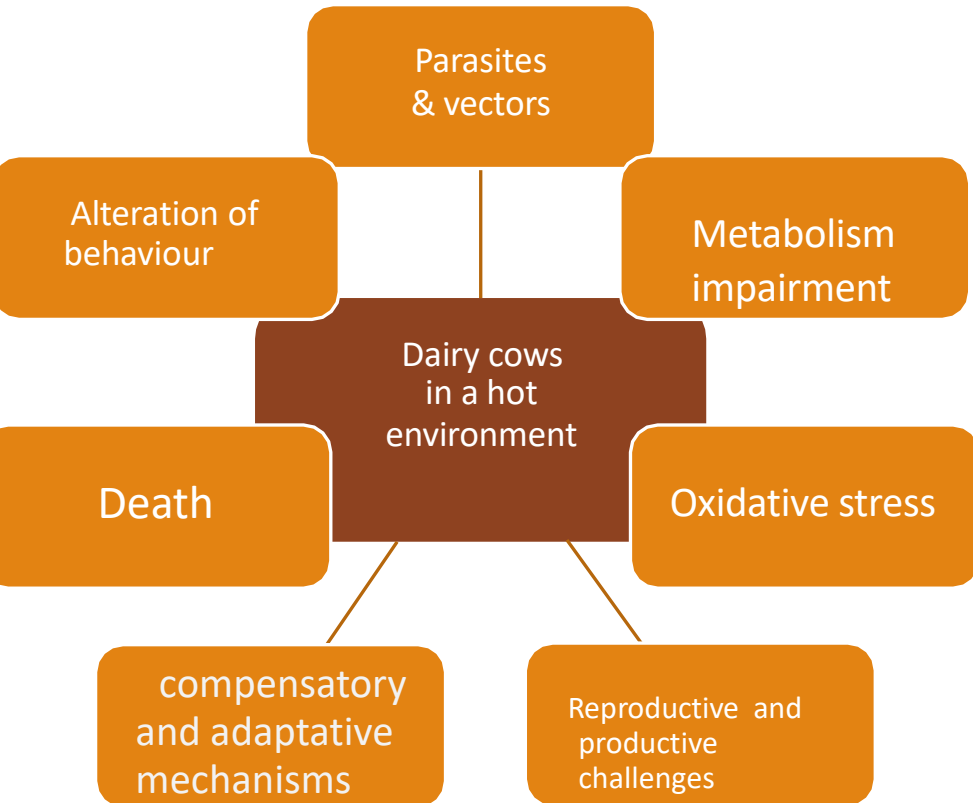
AIA: two levels integrated approaches

|	
OUTDOOR	**CLIMATE THI forecast**
	CLIMATE THI detection
INDOOR	**MICROCLIMATE THI tracking**
	SUMMER to WINTER report

THI forcast

COSMO-IT forecasting model (data from Italian Airforce meteo service)

48h Tm and Hu forecast downloaded twice/day (6.00 AM
and 6.00 PM)

Interpolation from grid nodes to exact farm GPS location

48h THI forcast following NRC. 1971. A Guide to Environmental
Research on Animals. National Academies of Sciences, Washington,
DC.

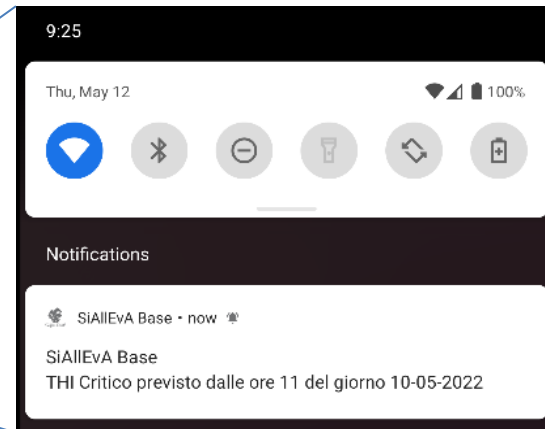THI $(((1.8 * T + 32) - (0.55 - (0.55 * U/100)) * (((1.8 * T + 32) - 58)))$

2.2 km
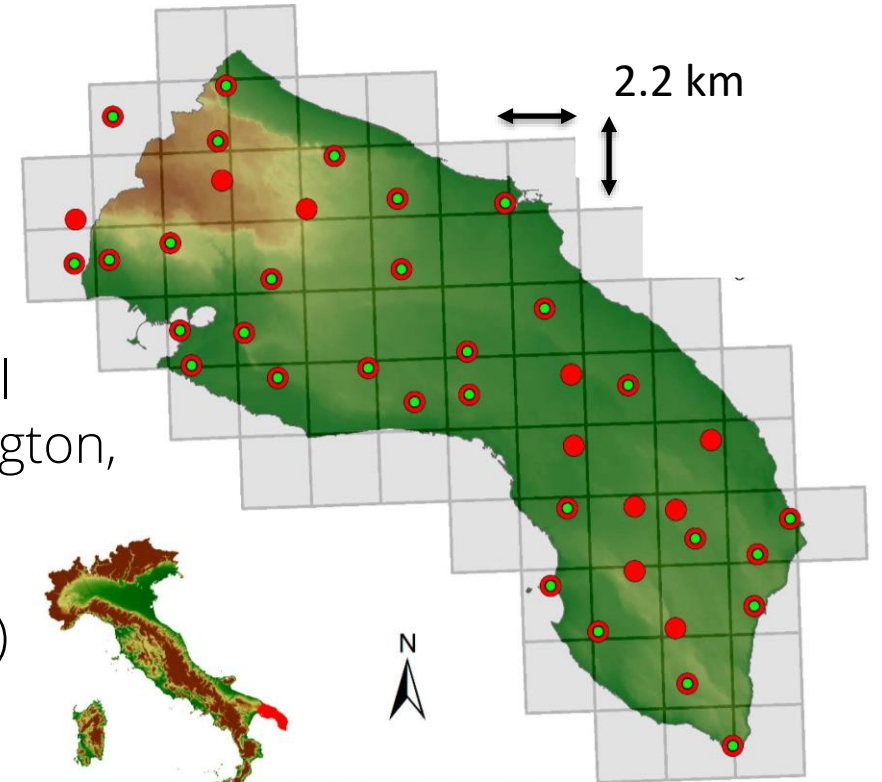
from THI forcast to THI alert

Si@lleva free App

Mobile

push notification

THI <= 70 🟢
70 < THI <= 75 🟡
THI > 75 🔴

9:25

Thu, May 12

Notifications

SiAllEvA Base • now
SiAllEvA Base
THI Critico previsto dalle ore 11 del giorno 10-05-2022

10:42

Previsioni THI

Insediamento 1-001RG001

Data e ora	Temp (°C)	Umidità	THI	
10/05/2022				
12:00	20.5	58.8	66	🟢
13:00	22.7	77.9	70	🟢
14:00	24.3	85.6	75	🟡
11/05/2022				
12:00	27.1	94.0	80	🔴 ⚠️
13:00	28.1	92.7	81	🔴 ⚠️
14:00	28.9	93.1	81	🔴 ⚠️
15:00	30.4	92.1	85	🔴 ⚠️

THI recording from ground weather stations

Climate data from 695 ground weather stations

National/Regional (593)

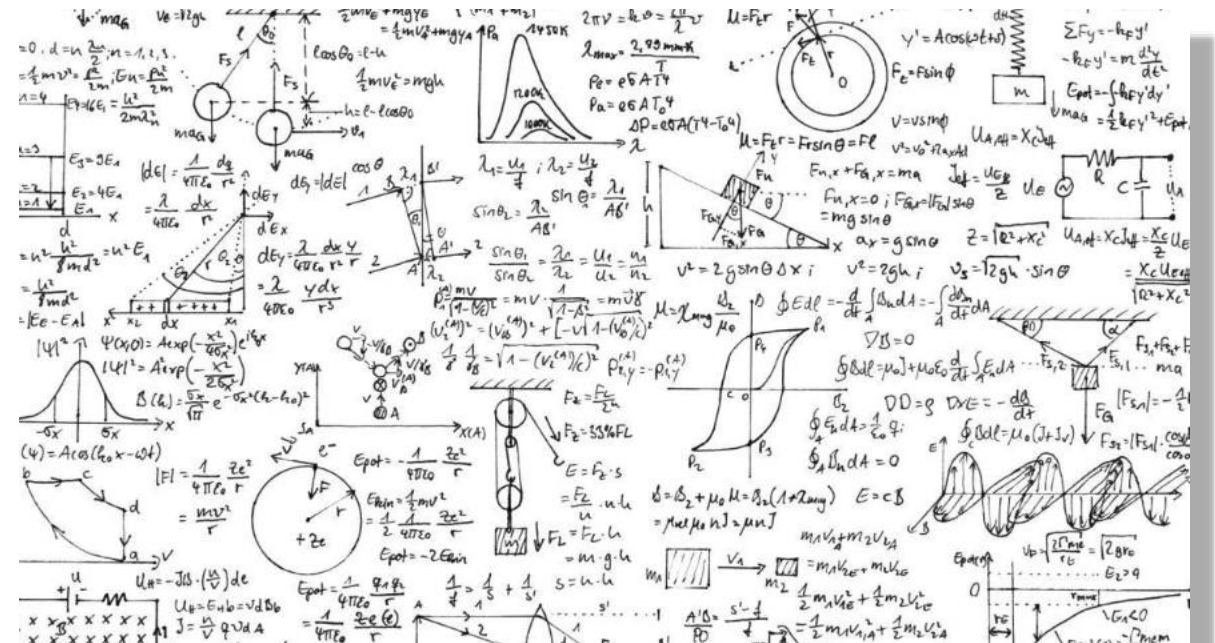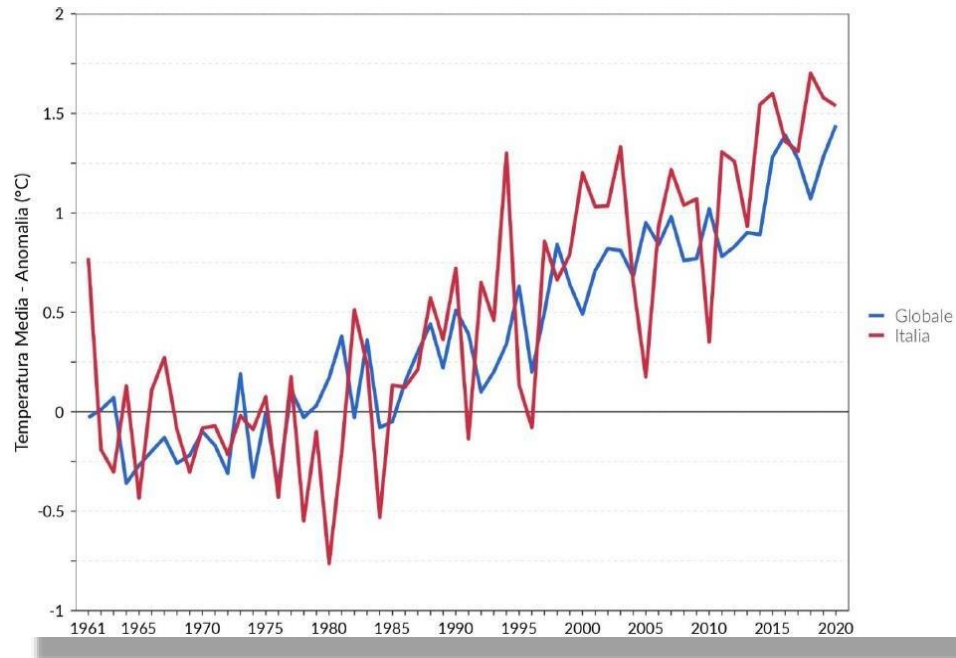Air Force (102)

T_{Max} T_{Min} Hu_{Max} Hu_{Min} Rainfall
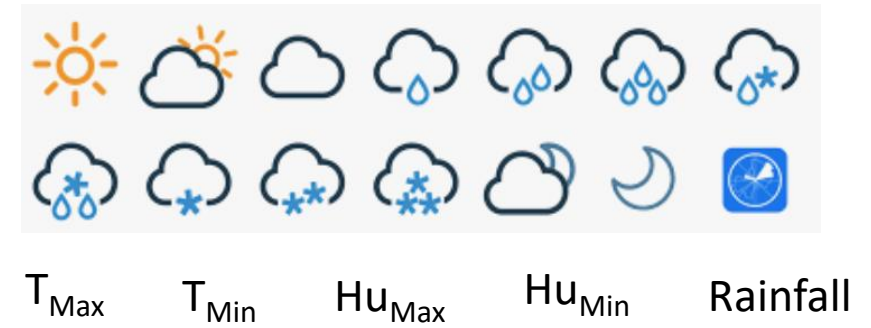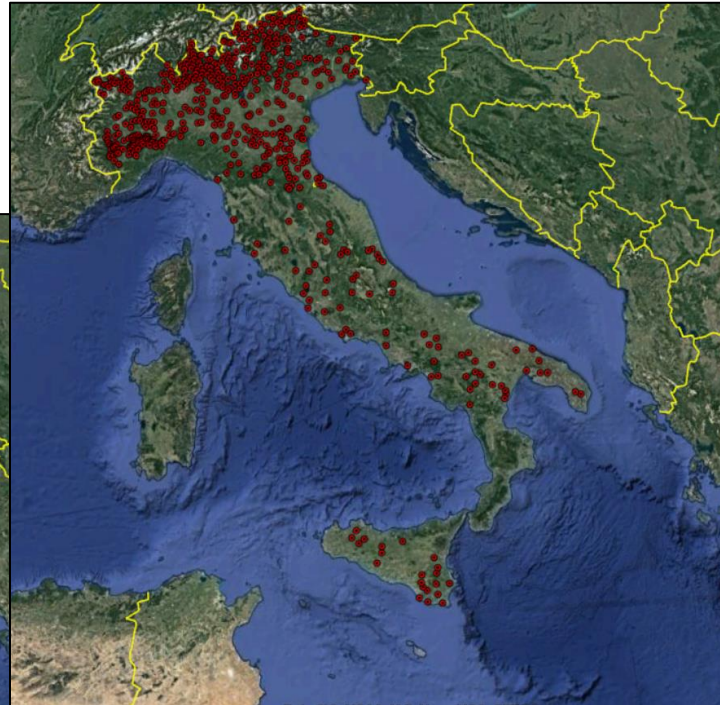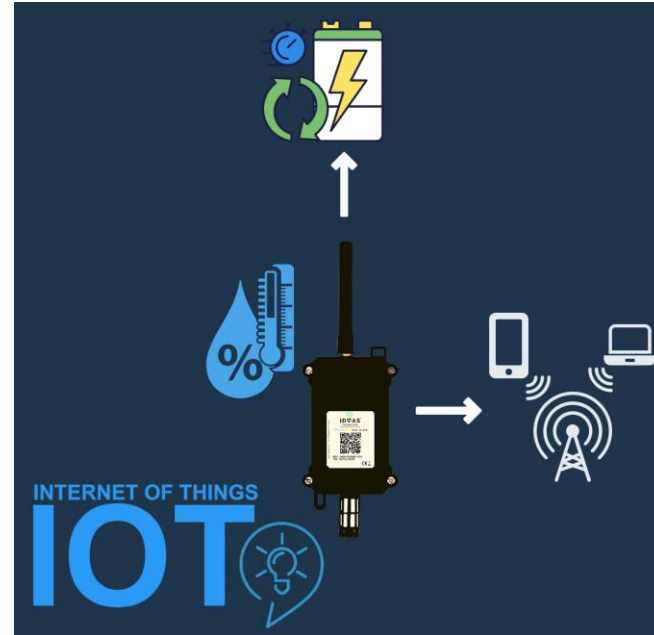
THI recording from weather stations

Creation of an open database with historical data (2017-today; more than 6 Million records up to now)

Predictive Modelization of THI

In-barn THI tracking

1000 herds equipped with datalogger

- 3.6V battery powered (~4 years, maintenance free)
- Does not require an internet connection. communicates, at configured intervals, relative humidity and room temperature values to a remote IoT platform via its built-in NB-IoT wireless connection.
- Does not need to be configured (ready-to-use).
- Suitable for any environment (IP66 plastic box dust/water intrusion protection)
- Auto-reset feature to re-establish connection
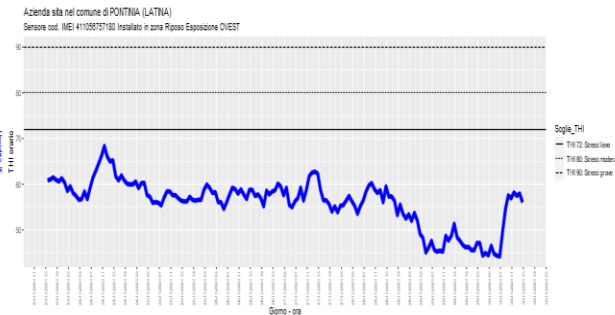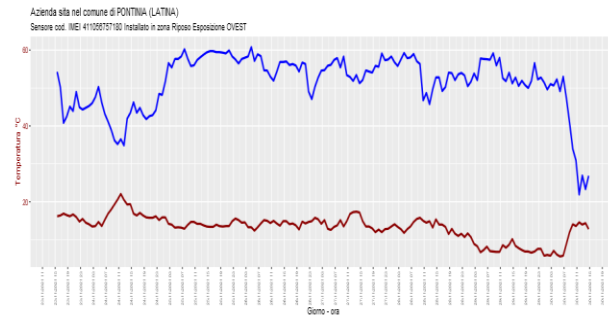
- Device powered by

In-barn THI tracking

- Data recorded quarterly
- Rest Area, Milking Waiting Parlour area
- Cooling/ventilation systems optimization
- Microclimate monitoring
- Animal Welfare
- Temperature /Humidity/THI report daily, weekly and monthly

Yearly SUMMER:WINTER report

o Compare winter and summer average performances (WINTER: Jan-Feb-Mar; SUMMER: Jul-Aug-Sep)

o Winter Performance as reference

o Parameters considered: Milk, fat, protein, lactation peak, cells and reproduction

o S:W Ratio: dimensionless

o Report issued annually

o Compares each farm to its "relative group" (sorted by region and production level)
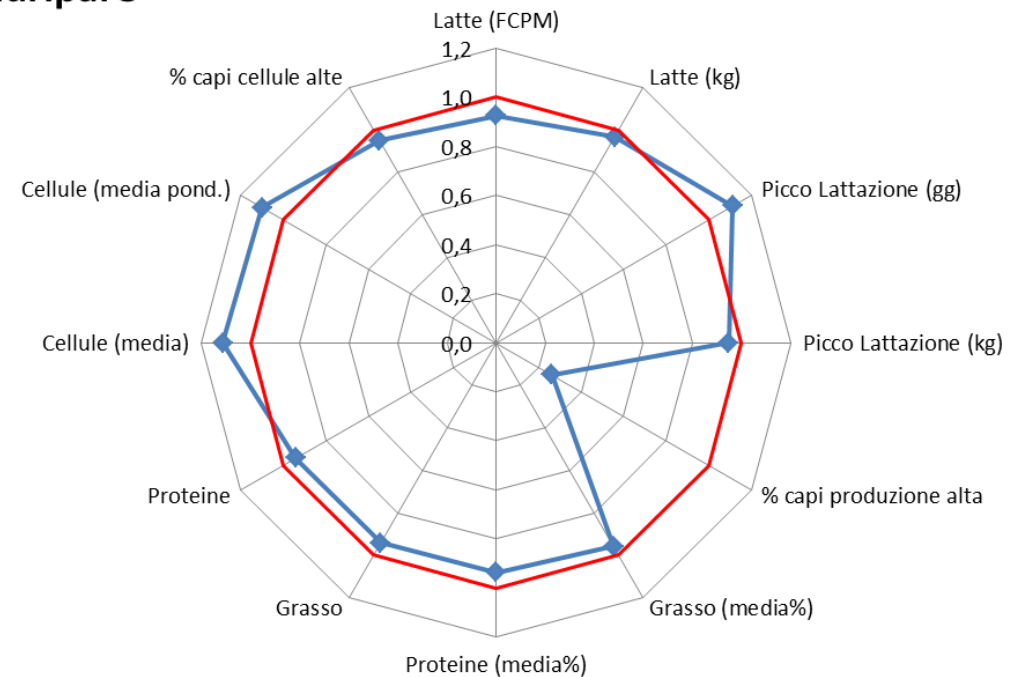
o Compares each farm to its data in previous 4 years

Flamenbaum.I and E. Ezra (2007). "The Summer to Winter performance ratio" as a tool for evaluating heat stress relief efficiency of dairy herds" J. Dairy Sci. Vol. 90, Suppl: abstract 753.
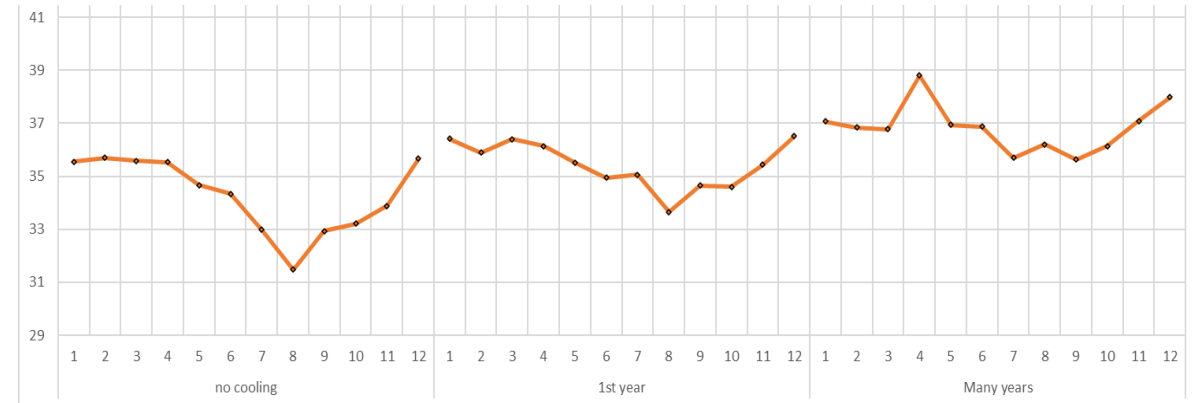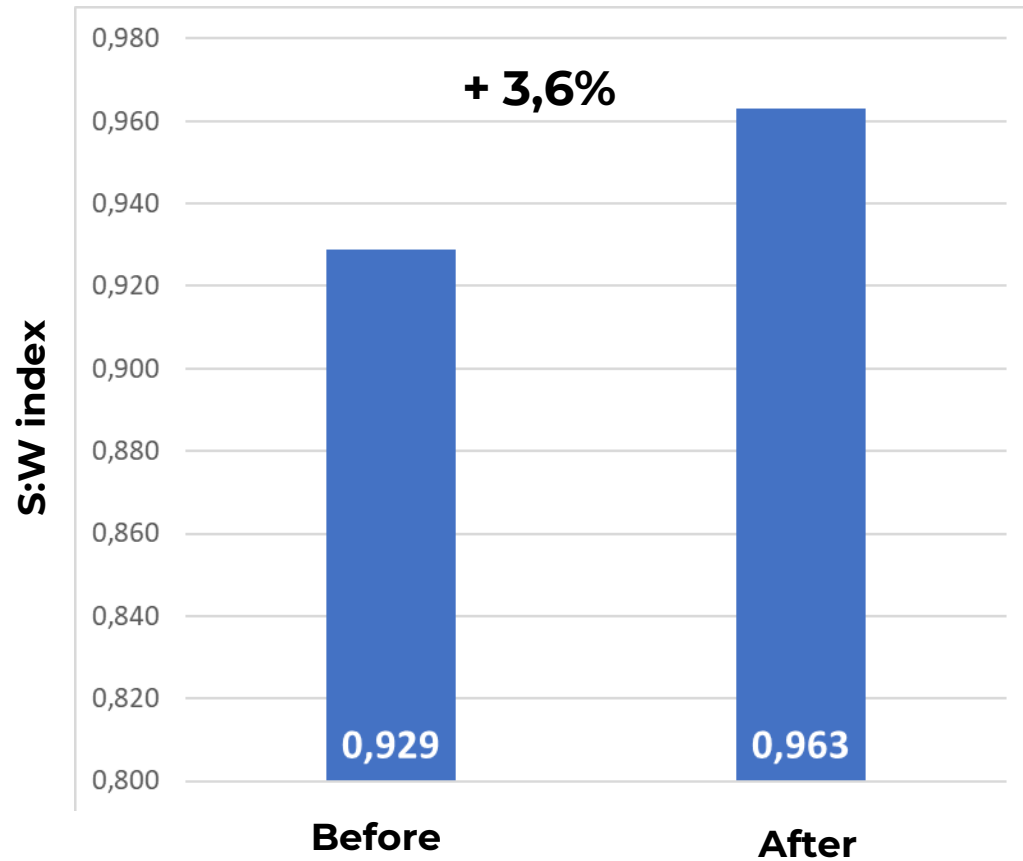
Yearly SUMMER:WINTER net
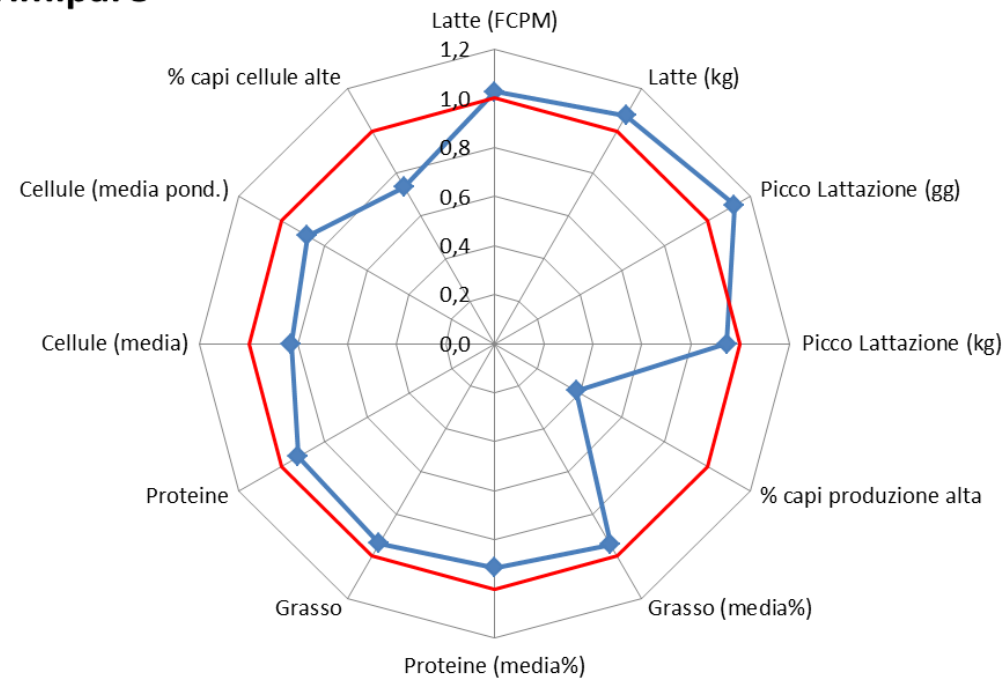
It seems working
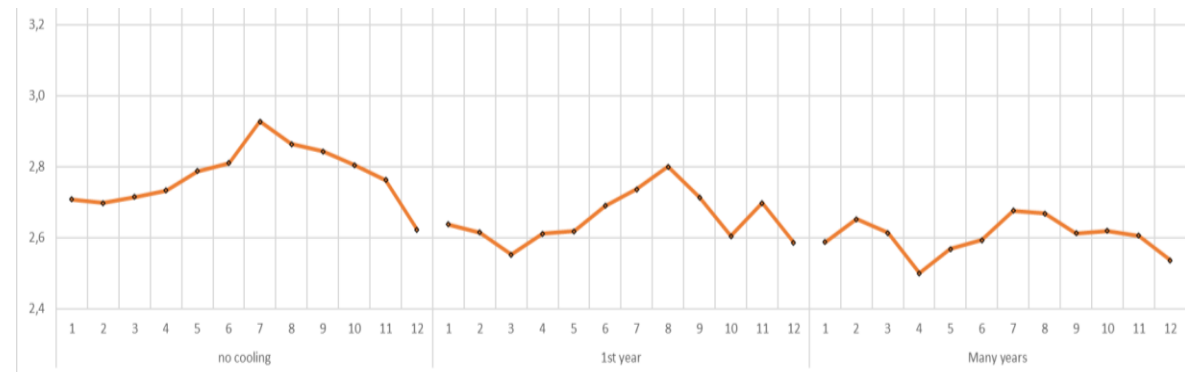
Average improvement of 99 FARMS adopting the Heat Management Strategy

+ 3,6%

S:W index

0,929 — Before
0,963 — After

FPCM milk yield production

Somatic cell linear score

Thanks for being here

www.leo-italy.eu