

Confirming genetic  
contributions to aggression,  
honey production, hygiene,  
and other traits -  
a tale of weather woes!

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# The Plan

- 2016: collect hive performance and genetic data from 1000 colonies
- 2017: collect hive performance and genetic data from 500 colonies
- 2018: find genetic markers from 2016 data, see if they are still there in 2017 data
- simple, eh?

We know selective breeding  
can work

- Selection over 3-6 years for Hygiene in Québec and Alberta
- 80-95% hygienic rate

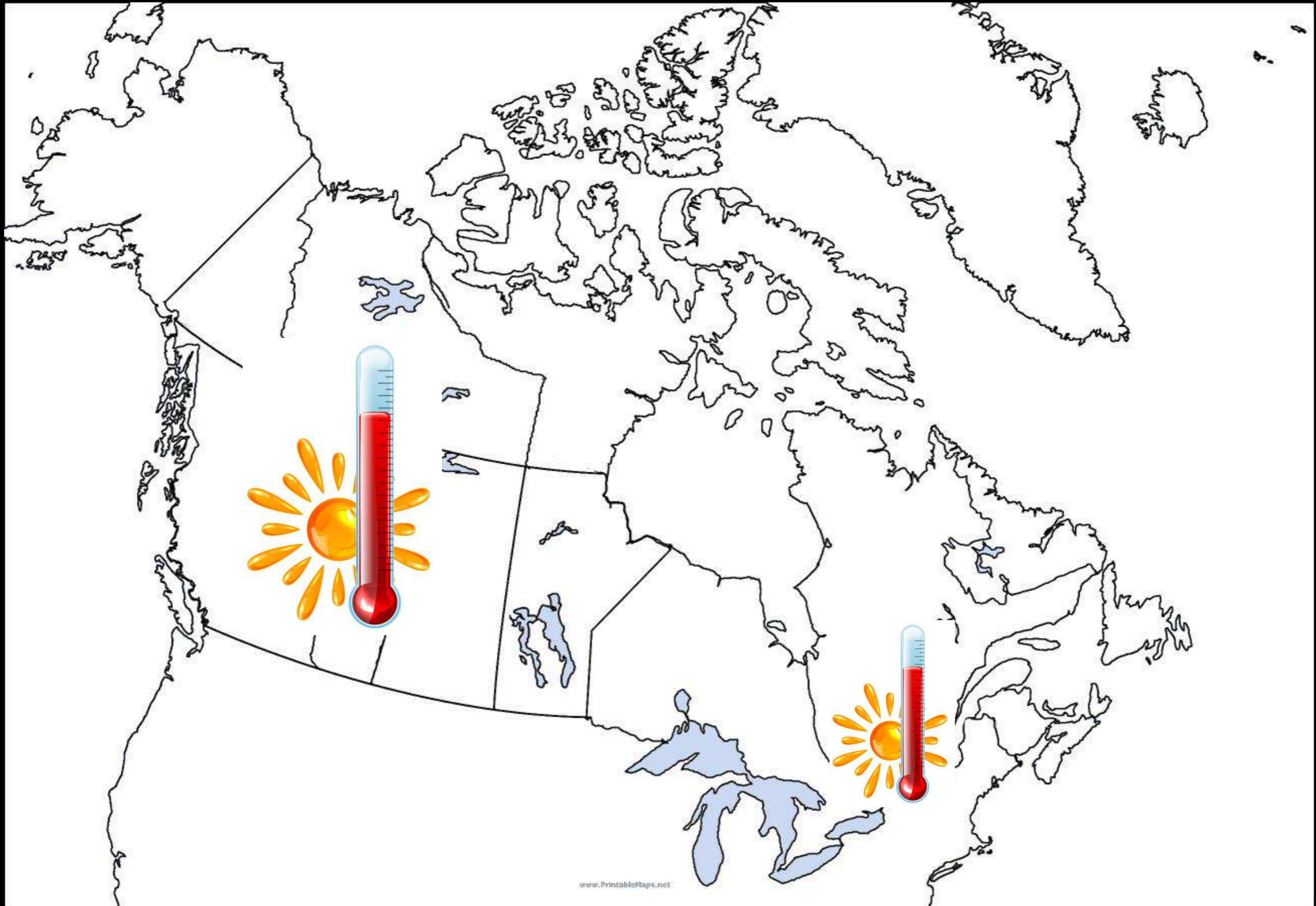
# 2016

A prolonged drought prevailed across a broad swath of Ontario, from Chatham north to Ottawa and into Quebec, with unprecedented high temperatures



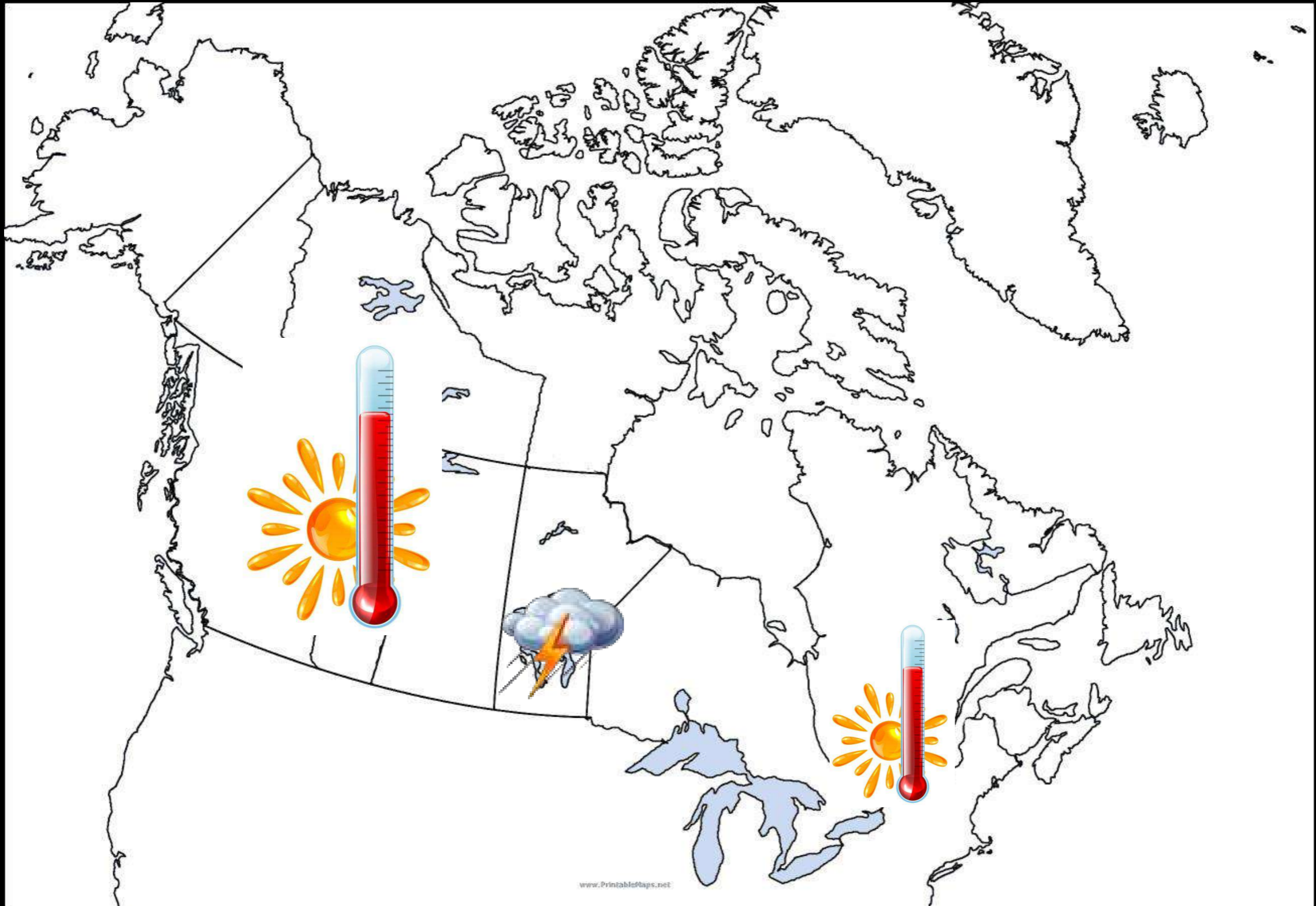
# 2016

B.C. the Yukon and the three Prairie provinces experienced their warmest spring in nearly 70 years of record-keeping. Across the West, it was beginning to look a lot like a drought with seeding being done in some of the driest conditions in years. By mid-May, forests were bone dry, humidity was low, and winds were strong and gusty, which raised the wildfire threat from high to extreme. On May 4, temperatures soared in Winnipeg to an unbelievable 35.2°C



# 2016

In the Prairies there were also 564 severe weather events (large hail, strong winds, heavy rain and tornadoes), which is over twice the normal number. Manitoba was hit the hardest with 240



# How does weather affect bees?

## THE WEATHER AND HONEY PRODUCTION

BY L. A. KENOYER\*

The weather and its changes exert a marked influence on honey production.

That fact stands out clearly in the daily records of the weight of a hive of bees and of the accompanying weather conditions, kept for 29 years by J. L. Strong, a successful beekeeper of Clarinda, Page county, Iowa, and furnished for study to the Iowa Agricultural Experiment station.

# Honey yield - temperature, rain, sun

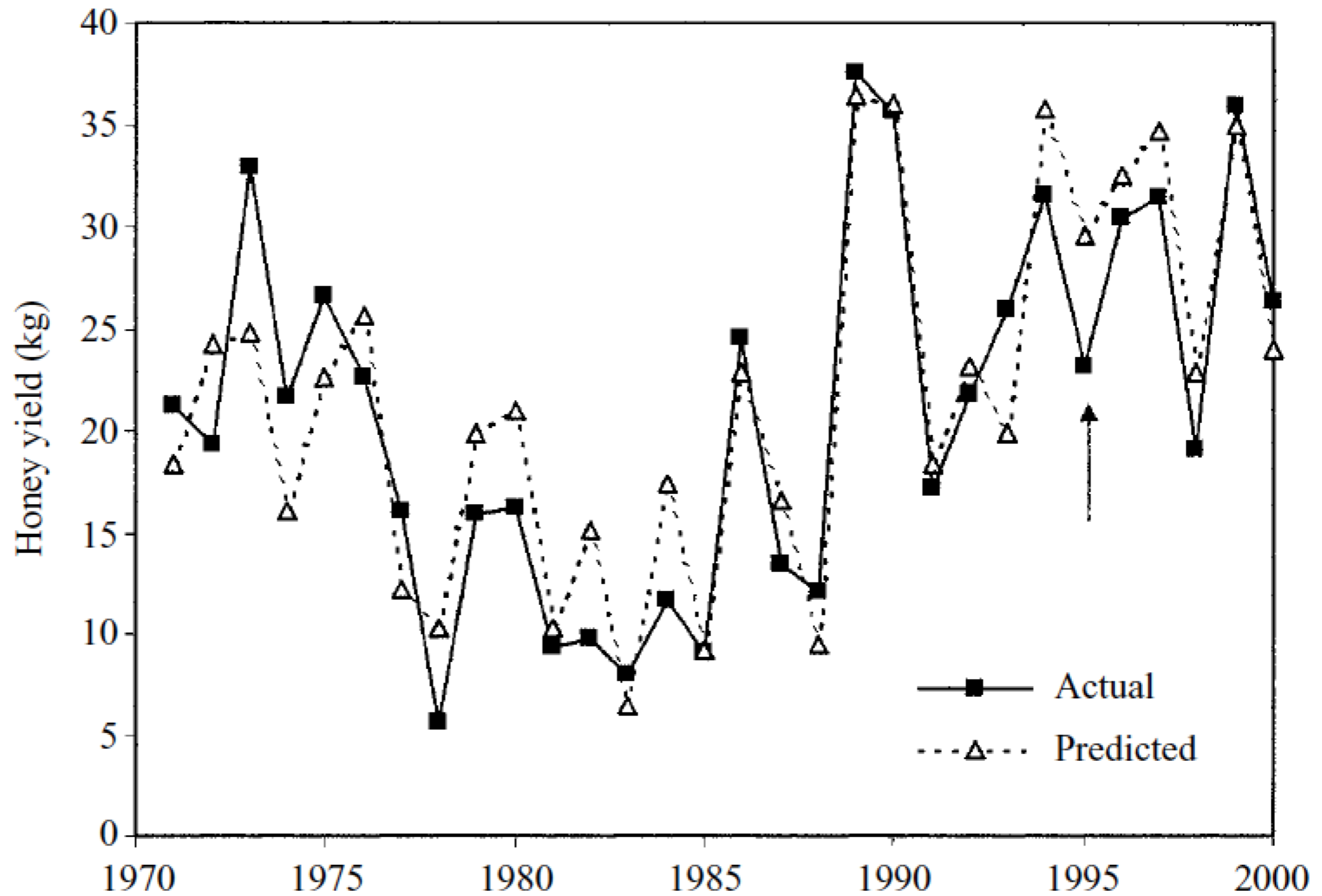
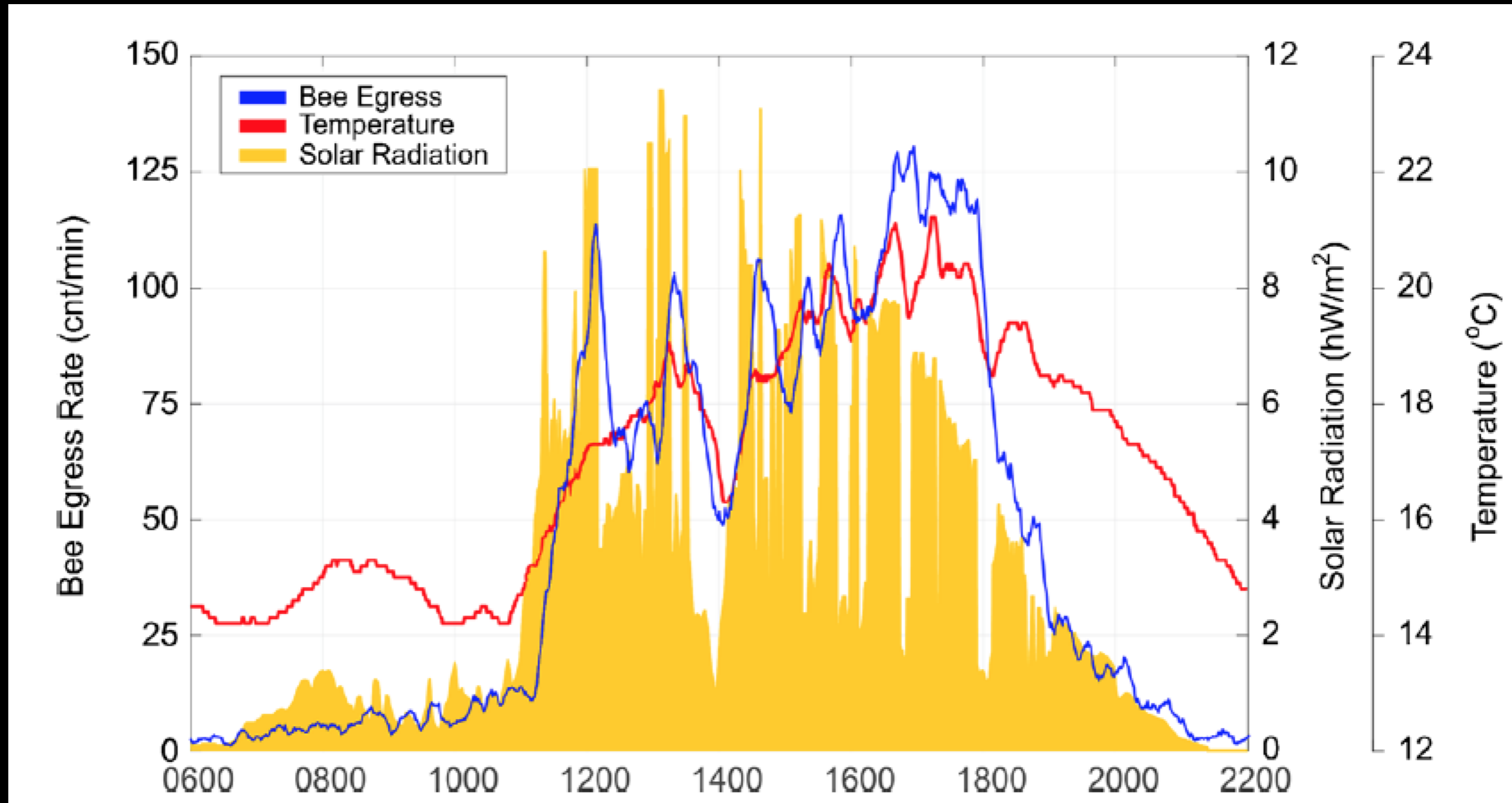


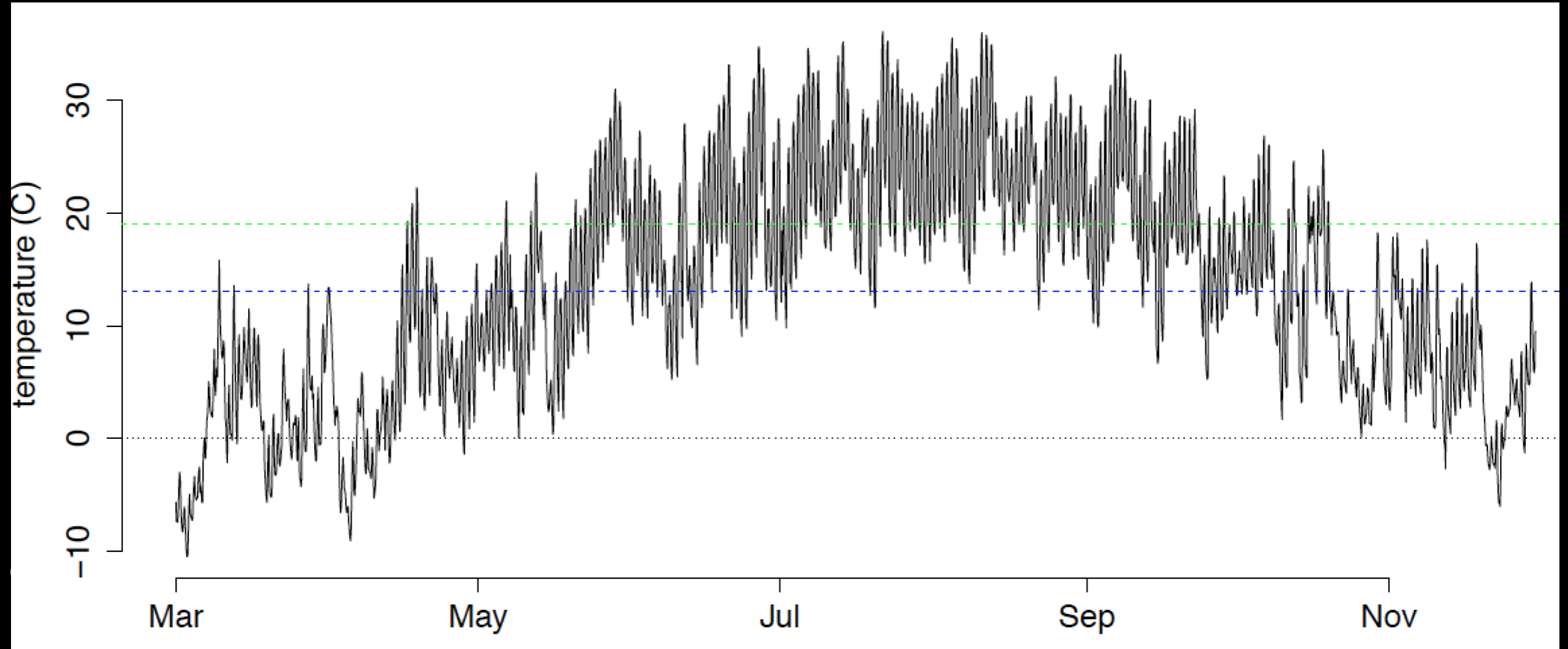
Fig. 1. Actual honey yields compared with predictions from Eqn 4.



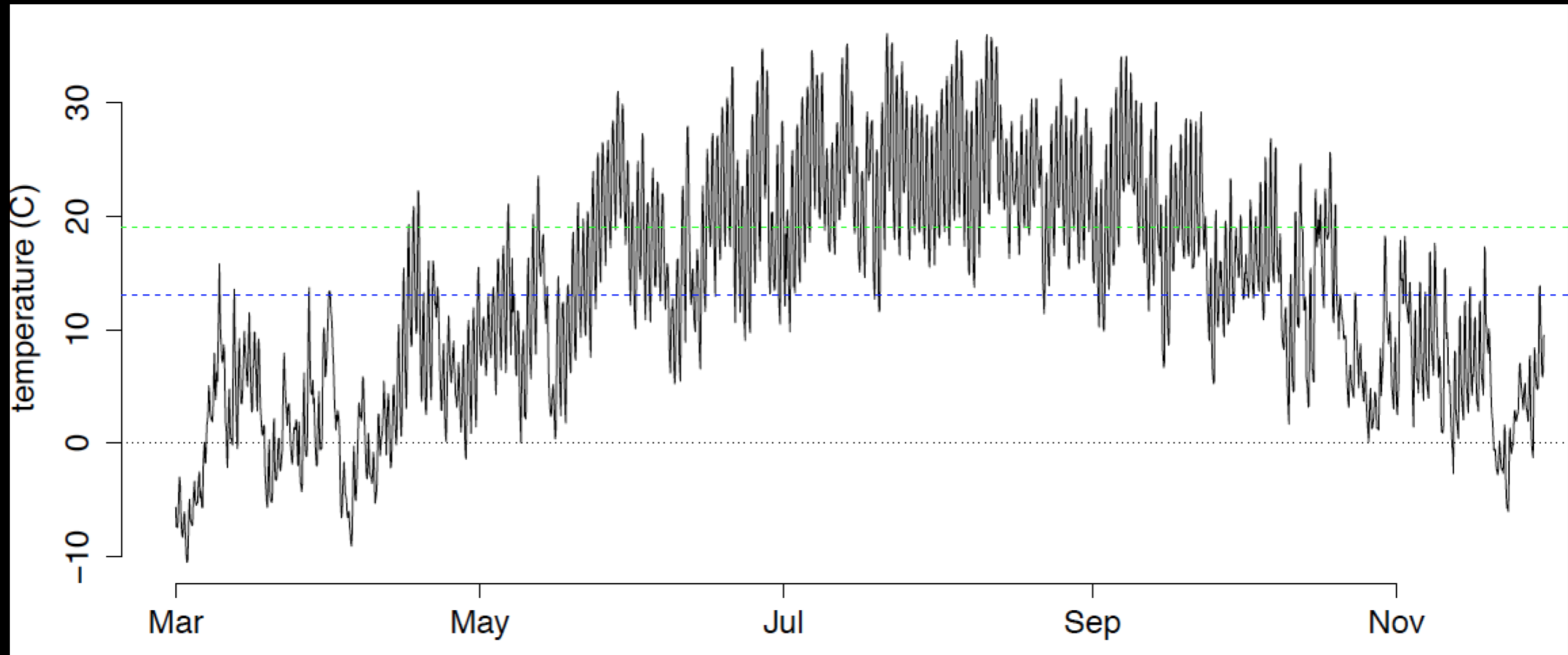
# Sun matters for foragers



Clarke & Robert, Apidologie (2018) 49:386–396

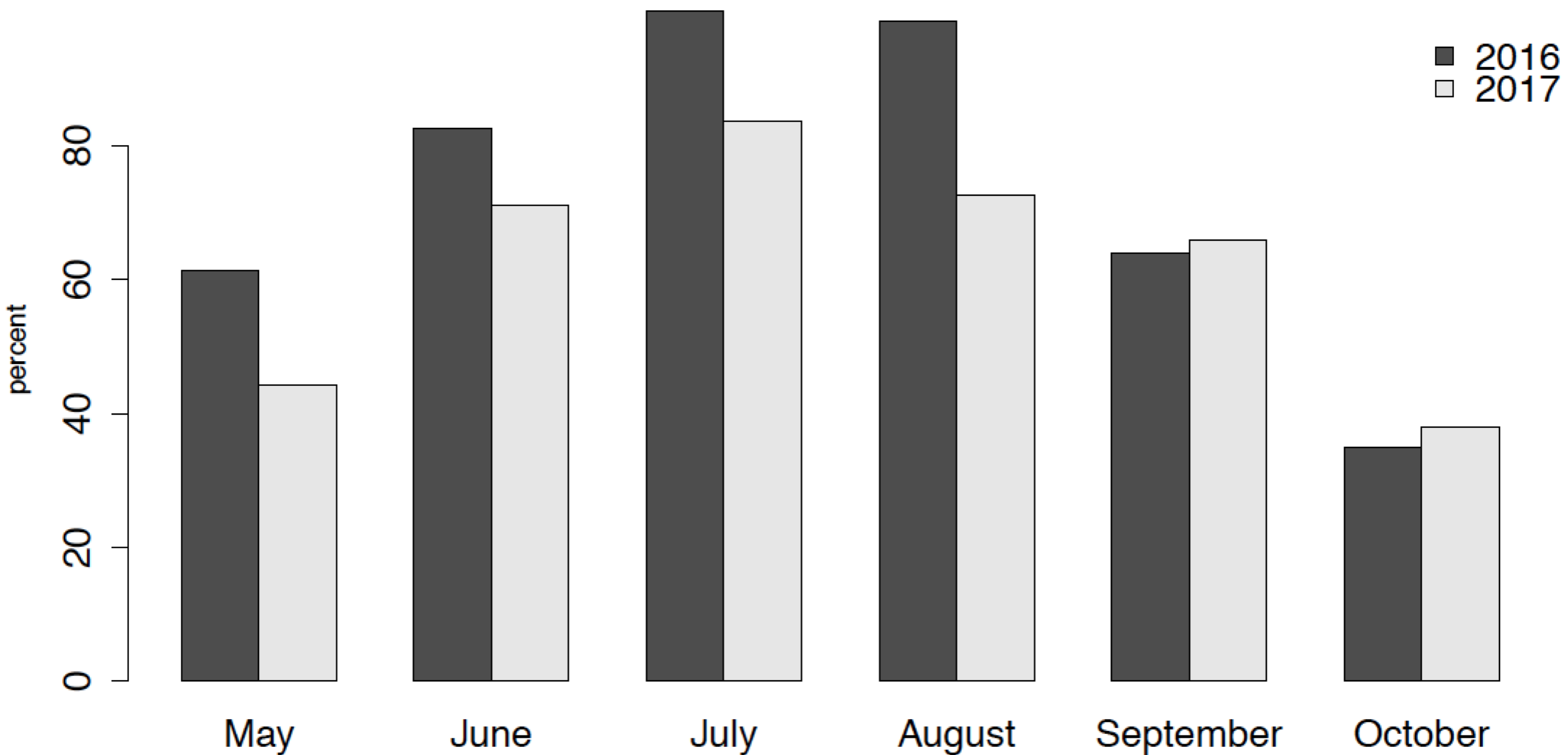


- every 3 hour values for temperature, sun, humidity, etc.



- “degree days” measured above 13C cutoff

# temperature x sun



# Lies, Damn Lies, & Statistics

- Good news: temperature and sunlight data explain 73.1% of variation in colony 2-week weight gain
- Use 3 weather variables

# East of Alberta

- 3 weather variable models account for 50.6% of 2 week weight gain variation for MB+ON+QUE
- the best 2-variable model for all of Canada reached 34% of variation
- Questions to be answered: why separate models for east and west?
  - are weeks for peak nectar flow very different?
  - is spring growth more important in one area?

# Thanks!

- Genome Canada
- Genome Ontario
- NOAA/NASA
- all the  
beekeepers

