# Mitigating heat stress: insights and ideas

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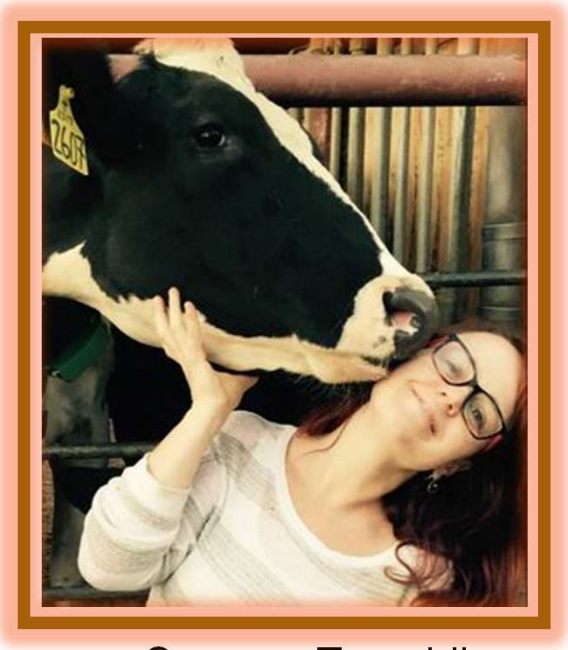

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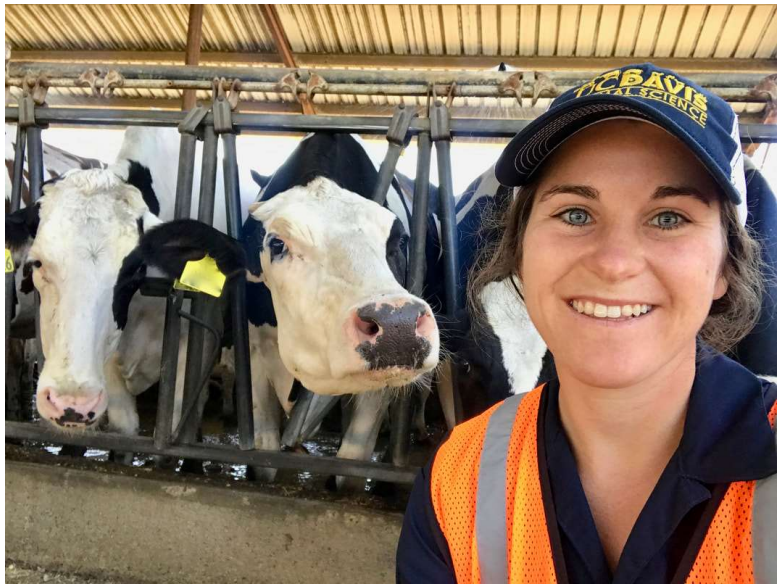

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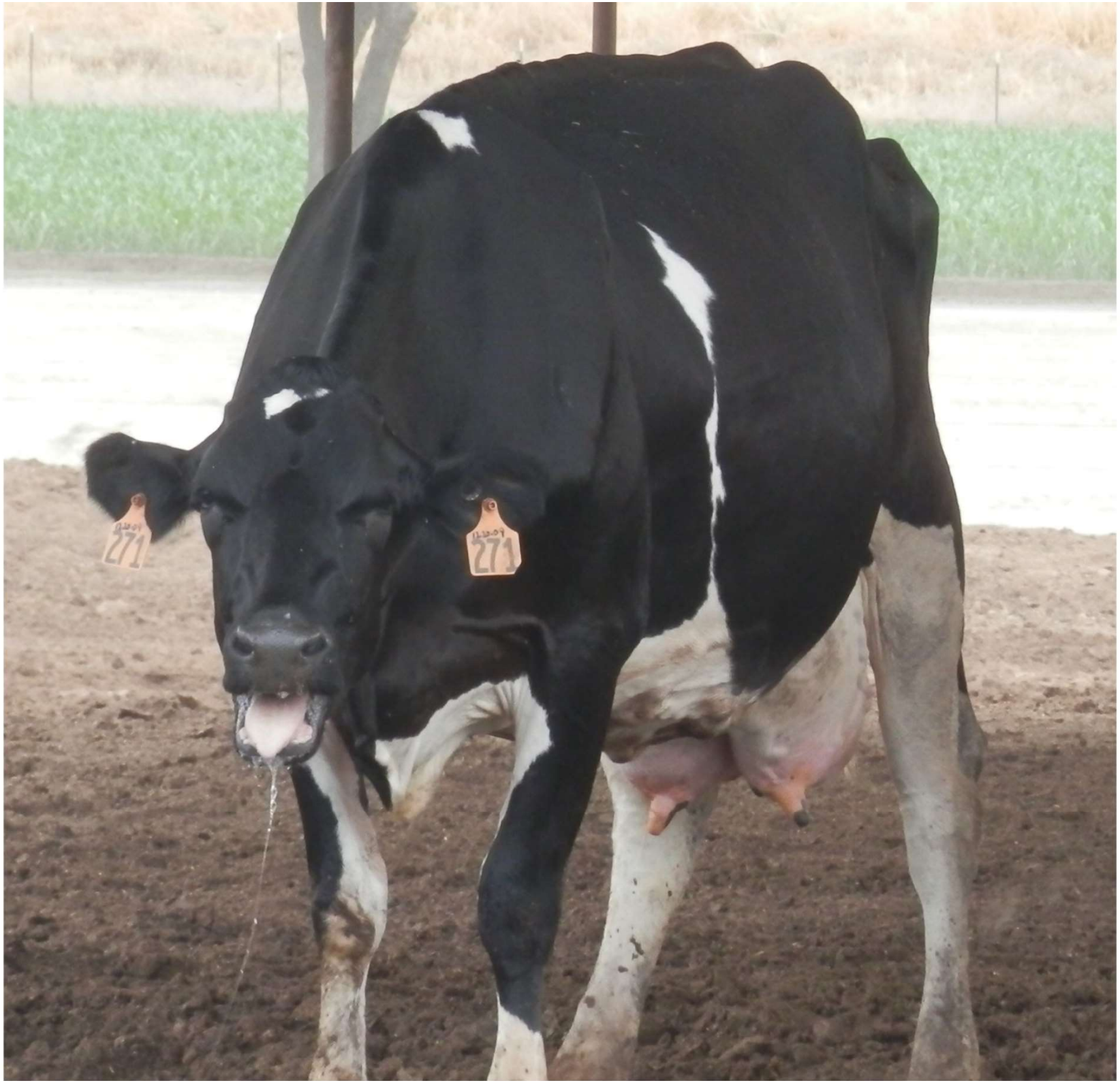


# Themes

- cows will prevent heat stress
- they have thermal “intelligence”

Insights or ideas from research and producers

# Heat abatement

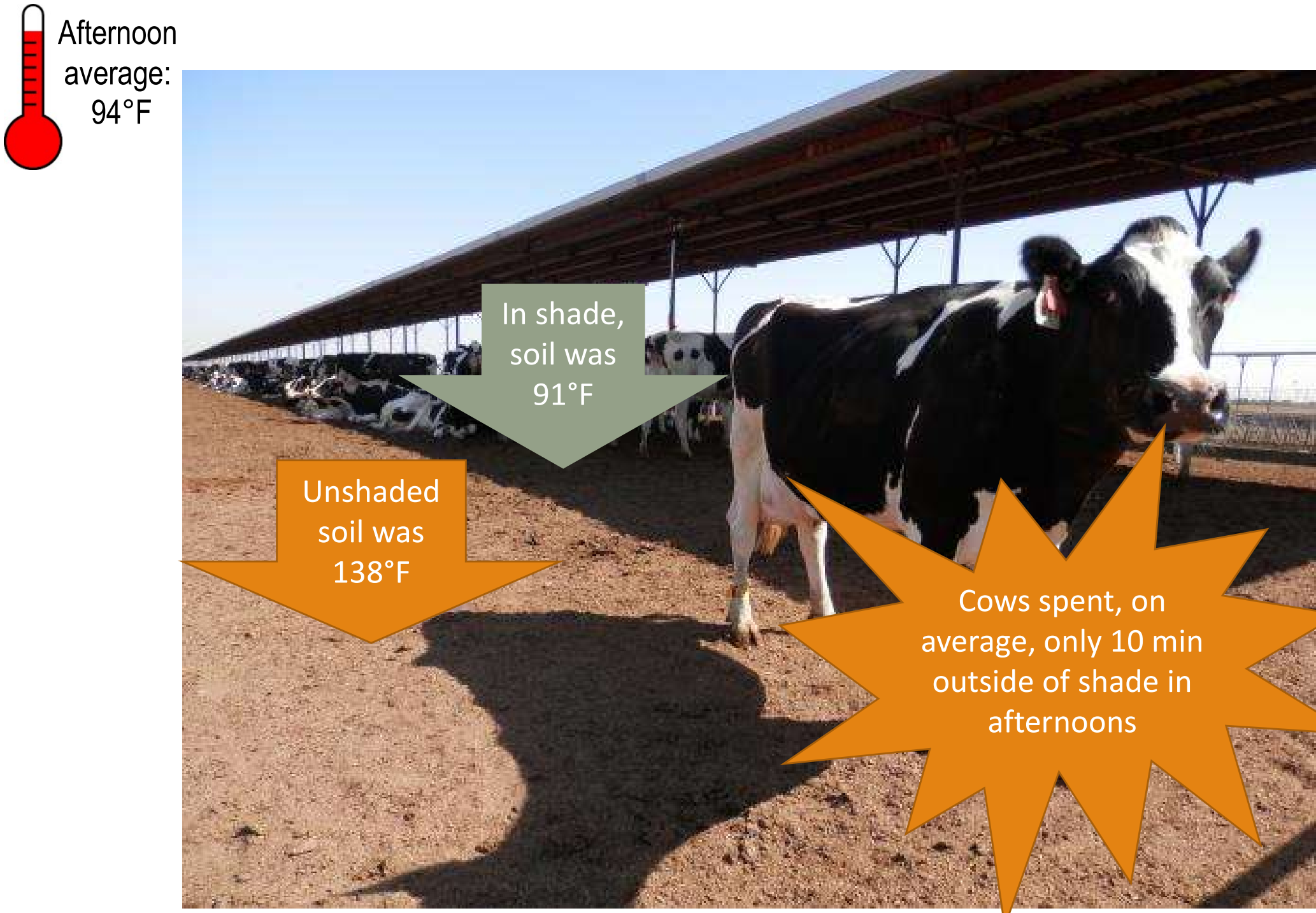
shade

# Unshaded cattle

Feedbunks for lactating cattle in drylots, older dairies

# Cows are half as likely to visit unshaded feedbunks

*Tresoldi et al., 2017*




*Tresoldi et al., 2017*

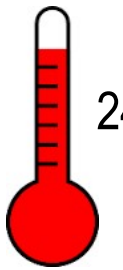
# Heat abatement

## shade

Provide shade over feed bunks

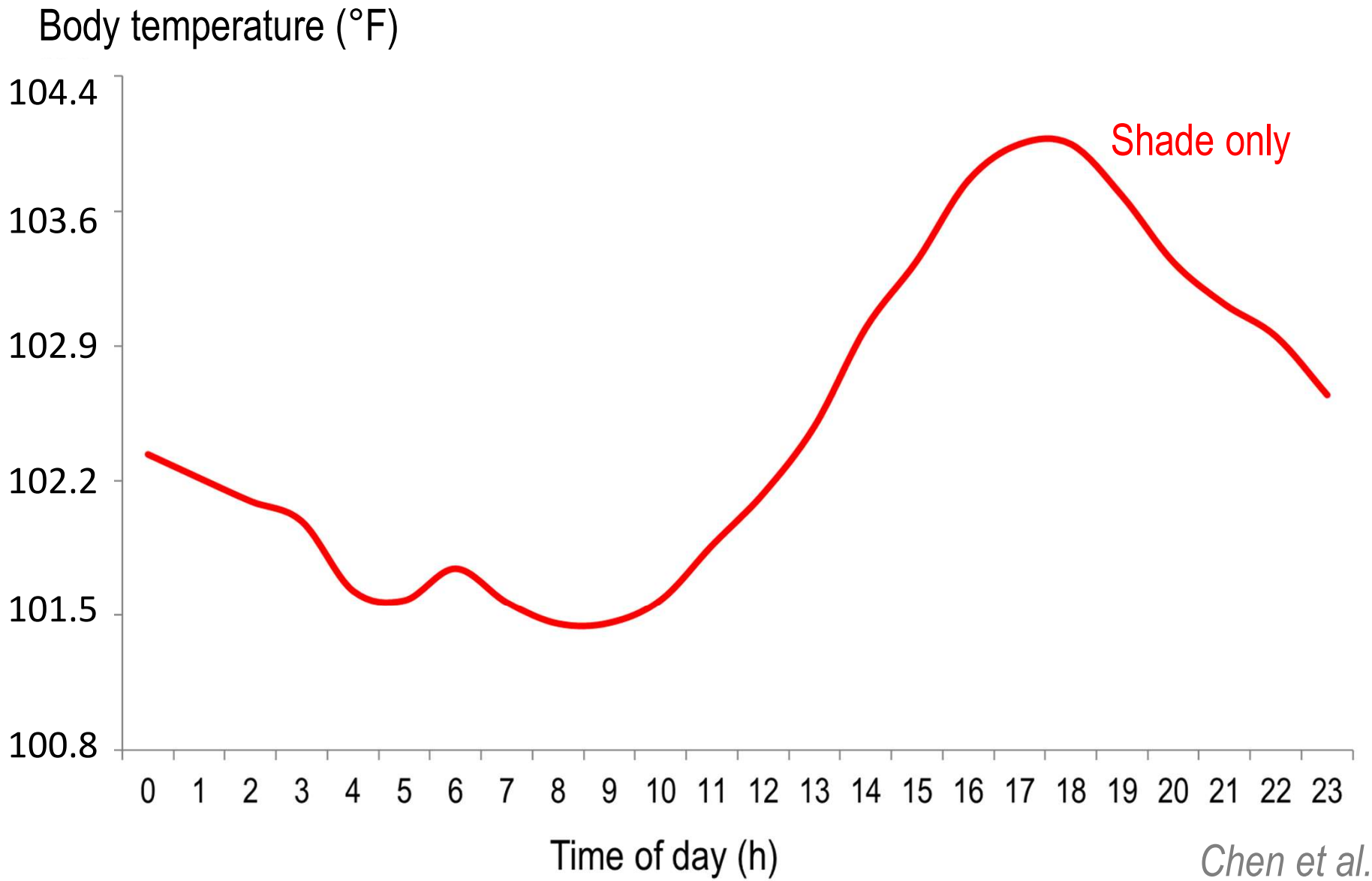
# Heat abatement

## spray water

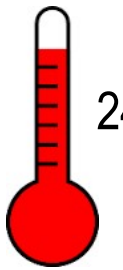


24-h max:
97°F

With only shade, body temp rises

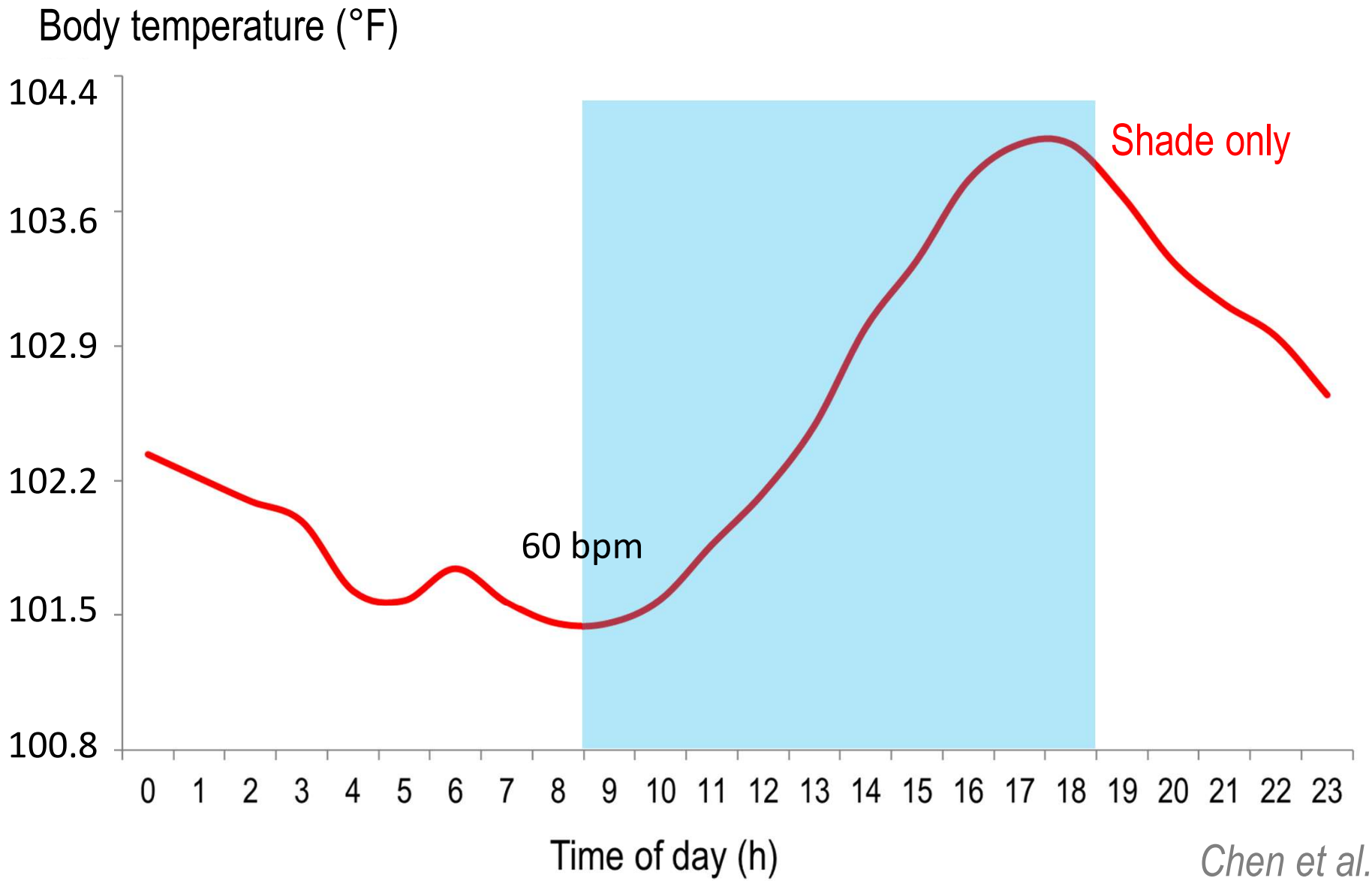



*Chen et al., 2013*

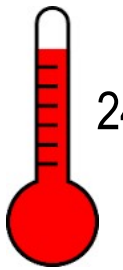


24-h max:
97°F

Cows started using soakers at 73°F (THI 69)

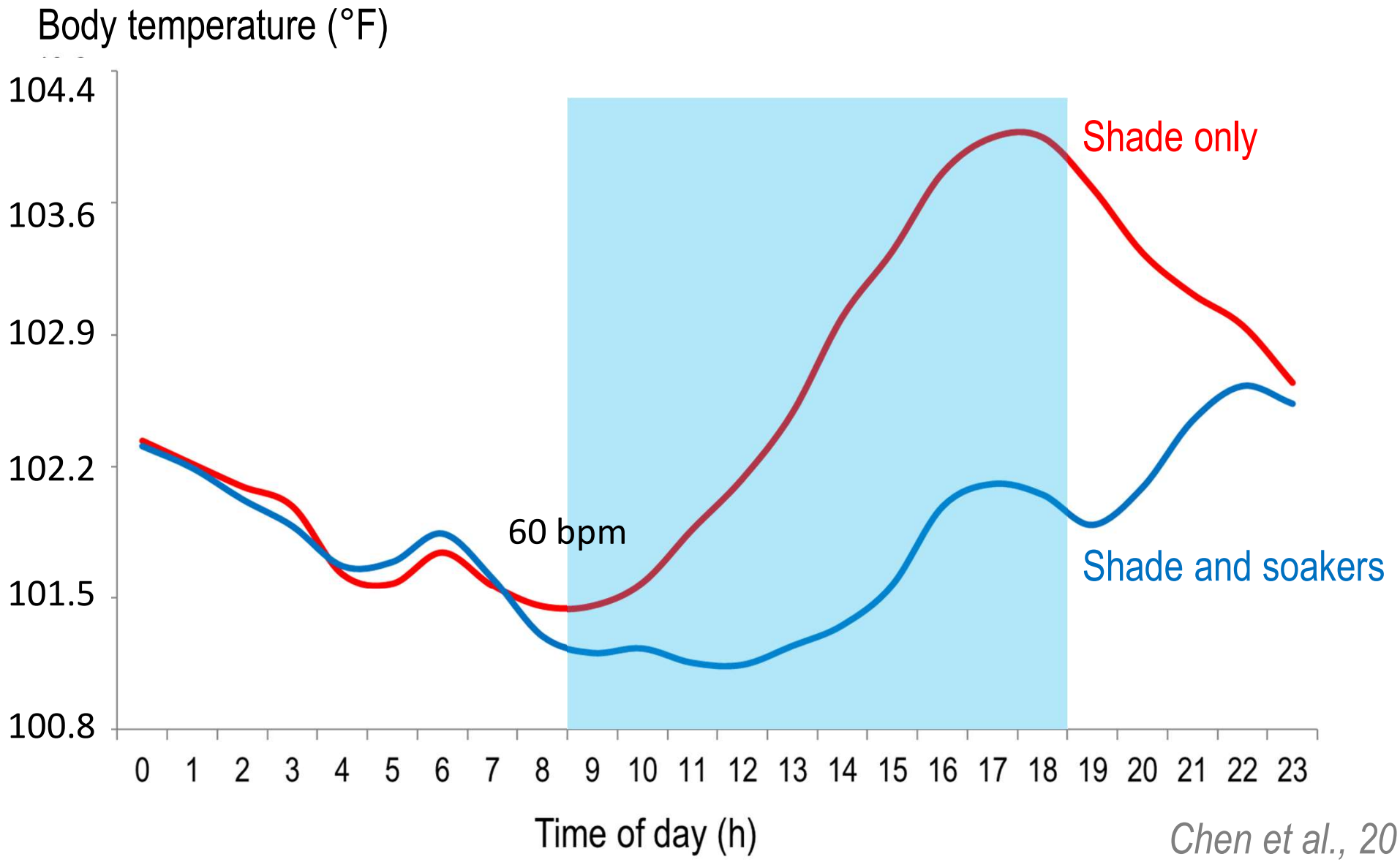



*Chen et al., 2013*



24-h max:
97°F

## Soakers kept body temp lower from 11am-8pm




*Chen et al., 2013*

# Heat abatement

## spray water

Provide spray water early

# Flow rate?

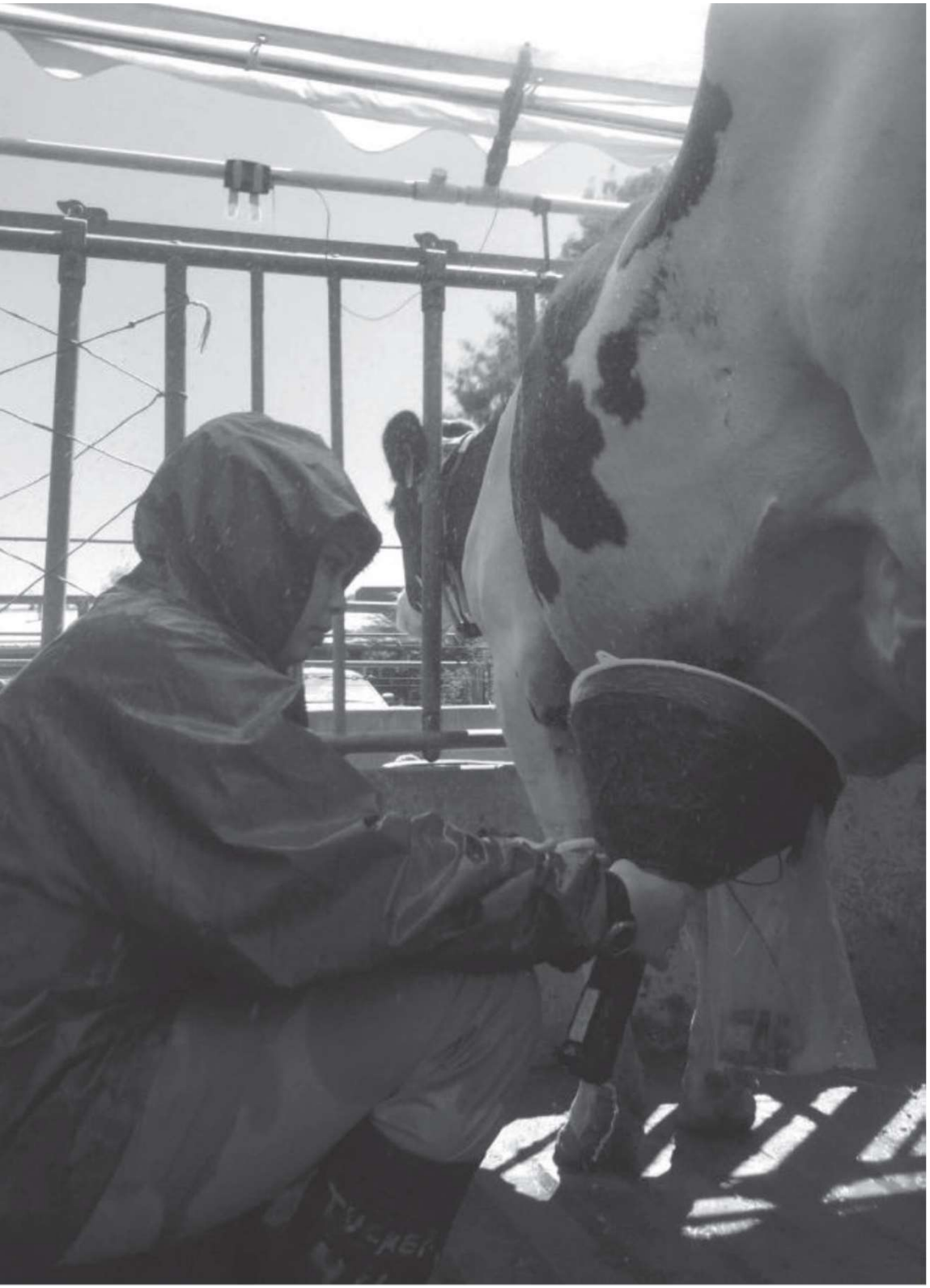
Soaking is better than mist

More water (green) is marginally better

1.5 gallon/min

1 gallon/min

*Chen et al., 2015, 2016; Tresoldi et al., 2018 x3*

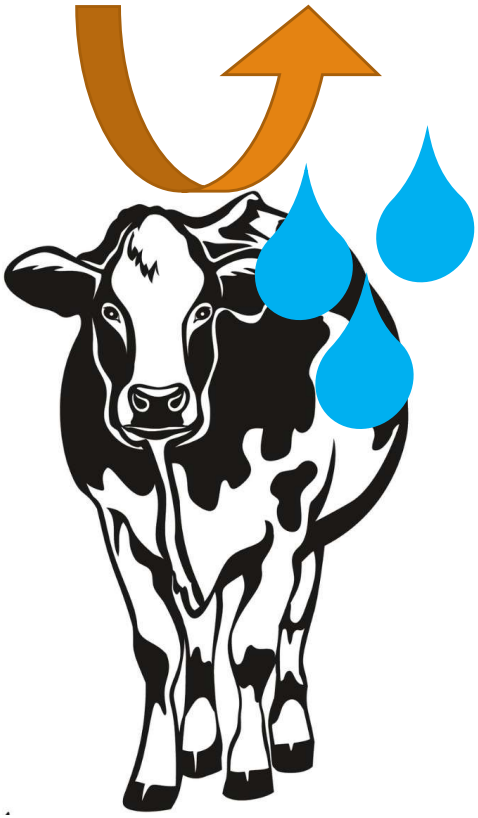


Water removes heat as it drips off the cow

But this dripping is not an efficient way to cool them

*Tresoldi et al., 2018*

# Use fans to evaporate water off cows to reduce heat



# Fans over soaker lines (and wet cows) improves opportunities for evaporation

# Fans + spray combination, at milking, can be an efficient way to cool cattle

# Heat abatement

## spray water

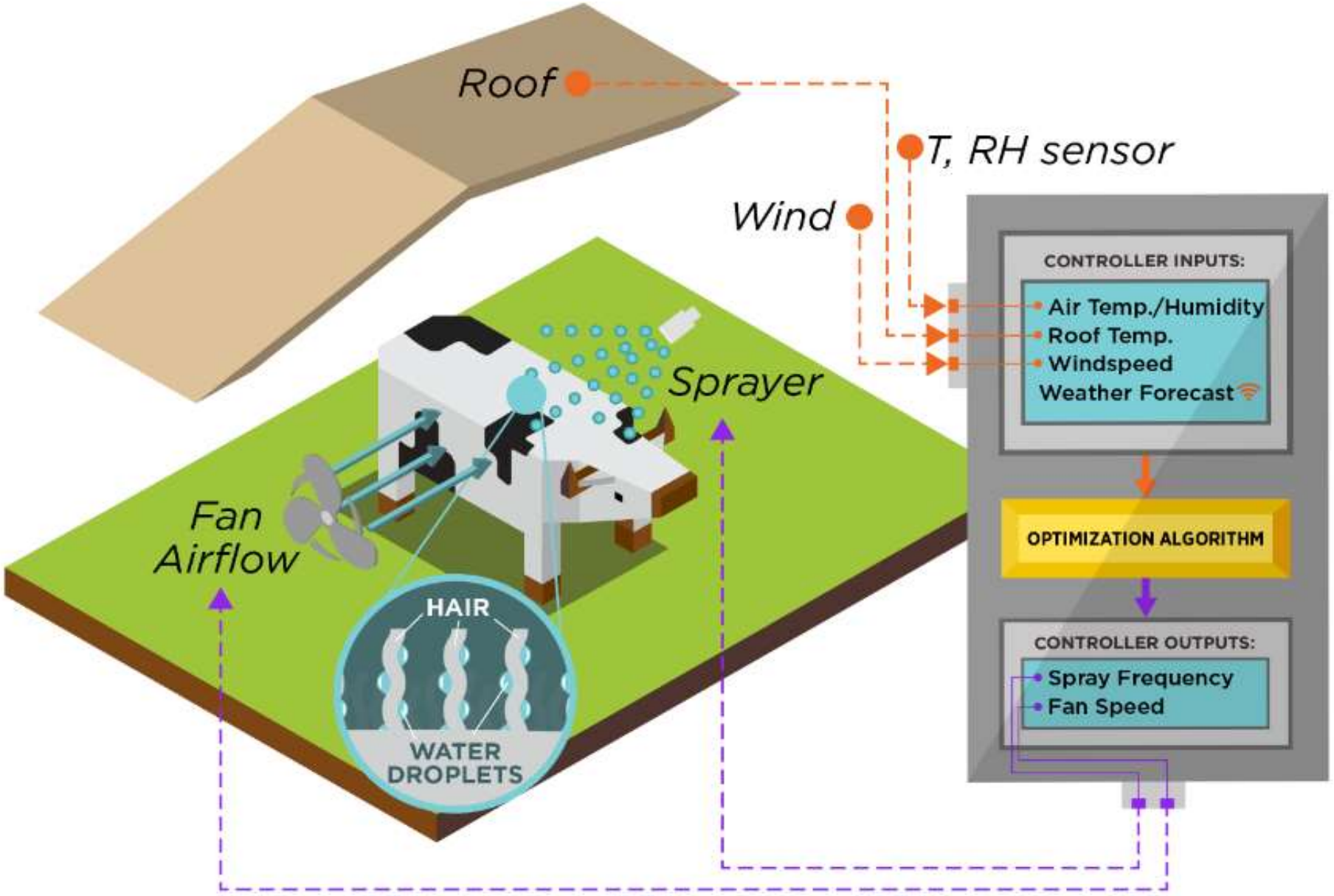
Use enough water to soak cows
Use fans to evaporate water (removes heat)

# Automated controllers help manage spray and fans

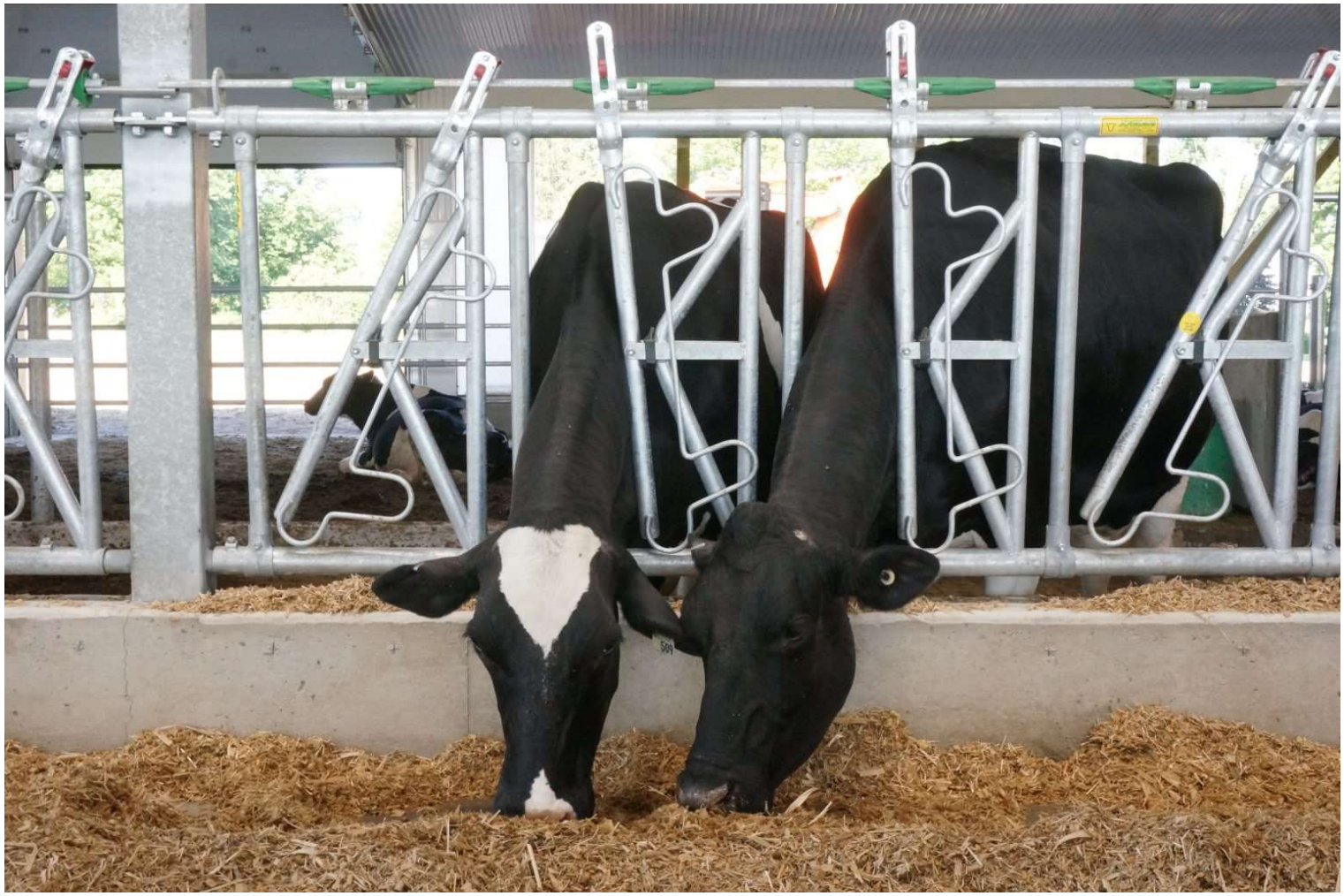
+ use ambient temp threshold

+ remove human error

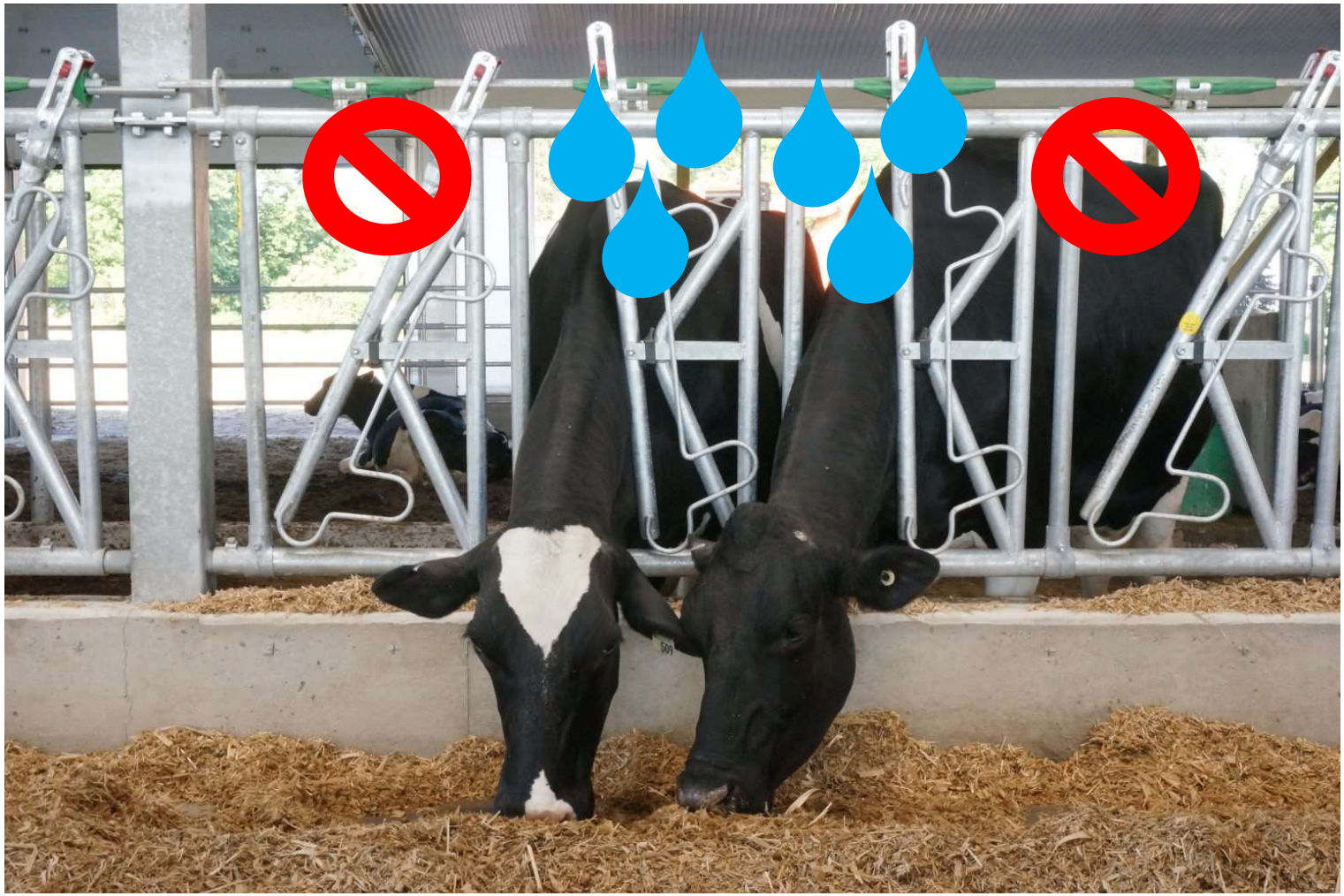
# Automated controllers: can we make them smarter, to reduce energy and water use?



# Would occupancy sensors help?



# Occupancy sensor: spray when cows at bunk



Has the potential to reduce spray water by 50%, while protecting cow comfort and cooling

# Commercial options

Avsonic

$175/unit for 2-3 cows

battery powered

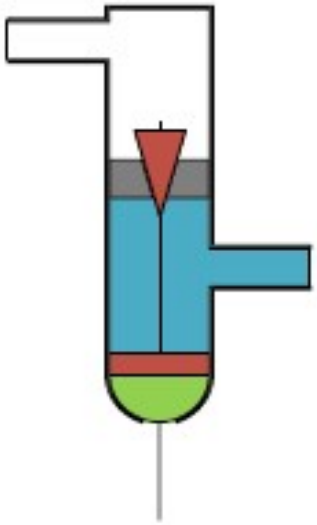
# Commercial options

Agpro

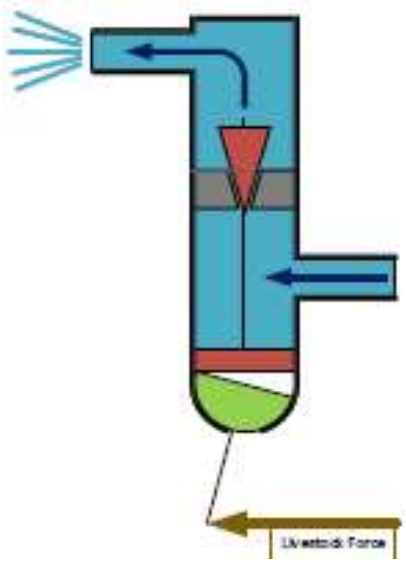
$120/unit for 2-3 cows

requires wired power

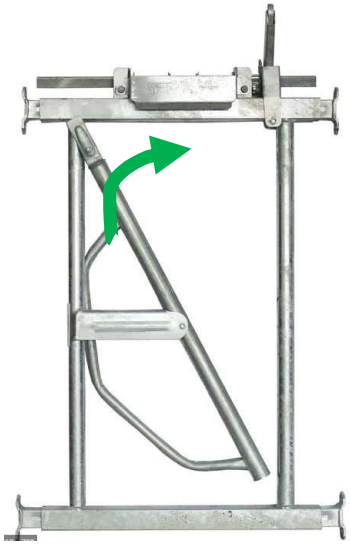
# An idea: mechanical control?



Valve closed



Valve open



Head gate motion

Early prototype

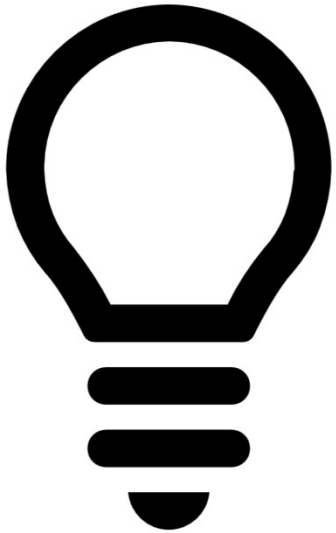
# Heat abatement

## spray water

Ideas for smarter control:
use more weather info, possibly occupancy sensing

# Insights and ideas

- provide shade over feedbunks
- soak them early, evaporate water
- smarter controls: more weather info, occupancy



# Questions?