Pollen Count Basics

Susan K. Harry, MLS
National Allergy Bureau Certified Pollen Counter

UAF
COLLEGE OF NATURAL SCIENCE & MATHEMATICS
University of Alaska Fairbanks

Pollen Identification

Physical features used to differentiate pollen types:

Time of year

Size (in μm)

Shape (circular, triangular)

Apertures (grooves, pores or both)

Ornamentation (spikes, air bladders)

Common Interior Pollen

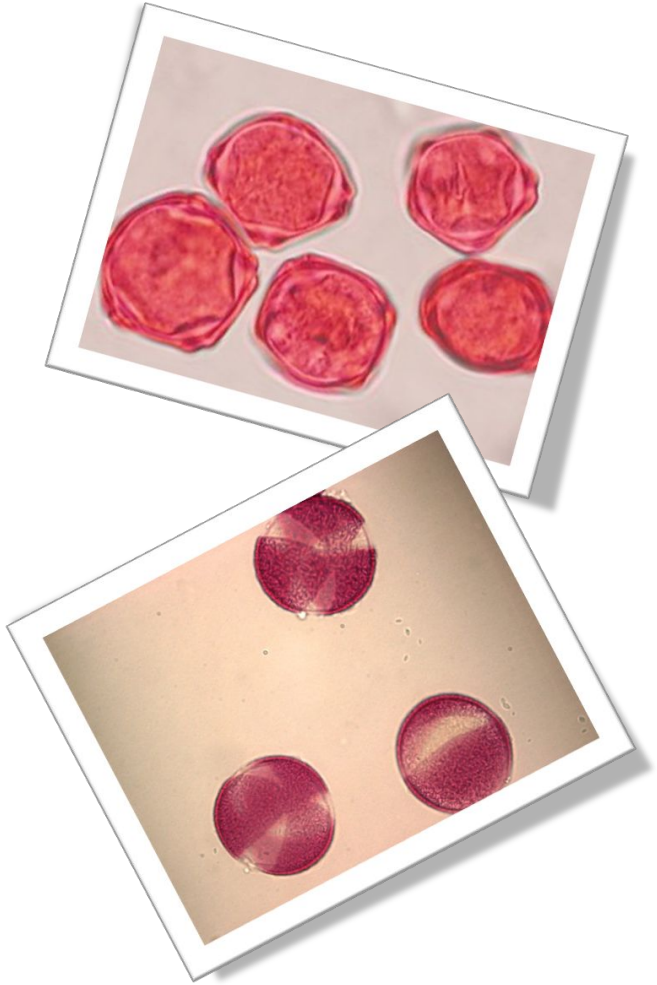
Alder (Thin-leafed and Red)

Considered a moderate allergen

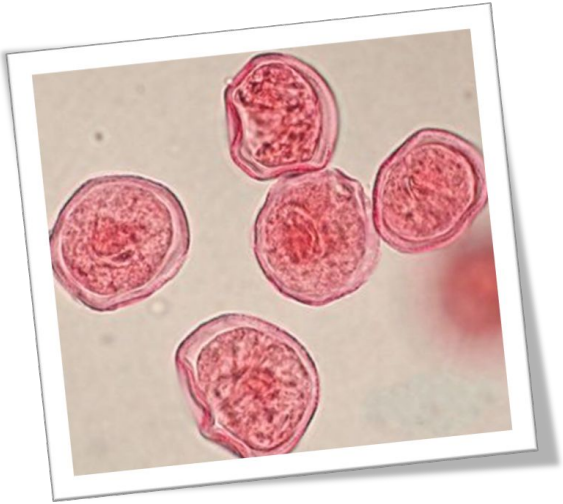
Usually first pollen to appear in the spring.

Willow (Several species)

Considered a severe allergen.



Common Interior Pollen



Black Cottonwood

Balsam Poplar

Quaking Aspen

All considered moderate allergens

A common misconception is that the trees are pollinating when they release their "cotton fluff" into the air. This release comes after the trees have actually pollinated.

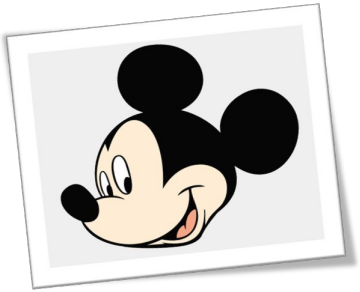
Common Interior Pollen

Black Spruce

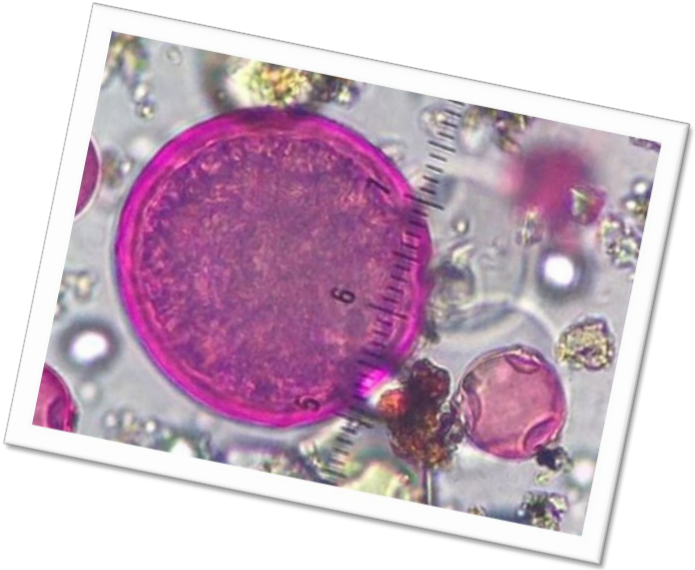
White Spruce

They are rarely considered allergenic.

Pollinate profusely, contribute large numbers to pollen count and noticeable yellow “dust” on decks, cars, etc.



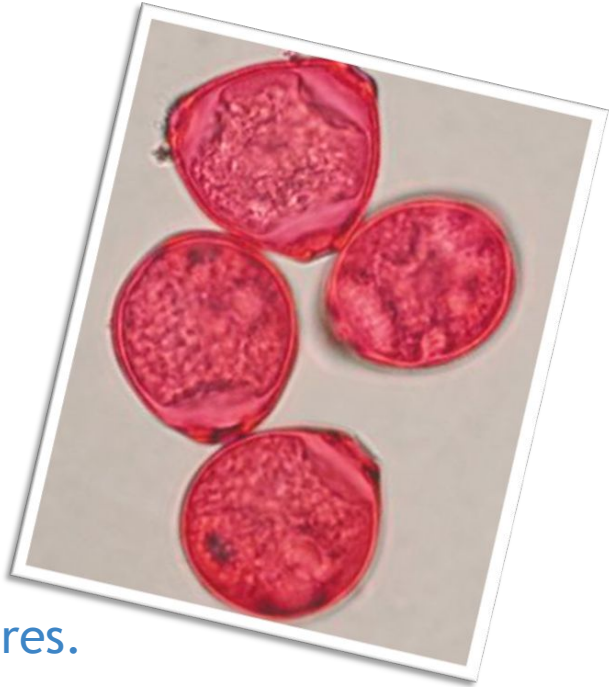
Common Interior Pollen



Tamarack

- Very large grain.
- No allergy has been reported.
- Generally the first forest tree to invade filled-lake bogs.
- One of the first trees to appear at the site after boreal forest fire.

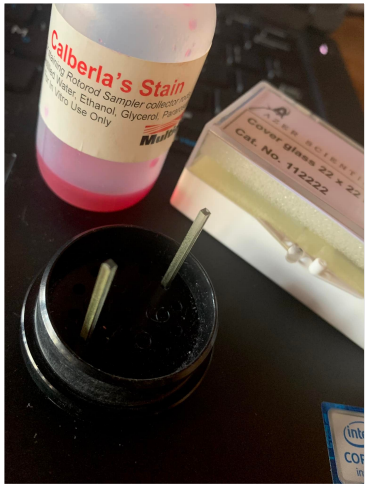
Common Interior Pollen

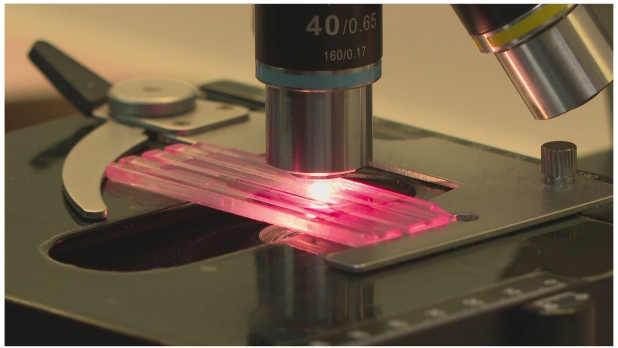


Birch

- Considered a moderate allergen.
- Biggest contributor to pollen count.
- Fairbanks has large population of birch trees
- Triangular, convex sides with three distinct pores.


Rotorod Sampler
MODEL 40


Calberla's Stain
Cover glass 22 x 22
Cat. No. 112222


40/0.65
160/0.17


PRESS KEYS ALL THE WAY DOWN
LABORATORY
COUNTER
Clay Adams

Pollen Reporting

The pollen levels are reported using the National Allergy Bureau chart below.

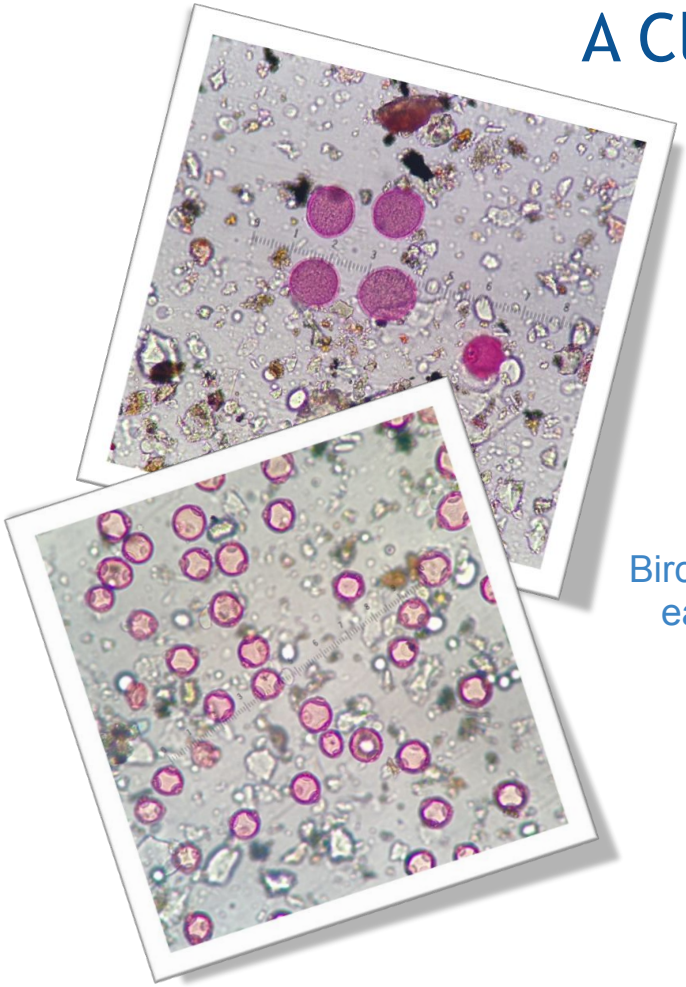
Tree	
0	Absent
1-14	Low
15-89	Moderate
90-1,499	High
1,500+	Very High

Weed	
0	Absent
1-9	Low
10-49	Moderate
50-499	High
500+	Very High

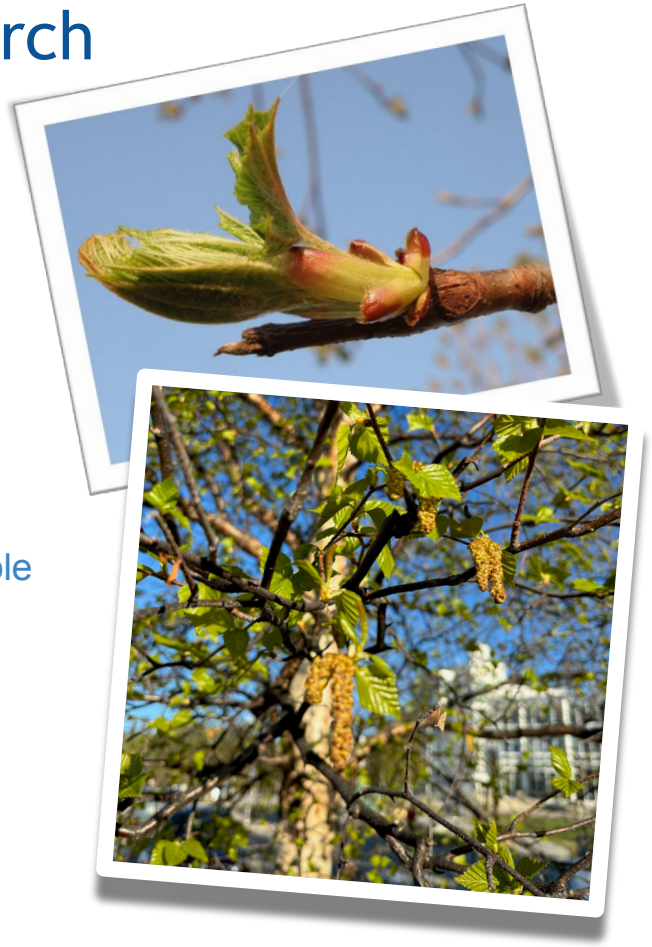
Grass	
0	Absent
1-4	Low
5-19	Moderate
20-199	High
200+	Very High

These levels and the corresponding ranges are based entirely on ecological measurements, not on health effects.

A Closer Look at Birch



Bud Burst



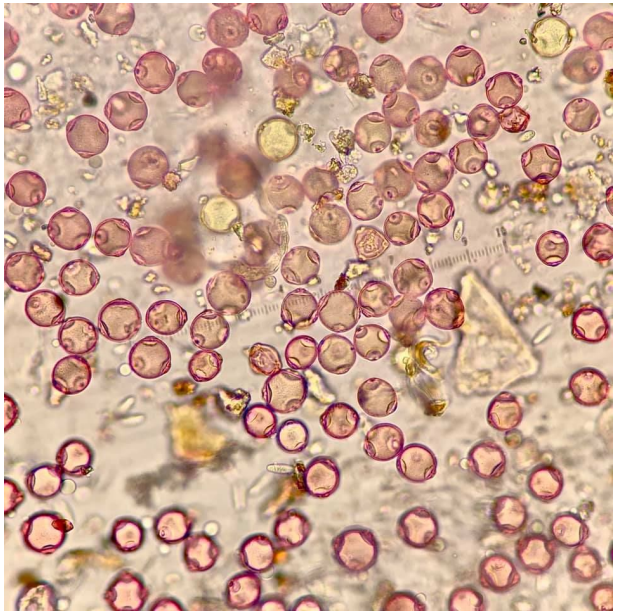
Birch pollen count begins to triple each day after bud burst then peaks on the third day.

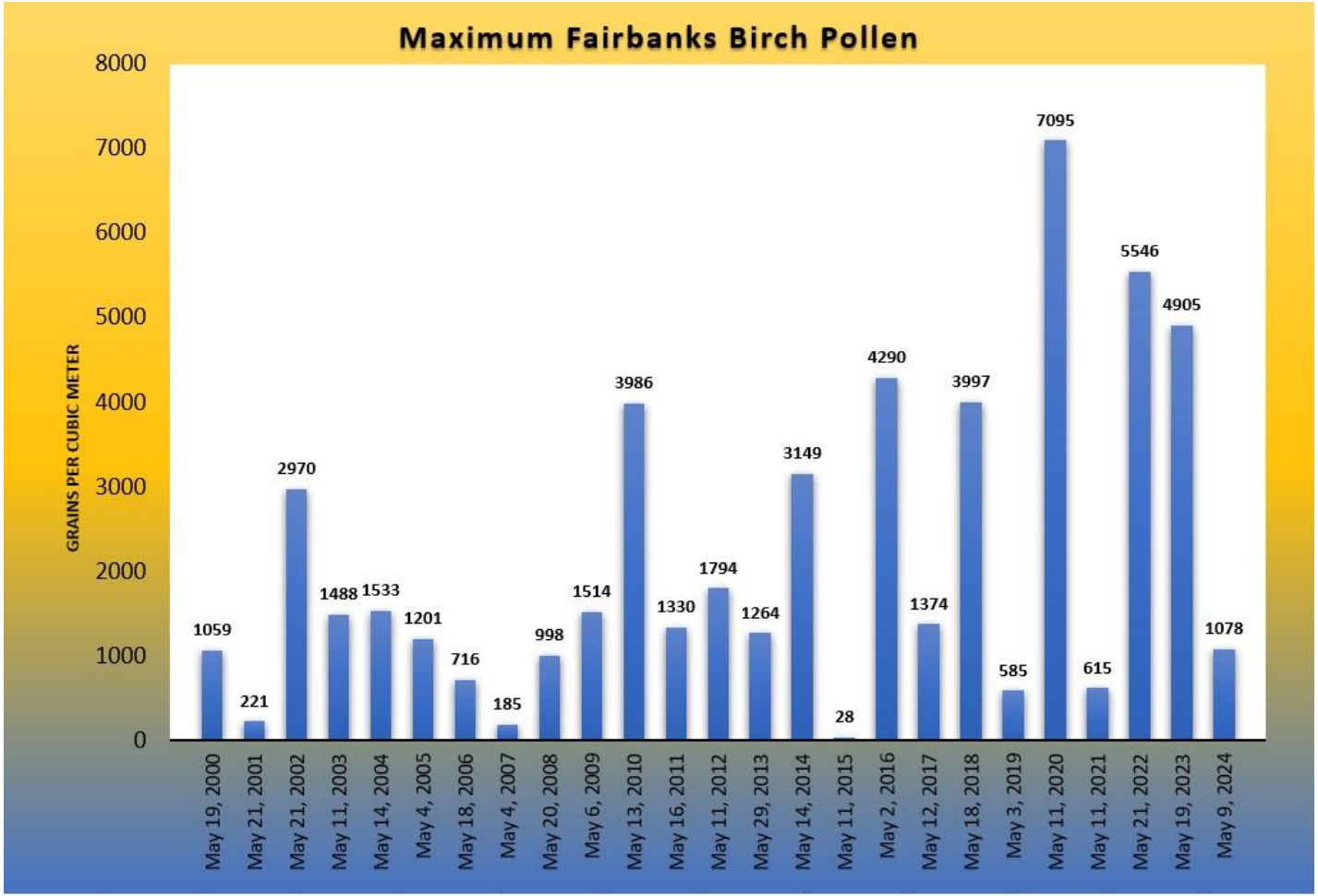
A Closer Look at Birch

Denmark had the record for the World's highest Birch count at 4696 m3 set in April 2014.

Fairbanks, Alaska smashed the record on May 11, 2020 with 7095 grains per cubic meter, highest recorded since counting began in 2000.

In 2022 and 2023 we saw counts well over 4,000. Something to watch as time goes on. With warming, pollen season in Alaska seems to be getting a bit longer and more intense.




Maximum Fairbanks Birch Pollen
GRAINS PER CUBIC METER
8000
7000
6000
5000
4000
3000
2000
1000
0
1059
221
2970
1488
1533
1201
716
185
998
1514
3986
1330
1794
1264
3149
28
4290
1374
3997
585
7095
615
5546
4905
1078
May 19, 2000
May 21, 2001
May 21, 2002
May 11, 2003
May 14, 2004
May 4, 2005
May 18, 2006
May 4, 2007
May 20, 2008
May 6, 2009
May 13, 2010
May 16, 2011
May 11, 2012
May 29, 2013
May 14, 2014
May 11, 2015
May 2, 2016
May 12, 2017
May 18, 2018
May 3, 2019
May 11, 2020
May 11, 2021
May 21, 2022
May 19, 2023
May 9, 2024

The Bigger Picture

International research team analyzed historical pollen data from 17 locations, across 3 continents with long term records including Fairbanks, Alaska.

Data was analyzed in relation to changes in maximum and minimum temperatures.

Of the 17 locations, Fairbanks data showed not only one of the biggest changes in pollen load (heavier) but also increase in length of season.

Published March 21, 2019 by Lancet Planetary Health: Temperature-related changes in airborne allergenic pollen abundance and seasonality for the northern hemisphere.

Seasonal Allergy Symptoms

Symptoms include:

- Itching in the nose, roof of the mouth, throat, eyes
- Sneezing
- Stuffy nose (congestion)
- Runny nose
- Tearing eyes
- Dark circles under the eyes

Managing Seasonal Allergies

Schedule an appointment with your healthcare provider.

Utilize medications to manage symptoms.

Minimize Allergen Exposure.

Maintain good indoor air quality.

Wear a mask if you must be outdoors when counts are high.

Stay hydrated.

Research being done on drinking birch sap as well as oral birch pollen immunotherapy with apples looks promising.

Additional links:

Spring Pollen Season is Getting Longer & More Intense

National Phenology Network- Status of Spring

Know Which Medication Is Right for Your Seasonal Allergies

Where to find the pollen count:

UAF's Cooperative Extension Service

Cold Climate Housing and Research Center

Allergy, Asthma and Immunology Center of Alaska

AAAAI's National Allergy Bureau map

Acknowledging the scientists who came before…

Ted Fathauer worked in NWS Alaska Region for more than 40 years and served as Meteorologist-in-Charge of the Fairbanks Forecast Office 1980-1998. His interest in Interior Alaska weather and climate and how that was manifest in the boreal ecosystem inspired the development of a method to forecast green-up.

Dr. Valerie Barber, UAF forest researcher and head of UAF's Forest Products Program (2004-2017), explored past climates to understand the present. Her pioneering research, using stable isotopes to analyze year-to-year variability in white spruce tree cores linked climate, fire, and spruce growth, and advanced understanding of how phenology reflects the broad ecological impacts of climate change.

Dr. Jim Anderson, IAB Senior Research Associate and UAF’s Bioscience Librarian (1970-2004) meticulously counted pollen in Fairbanks and around Alaska as part of his own curiosity. In 1974 he began keeping a record of the date of “greenup” in Fairbanks. Greenup, a term he coined, is the day “leaf buds in birch and aspen open just enough to produce a faint, but distinct green flush through the forest canopy.”

You may have heard the news that the White House plans to eliminate climate research at NOAA. ACCAP is funded entirely by NOAA's Climate Program Office so there is a possibility that we will lose our funding and our capacity to support communities responding to extreme events and other pressures that impact lives and livelihoods.

We are holding a listening session to gather stories from people whose life, community, work, or industry would be impacted by the termination of our work. Your testimonials are vital in documenting our significance and the importance of our work to funders, UAF leadership, and others.

Please join us on May 1st at 2pm AKDT to share your impact stories. Register here for the online listening session or fill out our survey.

Thank you for standing with us!