

Analyzing the Allergenic Airborne Pollen Season for Health Stakeholders



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HAQAST 4: Madison, WI

July 16, 2018



Year 2 Progress Update, PI Hess

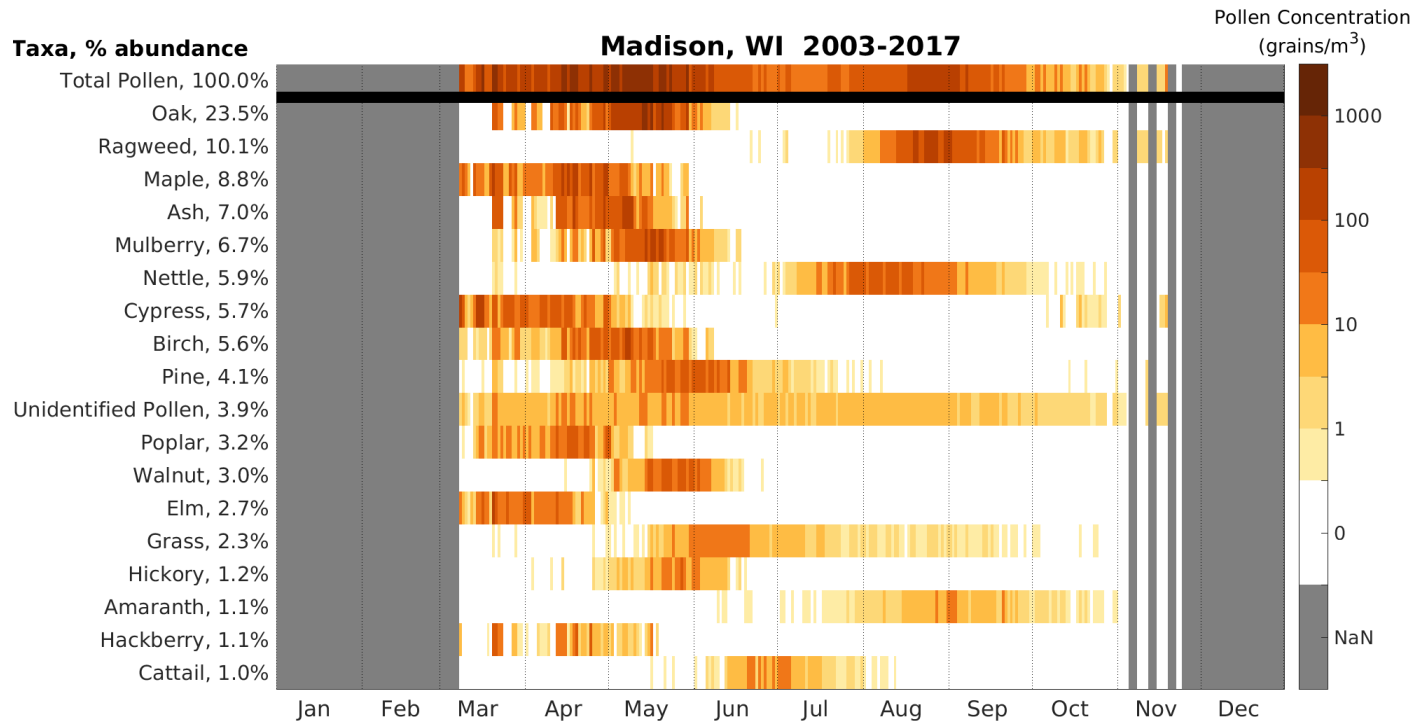
POLLEN, WEATHER, CLIMATE, & HEALTH

1. Influence of Weather, Climate on Pollen Season
 - Large descriptive analysis completed, presented AAAAI, paper in review
 - Ongoing analysis on weather/climate drivers of pollen season indices
 - Goal: to develop seasonal pollen forecast
2. Relationship between Pollen and Health Outcomes
 - Completed analysis of tree, weed, grass pollens and health outcomes, presented AAAAI, paper in preparation with CDC collaborators
 - Goal: expand analysis to individual pollen types
3. Developing Pollen Indicators
 - Preliminary analyses of Google search terms promising; paper describing proof of concept
 - 5 academic talks (AAAAI, AMS); 1 poster (PNWCC), 2 public talks (UW), 6 stakeholder meetings (EPA re: climate change indicators; CDC and CSTE re: pollen and weather in environmental public health tracking; AAAAI re: pollen sampling and exposure assessment; NADP re: pollen sampling)

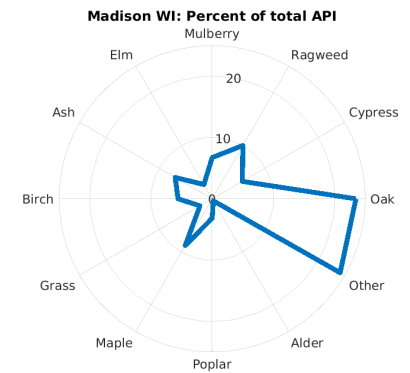
TIGER TEAMS

- TT Arlene Fiore. Using Satellite Data in SIPS.
 - In calls as scheduling allows; focused on public health stakeholder engagement
- TT Pat Kinney.
 - Collecting air pollution samples from Puget Sound region for wildland fire analysis; exploring use of MRI for pollen monitoring

Pollen Calendar: Madison



Percentage of total pollen

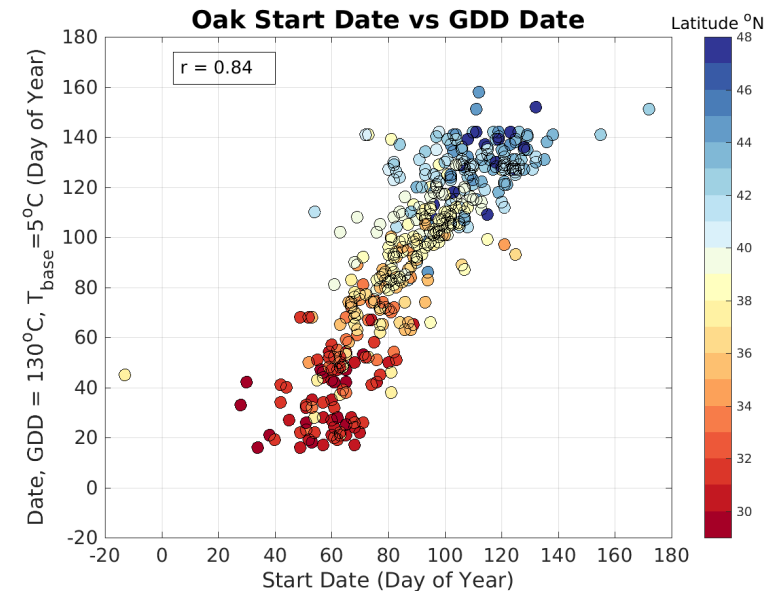
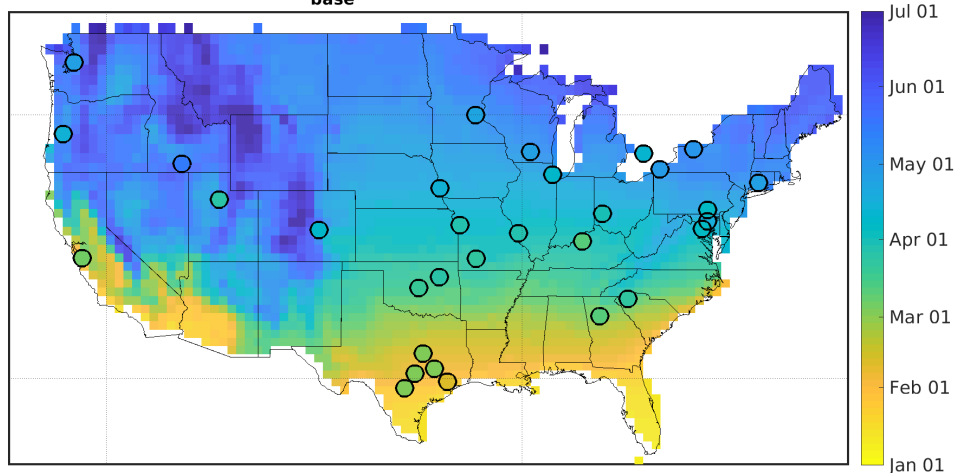


- Visualization of climatology of daily pollen concentration
- Define start date of pollen season by allergic symptoms
- Madison starts sampling pollen too late, late bias in start date

Start Date of Oak Pollen Season and Growing Degree Days

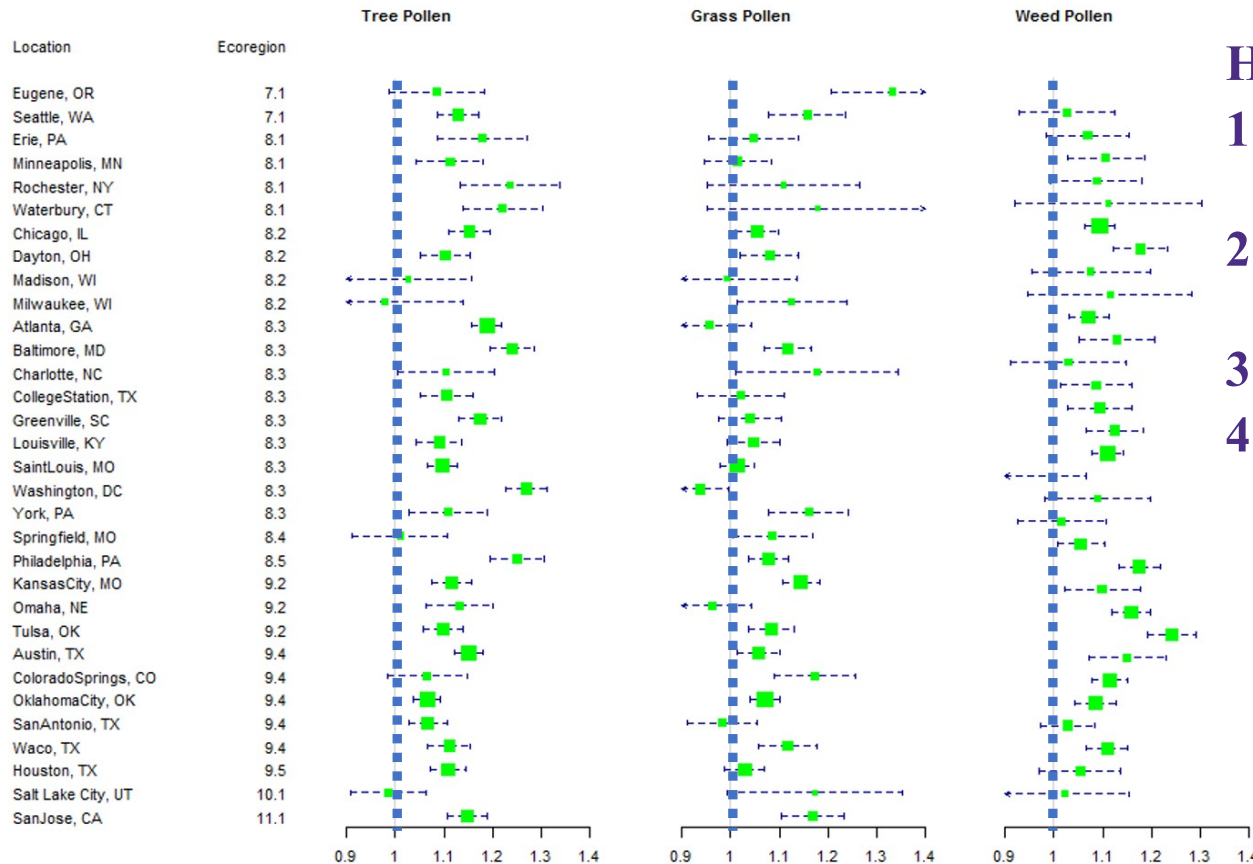
Growing Degree Days = accumulation of daily mean temperatures (Jan 1)

Mean Date GDD = 130°C ($T_{\text{base}}=5^{\circ}\text{C}$) and Mean Oak Start Date, 2003-2017



- Growing Degree Day and oak start date are significantly correlated over all stations for 2003-2017 => Temperature influences start date of the pollen season
- Latitudinal dependence

Pollen and Health Outcomes Related to Allergies



Health Outcomes:

1. Allergic Rhinitis Outpatient visits
2. Asthma Outpatient visits
3. Emergency Dept visits
4. Prescription Medication Refills

*Days categorized as 'low' to 'high' pollen counts based on these values (grams/m³) – Tree = (15,100,250), Grass = (5,15,50), Weed = (5,15,50)

Relative Risk of prescription medication refills on days of high vs low pollen.

Next Steps:

- **Is there a relationship between seasonal precipitation and solar radiation s and pollen season characteristics?**
- **What affects daily pollen concentration? Temperature, precipitation, humidity, solar radiation, winds**
- **Health Outcomes: how do other pollen types besides oak pollen affect health outcomes?**