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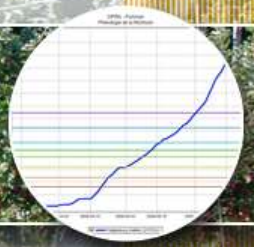


CIPRA: using real-time weather information to forecast crop phenology, insects, diseases and physiological disorders

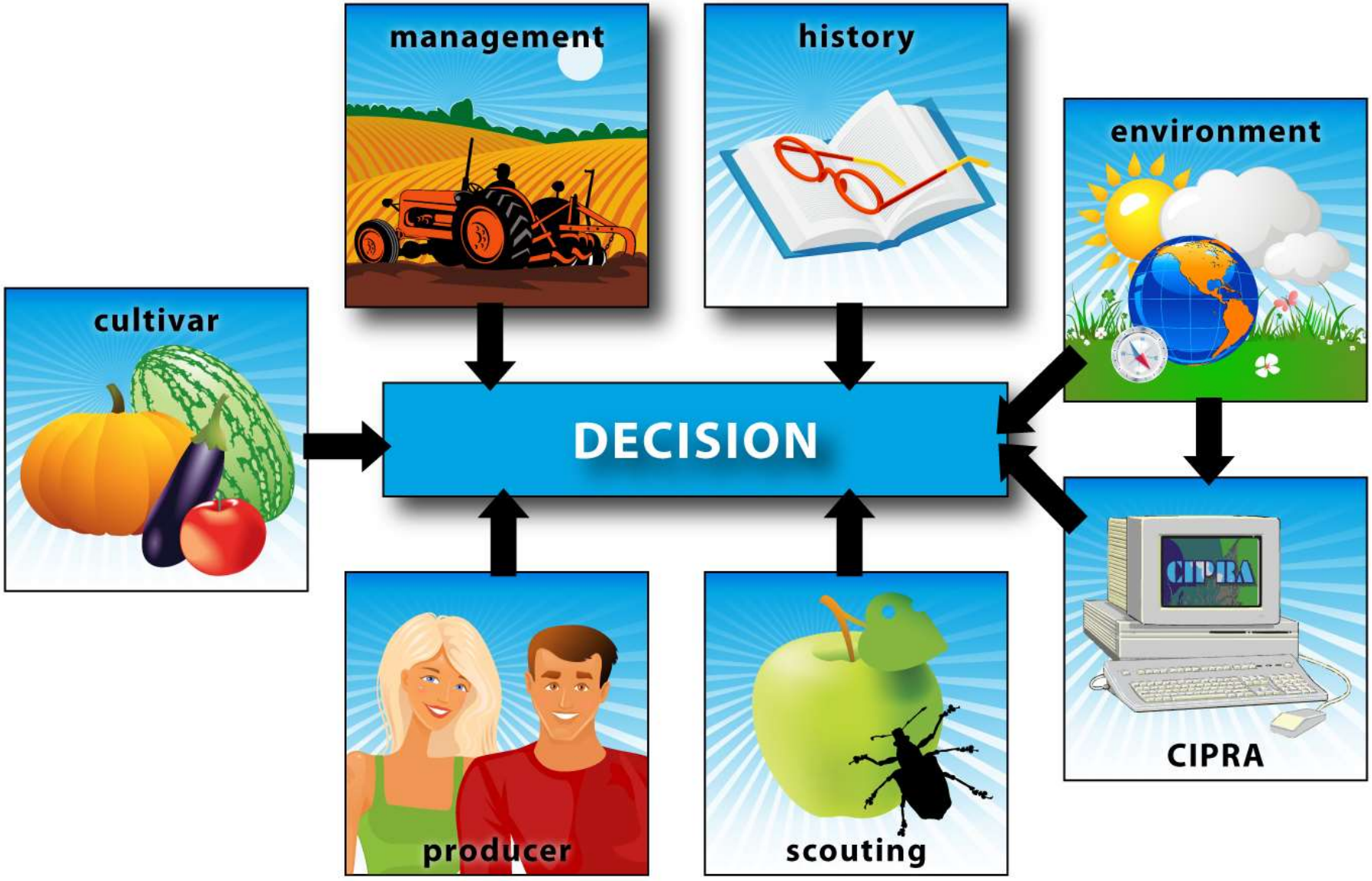
Dominique Plouffe and Gaétan Bourgeois

Horticulture Research and Development Centre, Saint-Jean-sur-Richelieu, QC

Canada

Presentation

- What is CIPRA?
- Source of weather data
  - Observations
  - Forecasts
  - Normals
- Meteorological module
- Bioclimatic models in fruit crops: some examples
- Conclusion


management
history
environment
cultivar
DECISION
CIPRA
producer
scouting

Computer Centre for Agricultural Pest Forecasting

>100 Bioclimatic models and indices → ~25 Crops

Tair, Tsoil, RH, Wind, SolRad, Precip

Tair, RH, Precip (%prob.), Cloud Cover, Wind

Tmax, Tmin, Precip

Weather observations (hourly)

Weather forecasts (hourly)

Climate normals (daily)

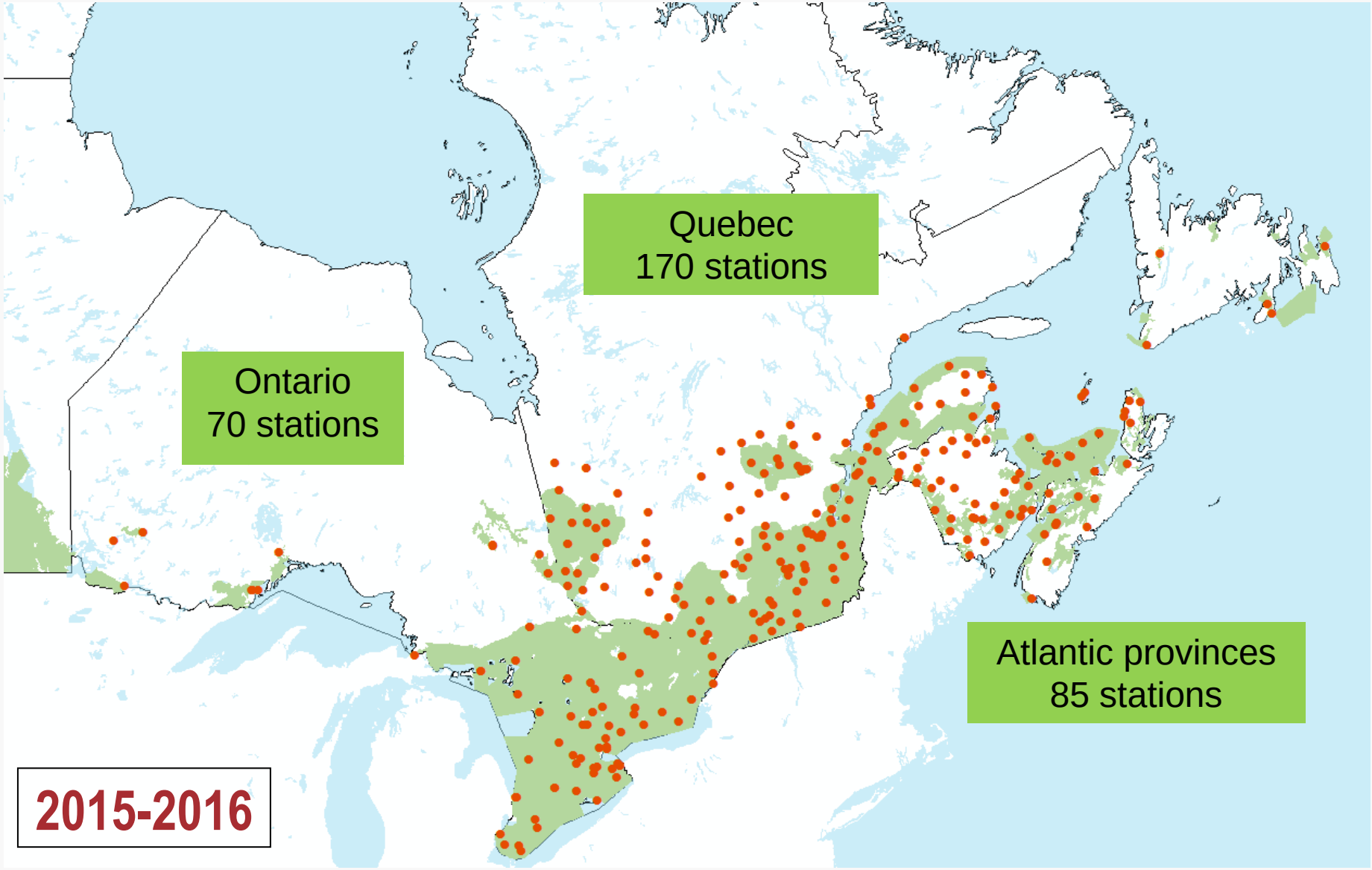
Bioclimatic models

Predicted values

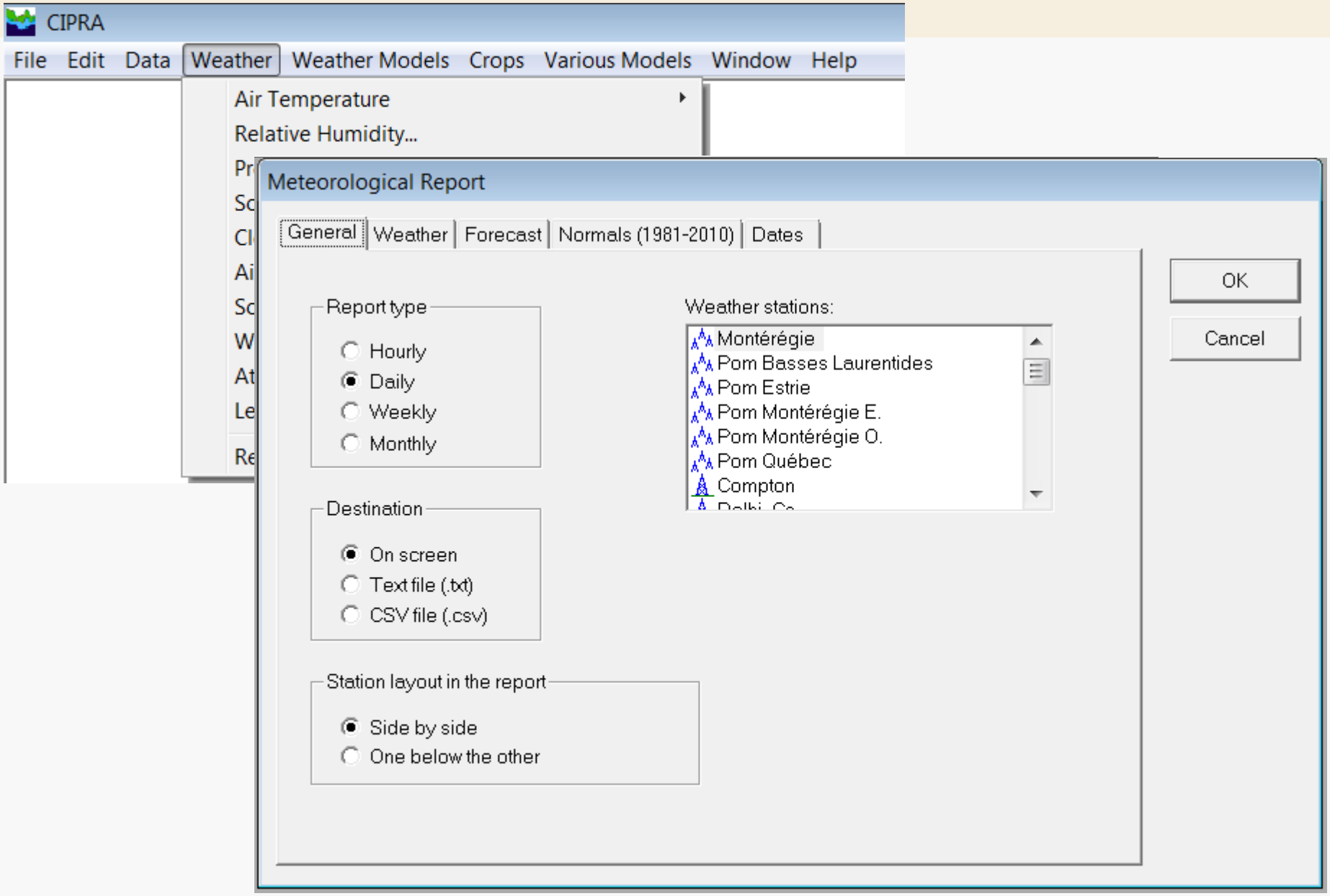
Biological observations

- Interpretation
- Evaluation
- Development and/or update
- Technology transfer

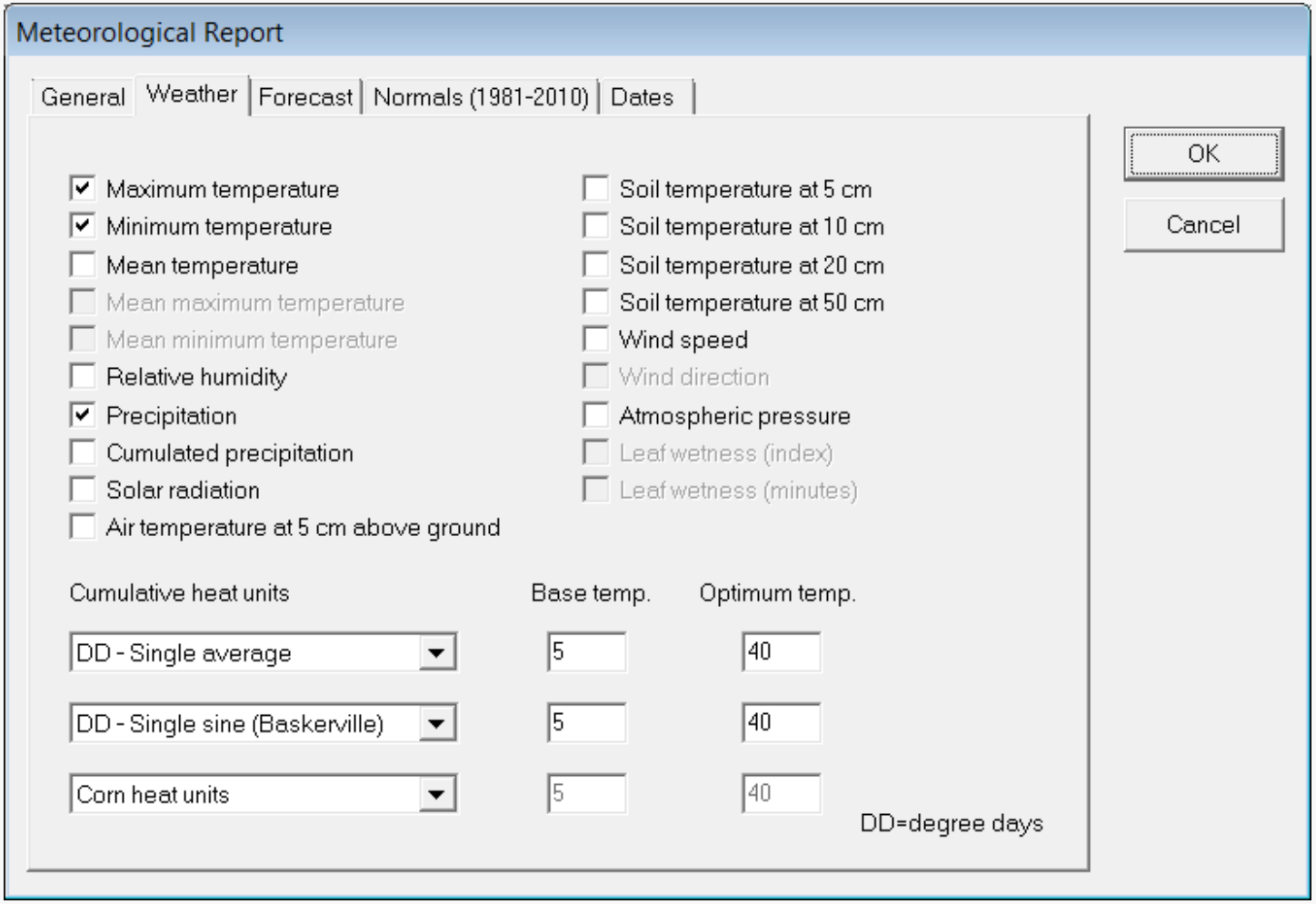
Operational weather network for bioclimatic models implemented in CIPRA for Eastern Canada (“real time”)



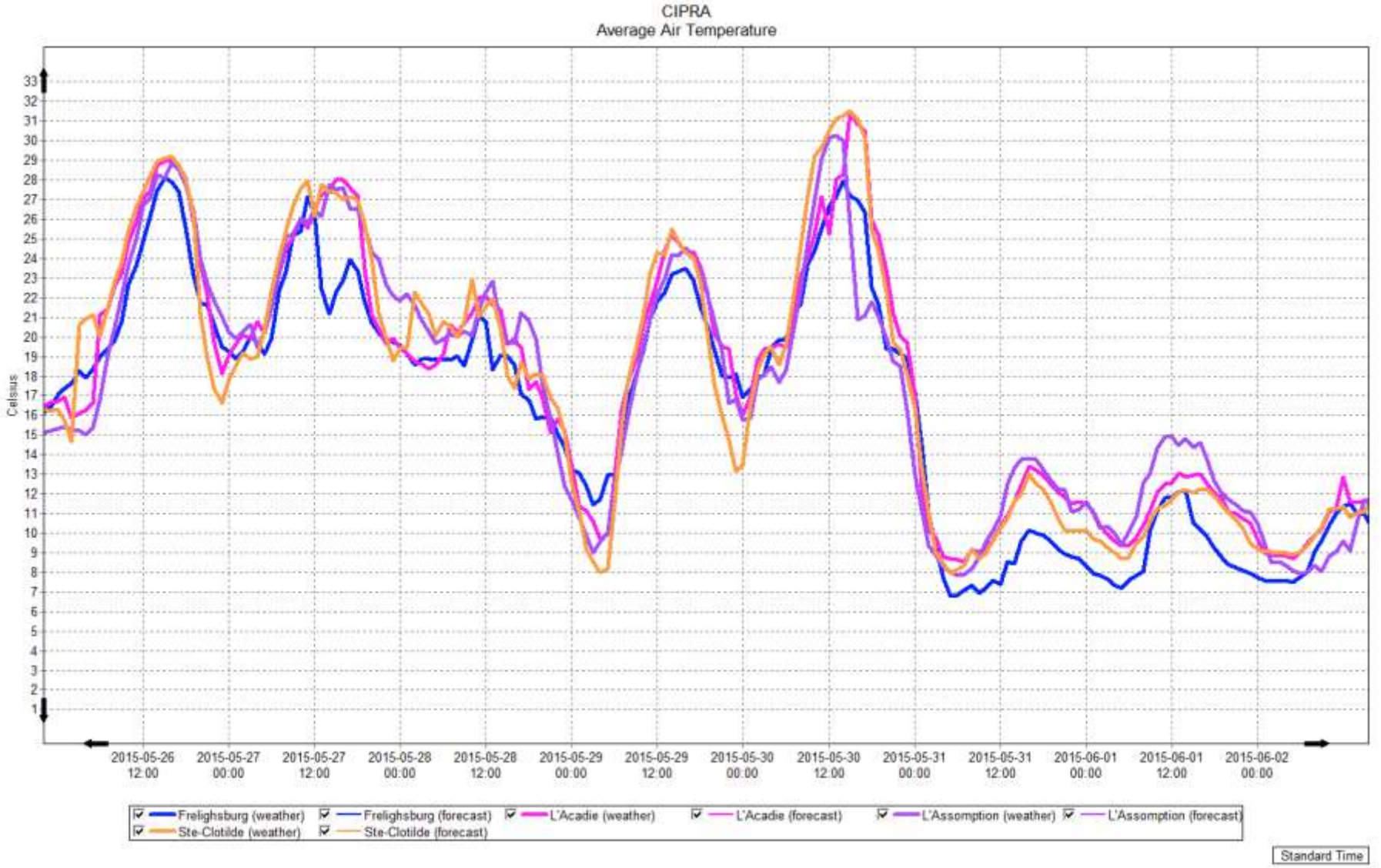
Weather module



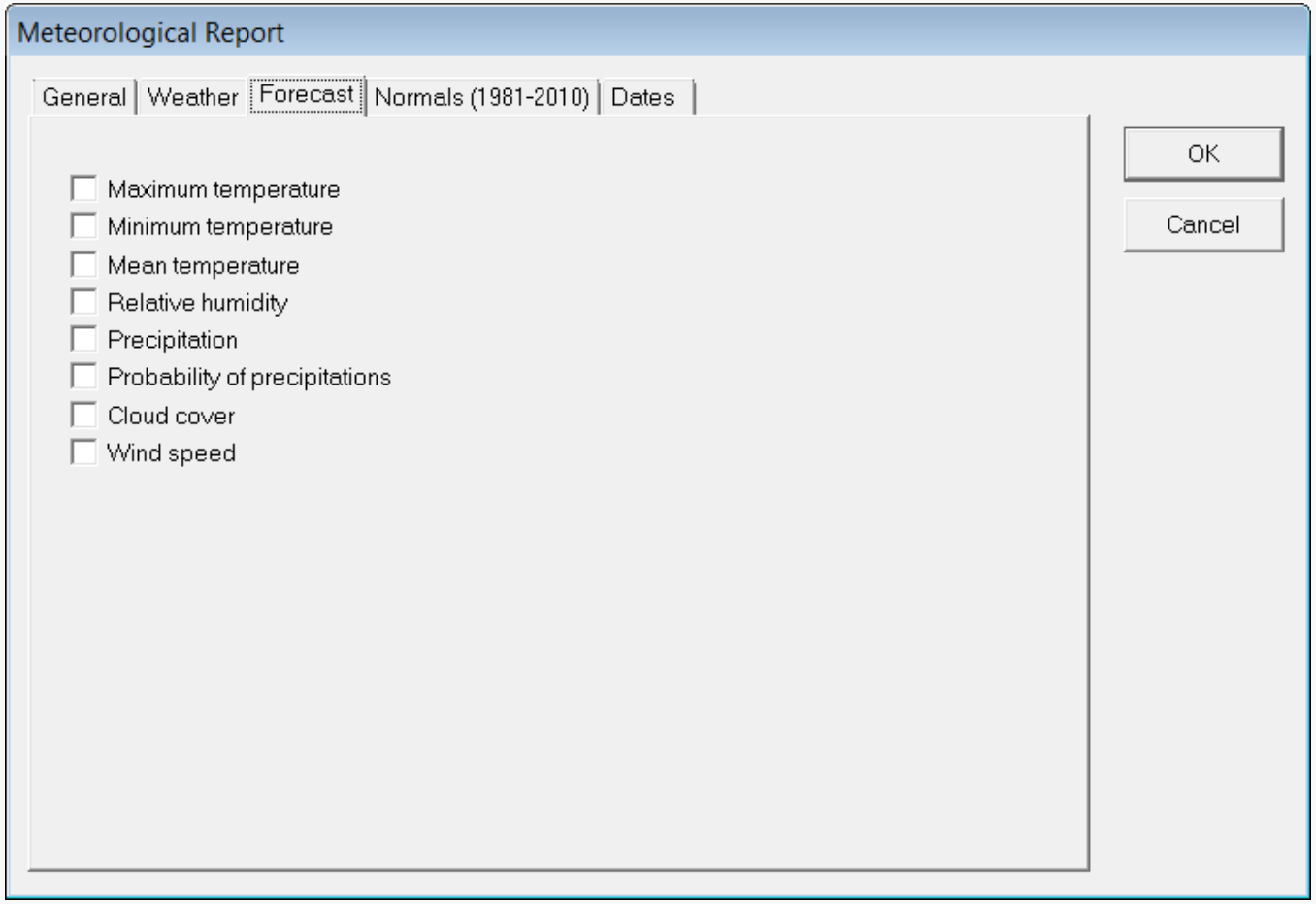
Weather observations: air temperature



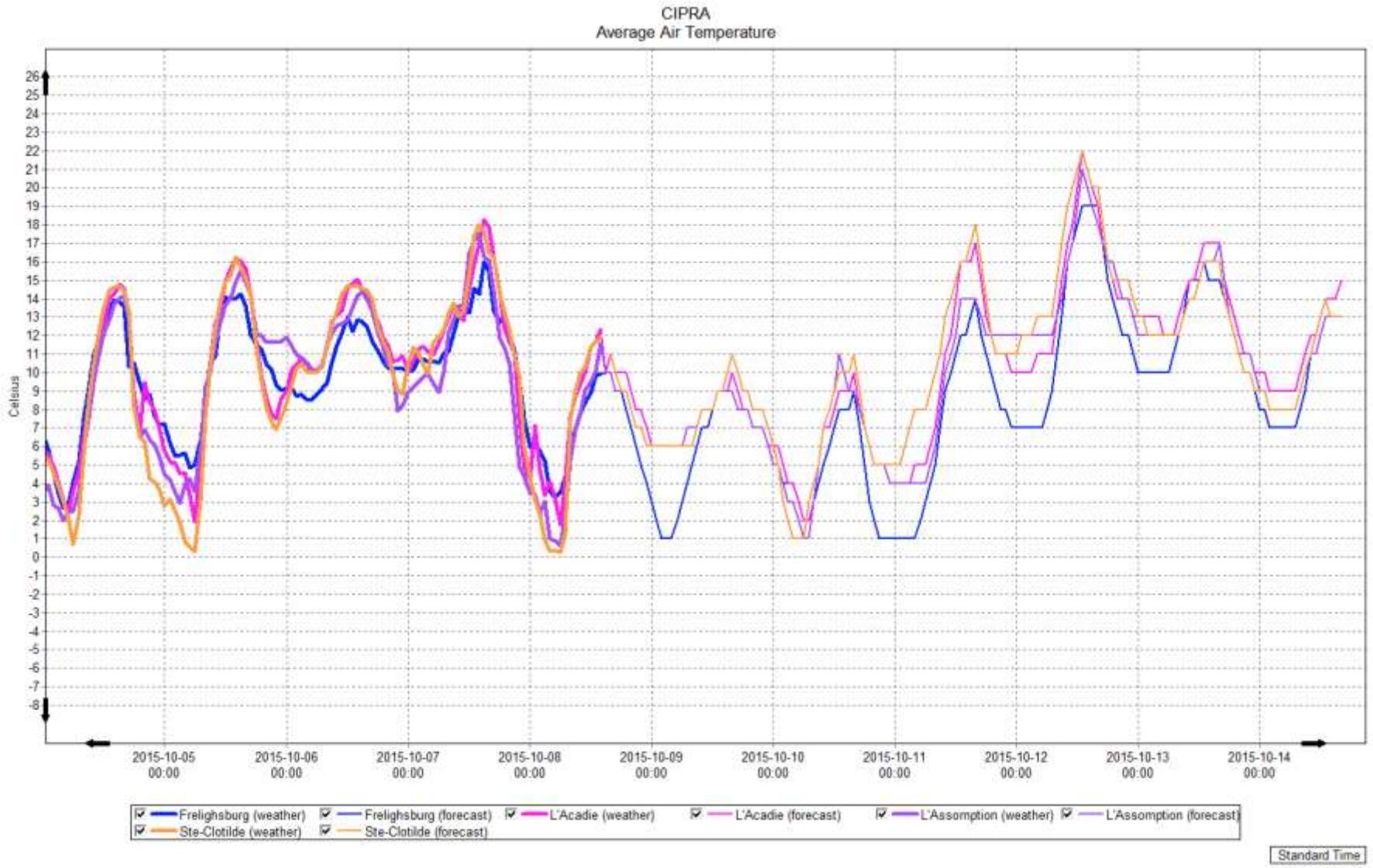
Weather observations: air temperature



Weather forecast: air temperature

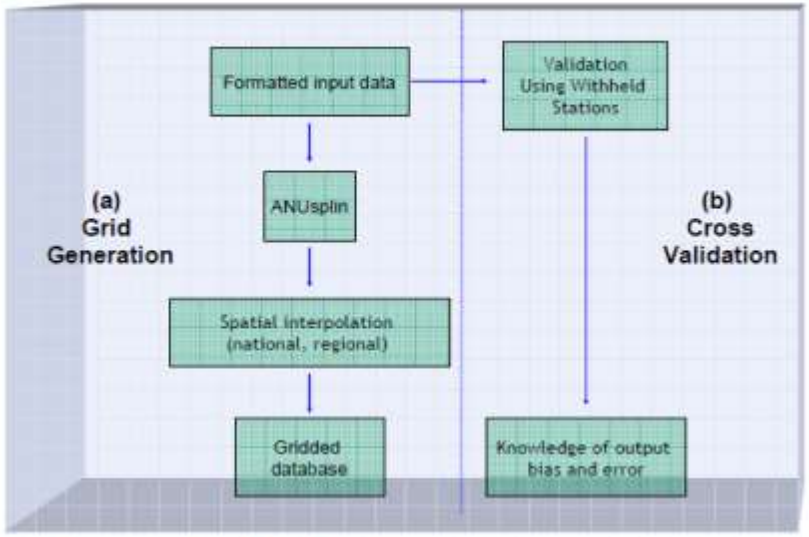


Weather forecast: air temperature

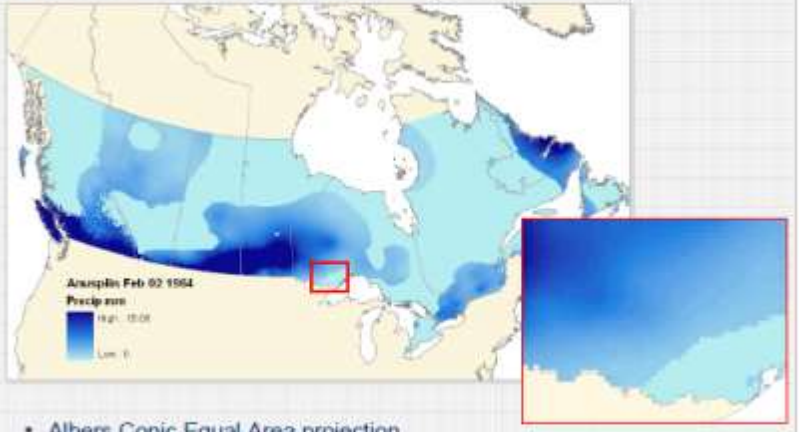


Climate normals (averages of 30 years) generated from the daily 10 km gridded climate dataset for Canada (1950 to 2012)

Methodology

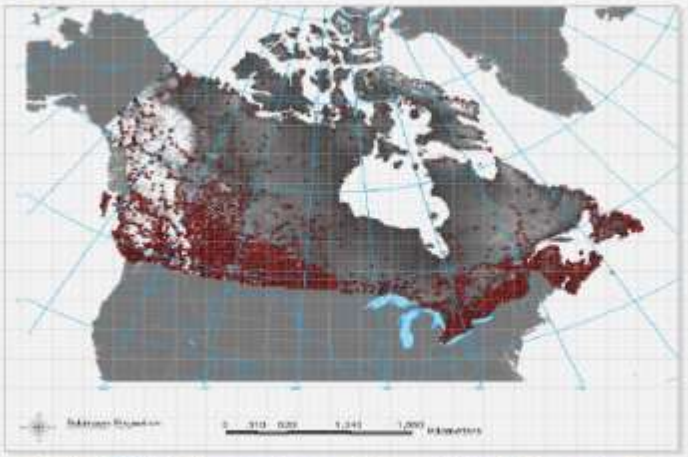


Grid Generation: Output Data (Raster Grids)



- Albers Conic Equal Area projection.
- Grid cell size: 10 km; (Rows: 260, Columns: 544).
- GeoTIFF raster format.

Grid Generation: Input Data



- Daily Max/Min Temperature and Precipitation data acquired from EC.
- Data acquired for period 1961–2003 (approximately 7514 stations).

Grid Generation: Output Data (ASCII Point Grids)

- Albers Conic Equal Area projection.
- Grid point spacing: 10 km.
- Comma-delimited (.csv) text file format.

Tair, Tsoil, RH, Wind, SolRad, Precip

Weather observations (hourly)

Tair, RH, Precip (%prob.), Cloud Cover, Wind

Weather forecasts (hourly)

Tmax, Tmin, Precip

Climate normals (daily)

Bioclimatic models

Predicted values

Biological observations

- Interpretation
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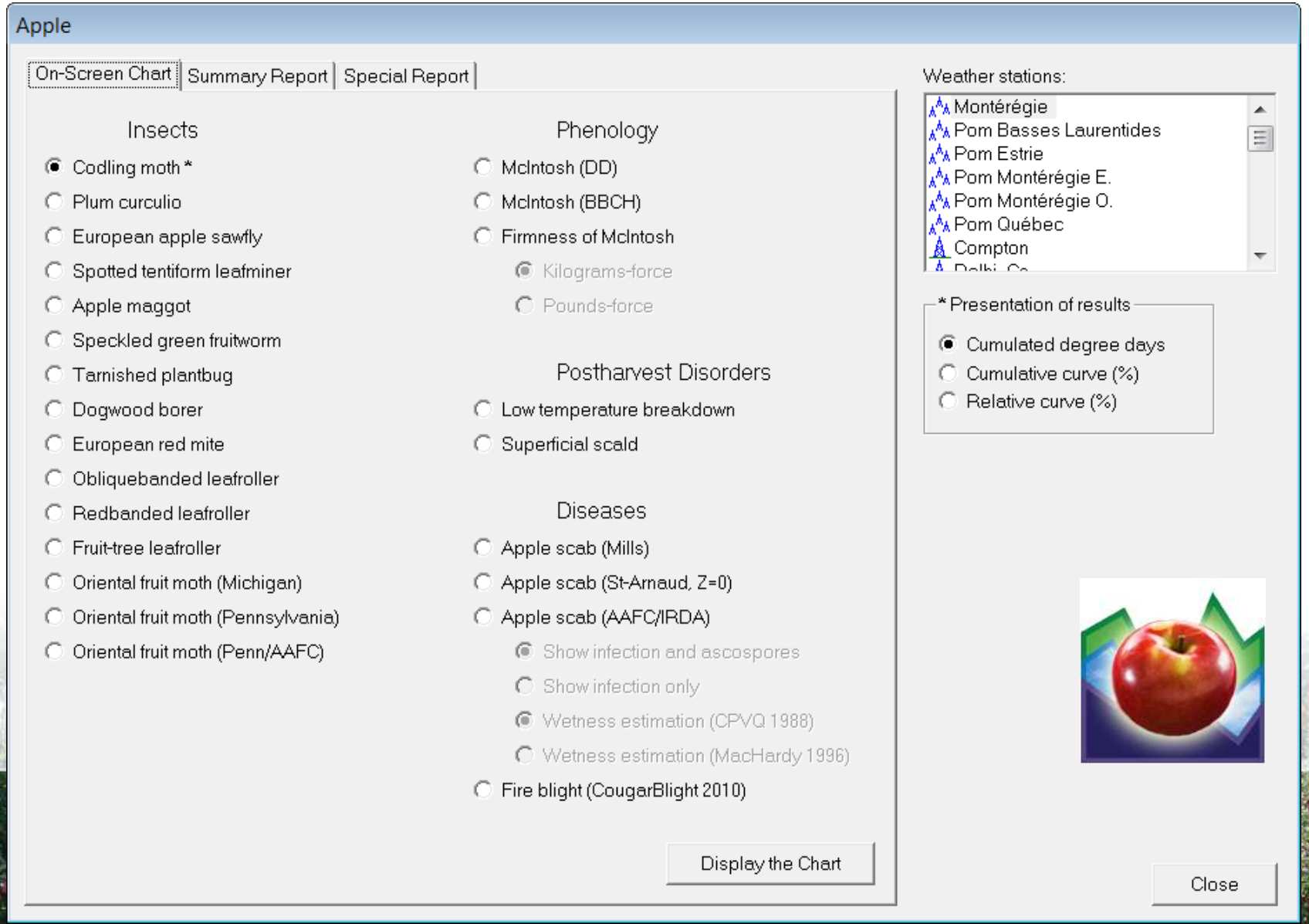
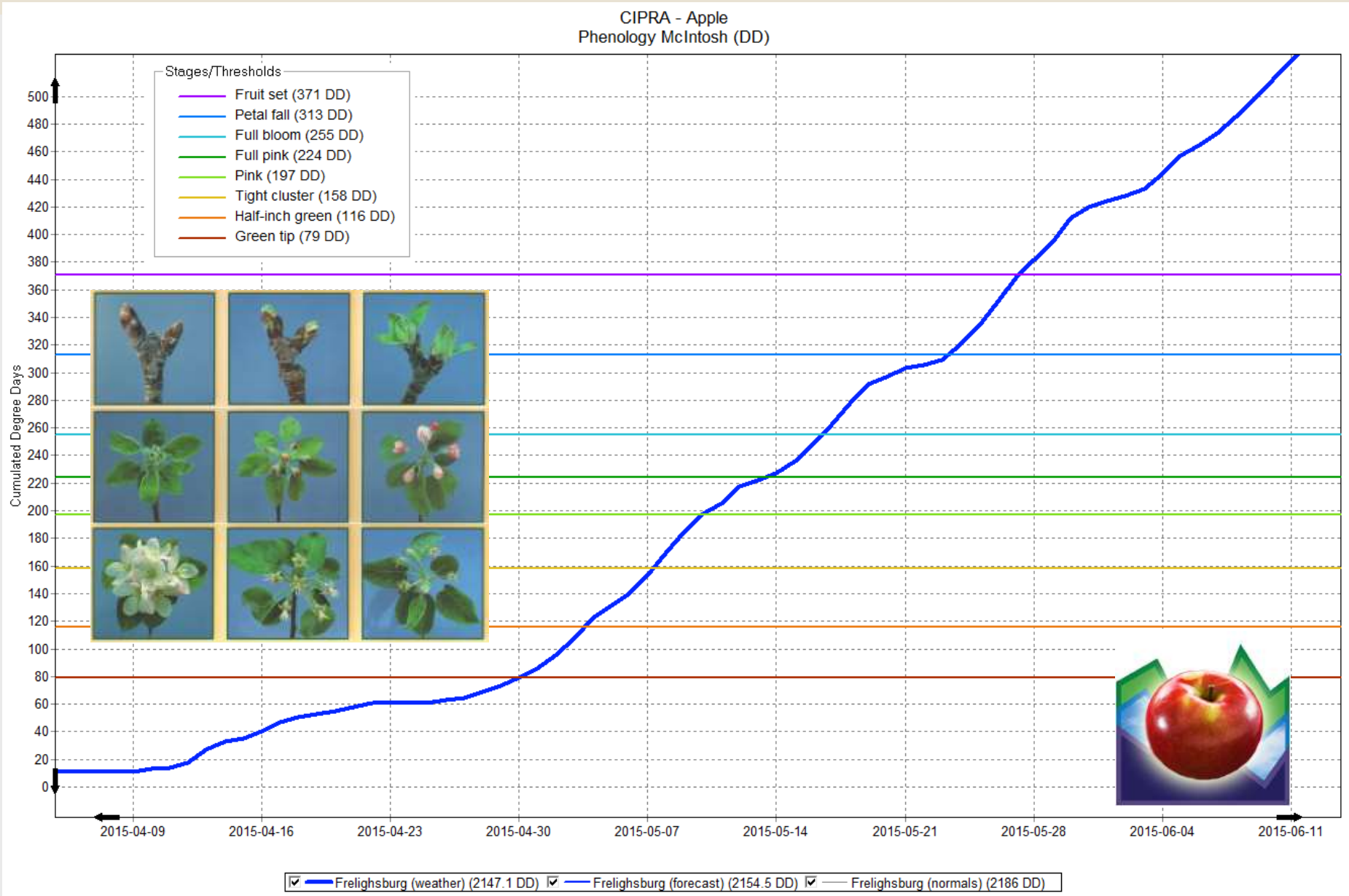
- Development or Update
- Technology Transfer

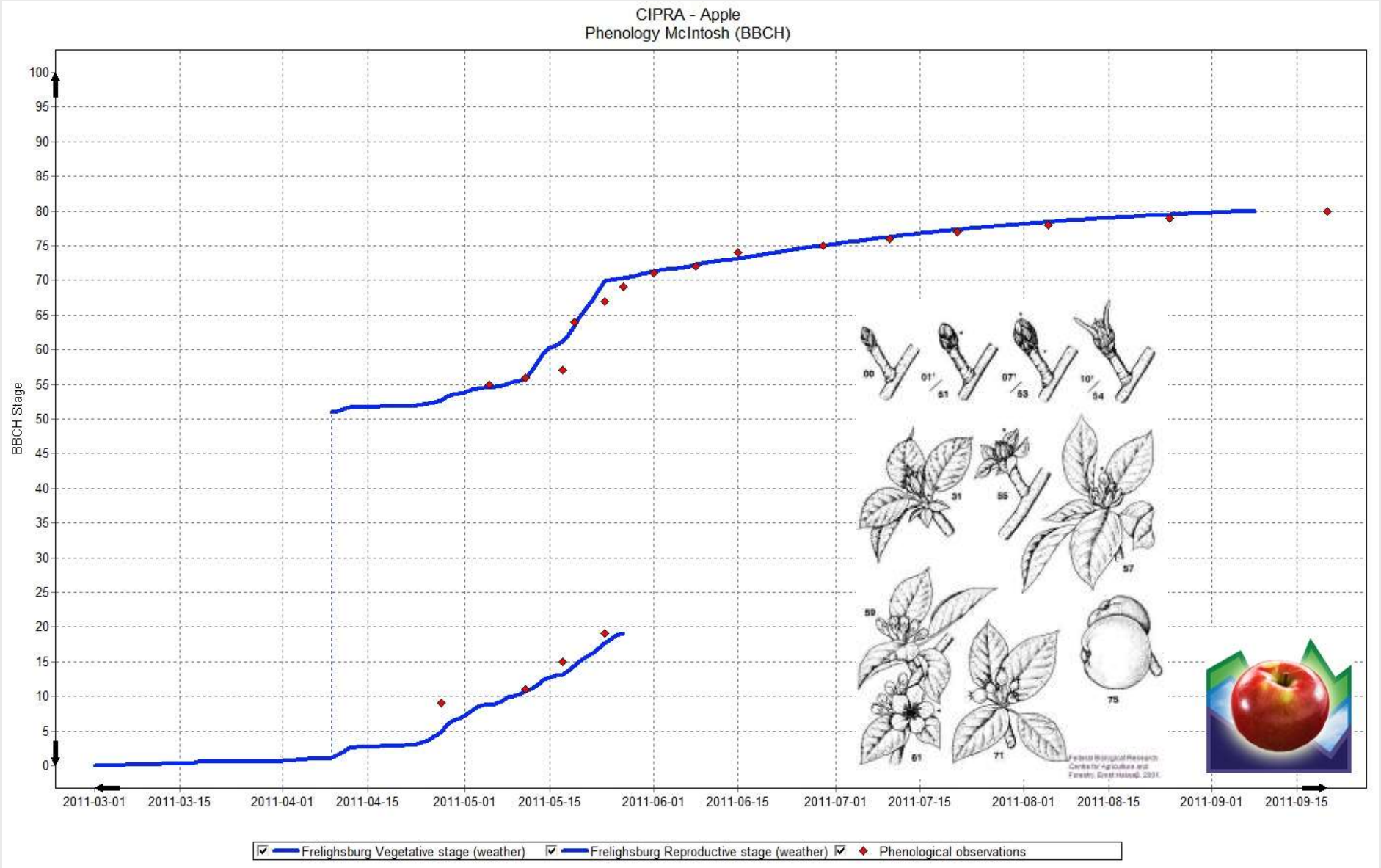
Bioclimatic models in apple



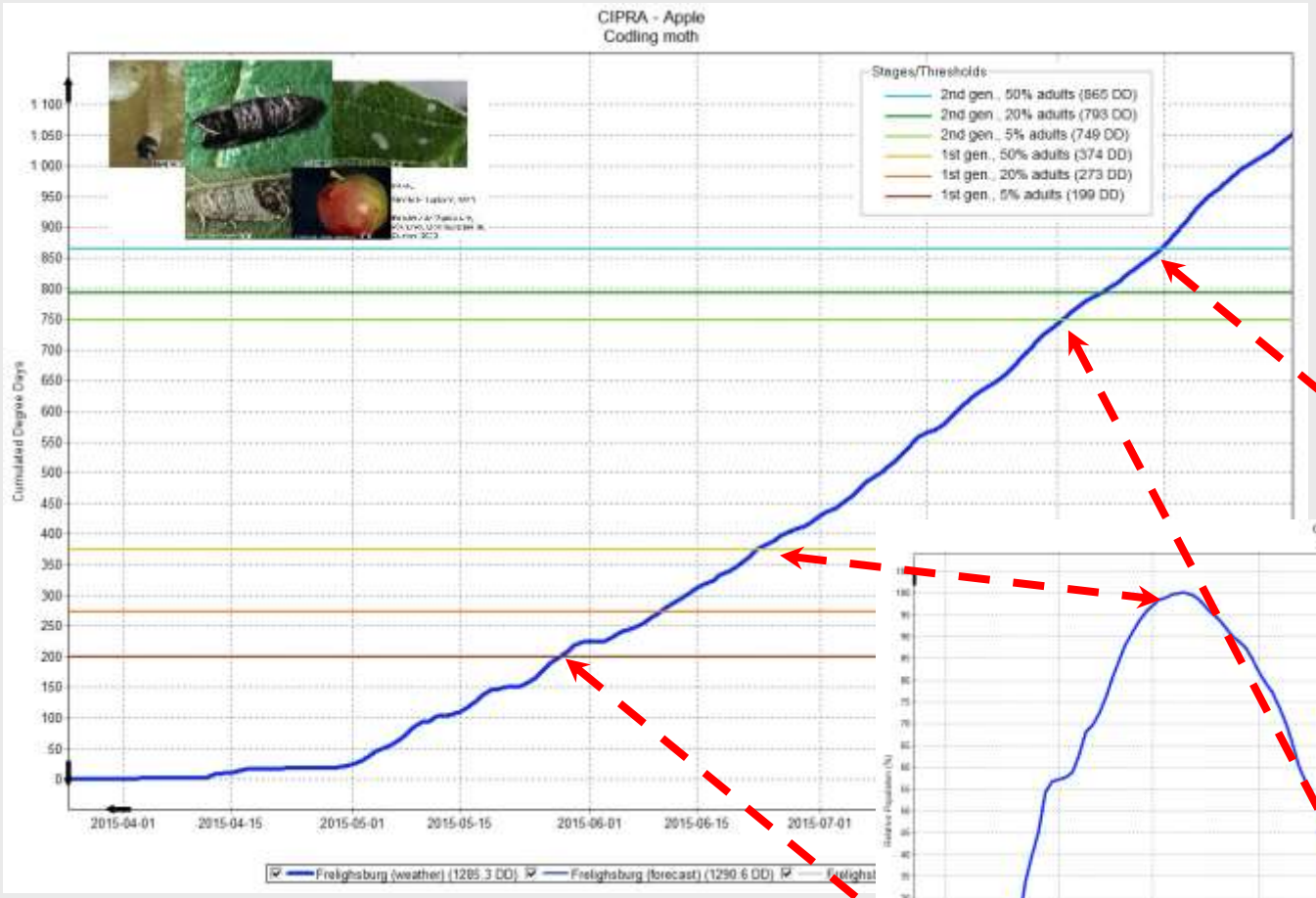
Predicting apple phenology: cumulated degree days



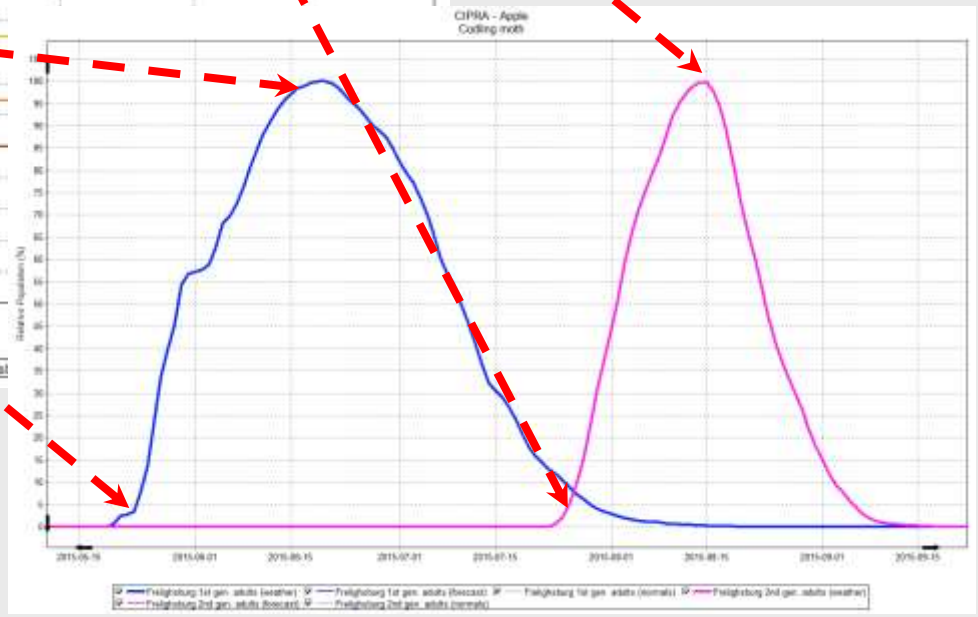
Predicting apple phenology: BBCH stage



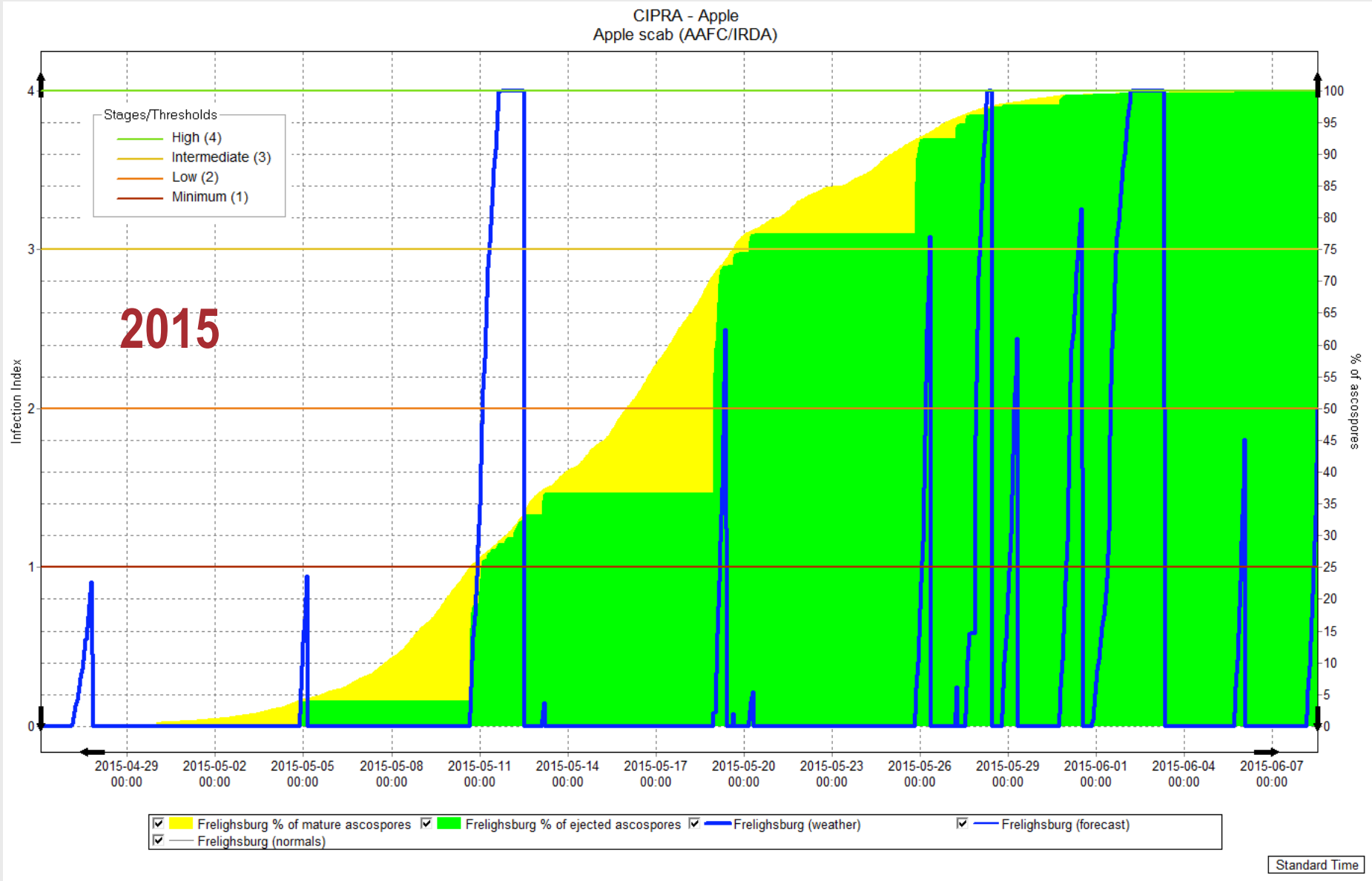
Forecasting codling moth: based on cumulated degree-days



2015

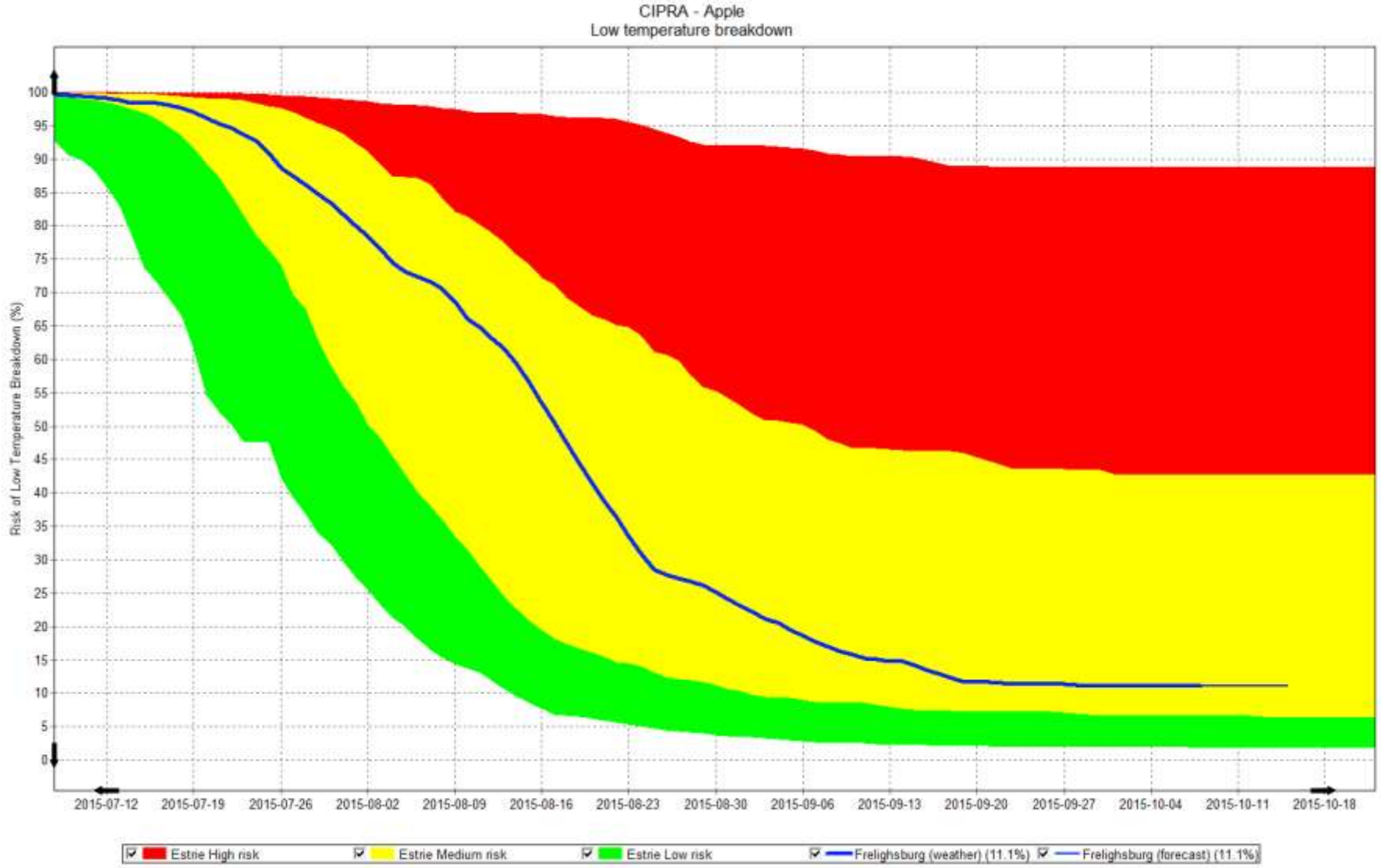


Forecasting Apple Scab



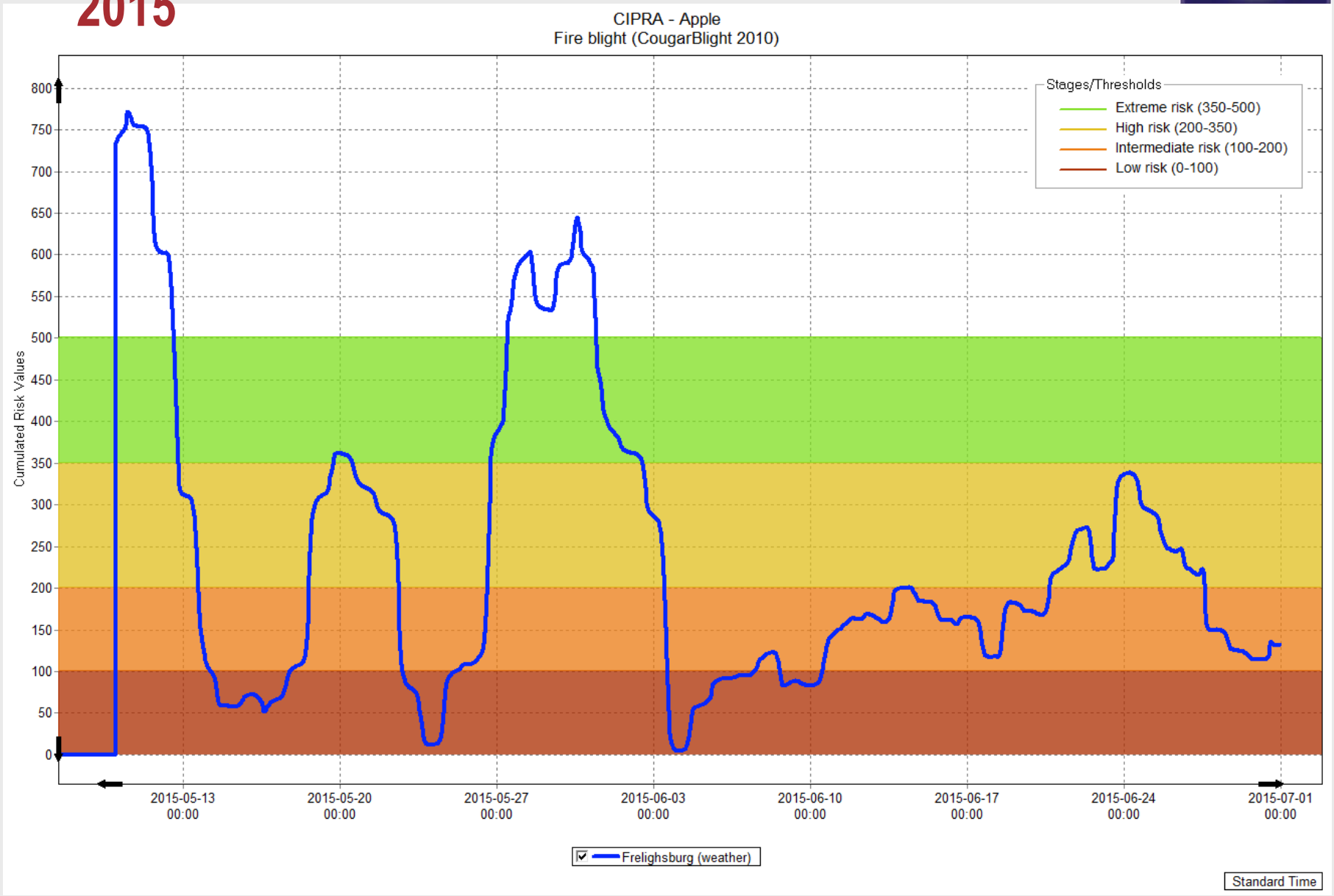
Forecasting Low Temperature Breakdown

2015

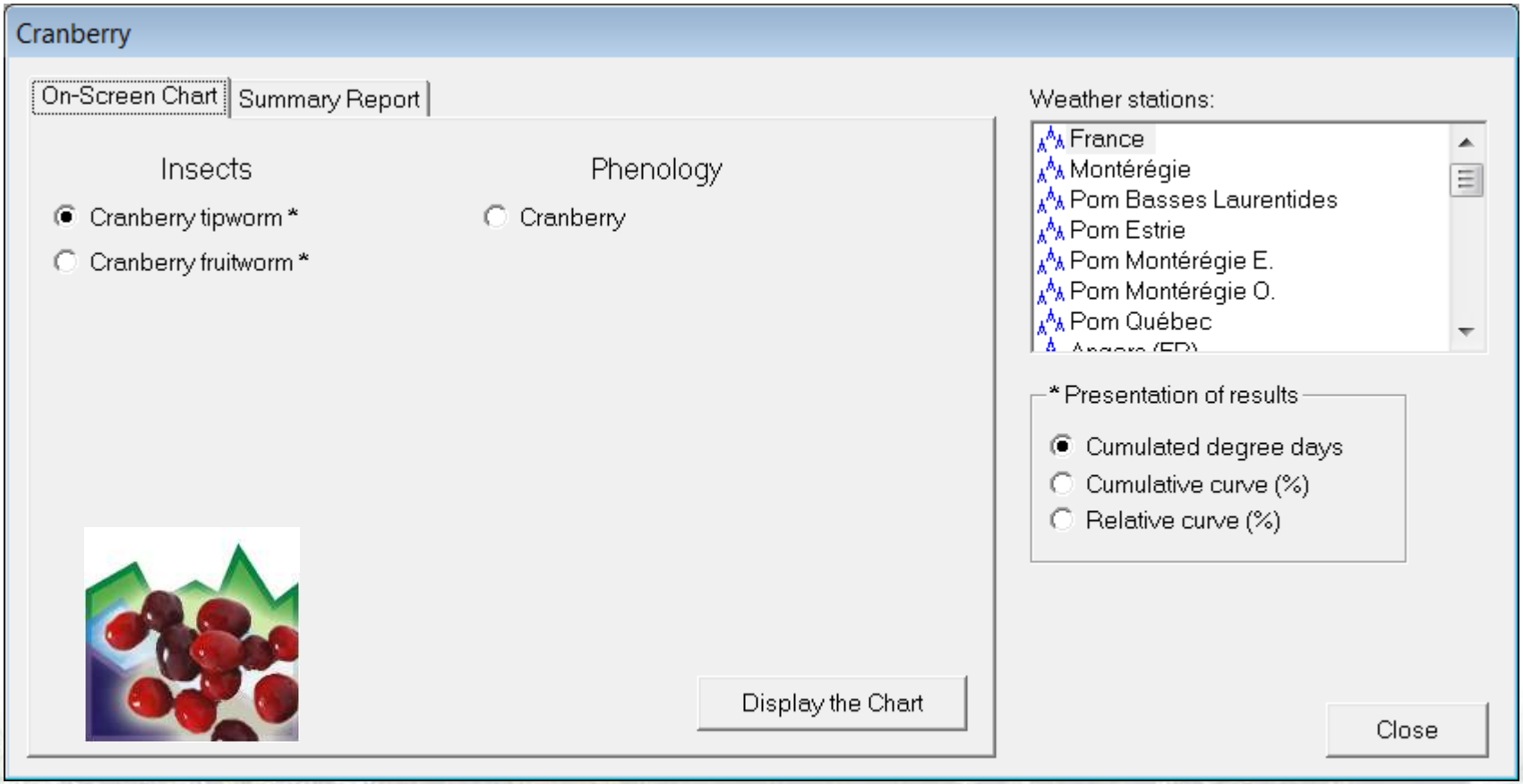


Forecasting Fire Blight

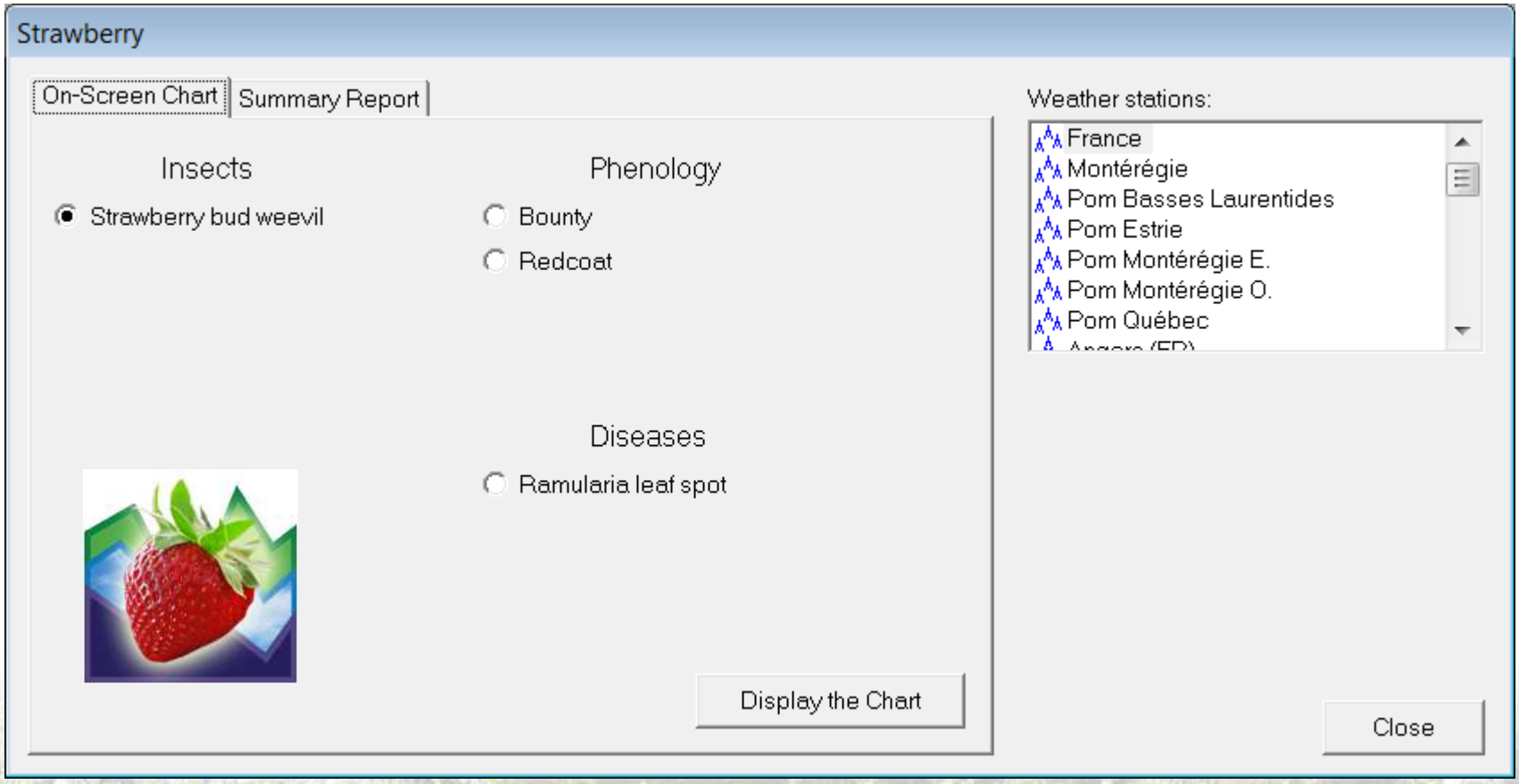
2015



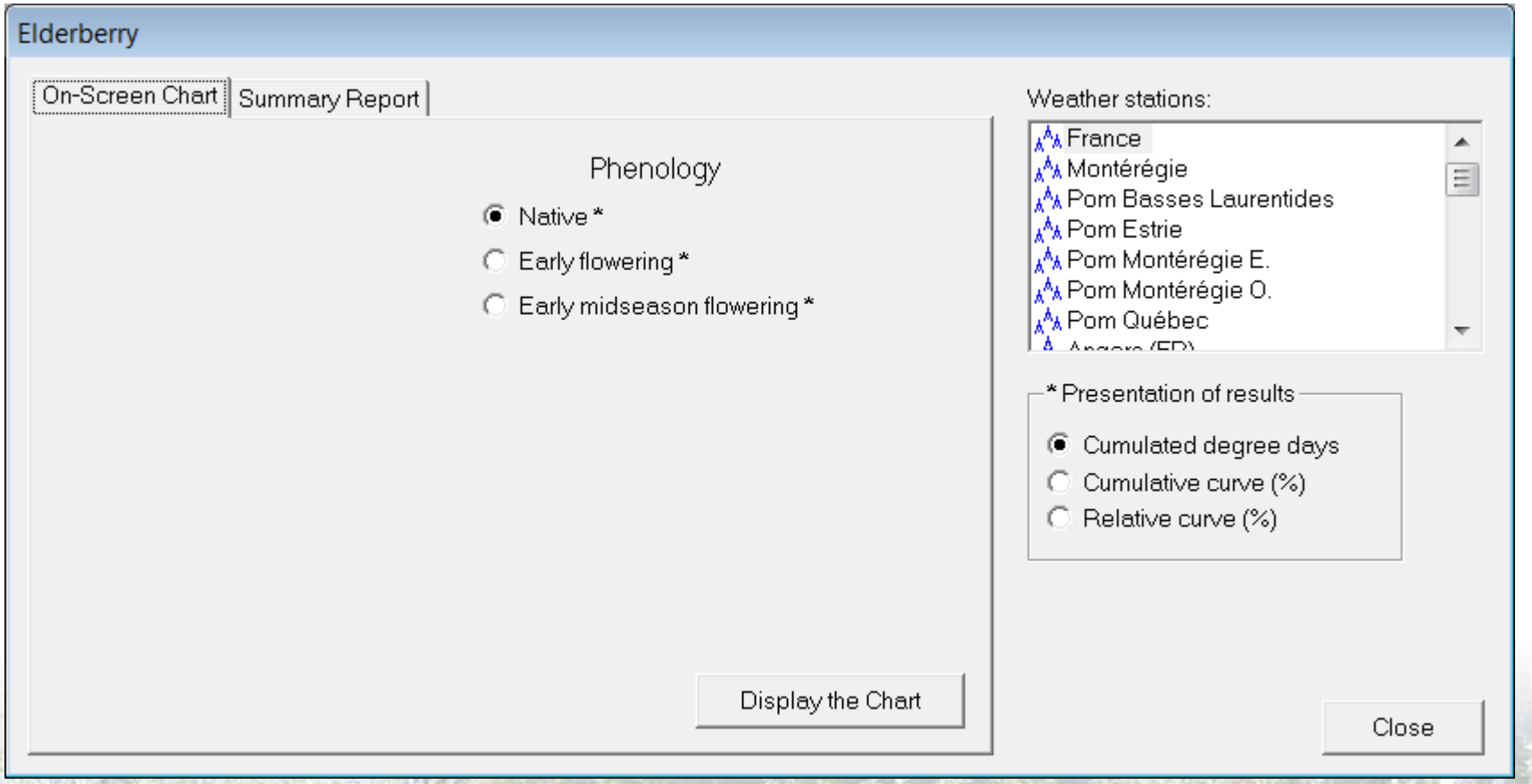
Bioclimatic models in other fruit crops



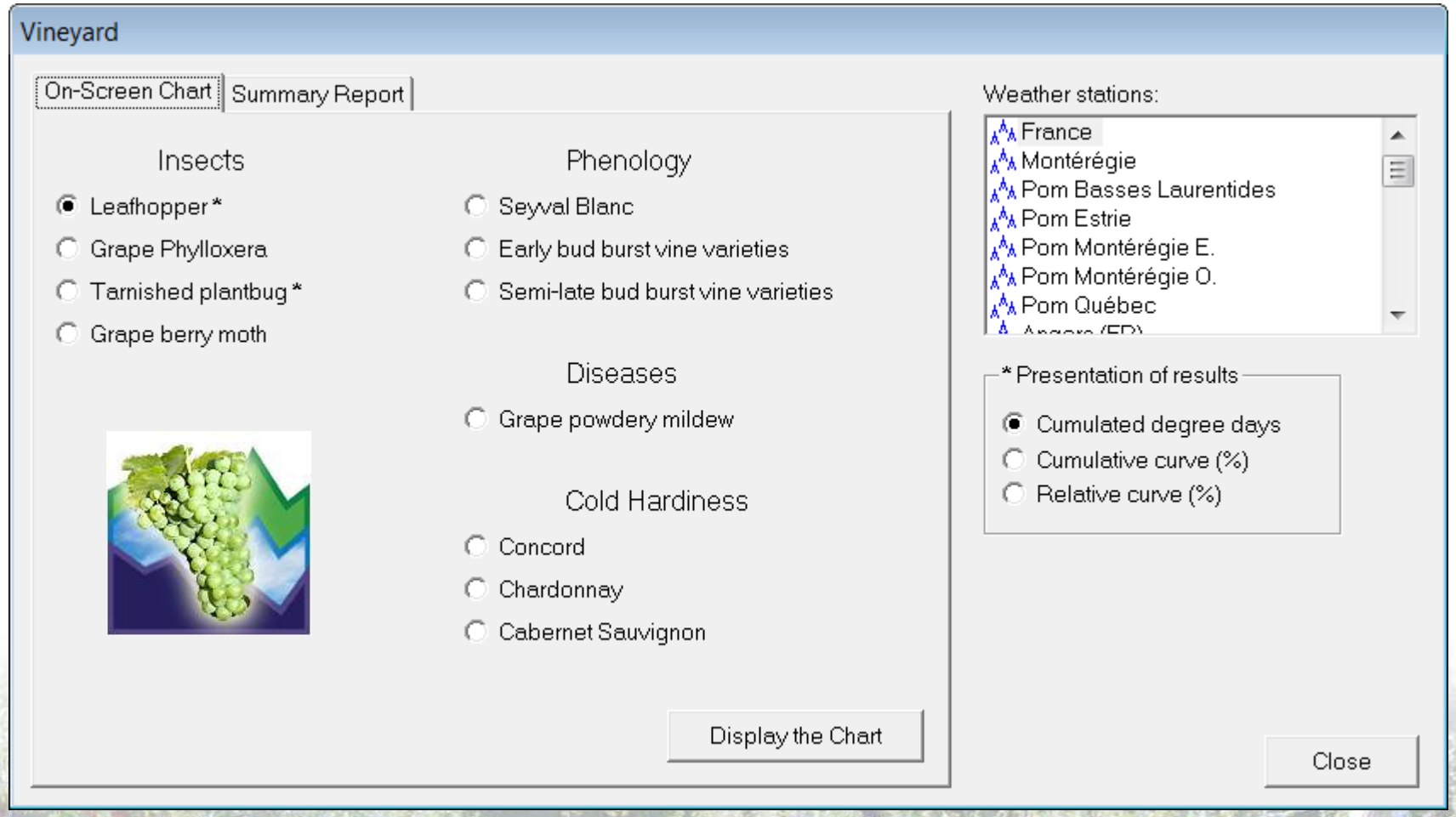
Bioclimatic models in other fruit crops



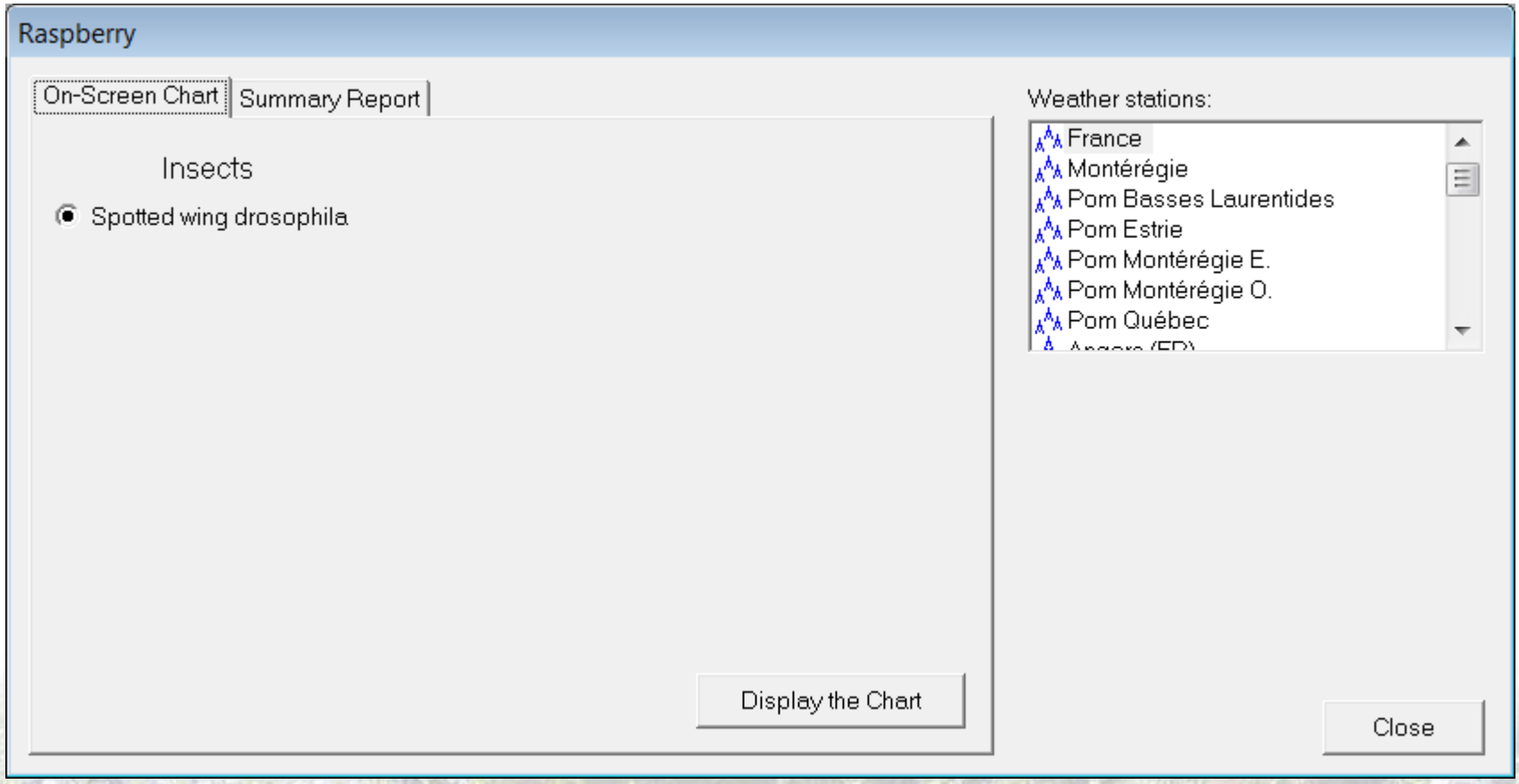
Bioclimatic models in other fruit crops



Bioclimatic models in other fruit crops



Bioclimatic models in other fruit crops



CIPRA at a glance

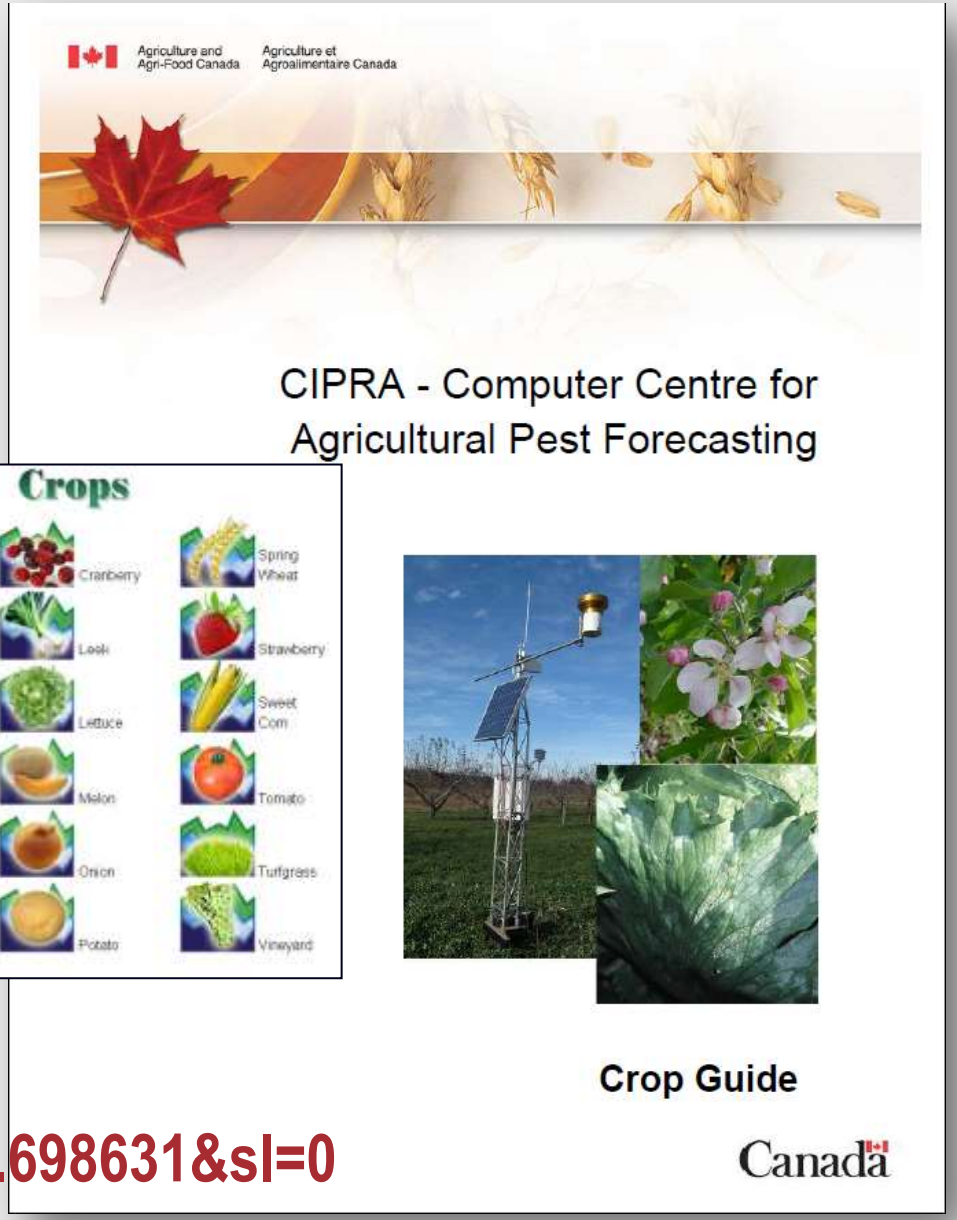
- ✓ 23 crops: vegetables (9), fruits (6), grains (3), forage (3), potatoe, turfgrass
- ✓ Models : phenology (24), insects (36), diseases (14), physiological disorders (2)
- ✓ Real-time and forecasted predictions (observations and weather forecast)
- ✓ ± 215 users:

  Canada (195), France (6), USA (4), Spain (2), Canary Islands (1), Ireland (1), Korea (1), Morocco (1), Namibia (1), Nigeria (1), Dakar (1), Ethiopia (1)

For more information on bioclimatic models

- Guide on bioclimatic models of CIPRA
- Available on-line
- Information
  - ✓ Pest descriptions
  - ✓ References for the models (thresholds, dev. temp., etc.)
  - ✓ Interpretations of the curves

Published in November 2014



http://publications.gc.ca/pub?id=9.698631&sl=0

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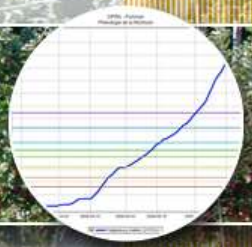

Thank you !

Horticultural R&D Centre, Saint-Jean-sur-Richelieu, QC
For more information: Dominique.Plouffe@agr.gc.ca

Canada