

**Pollen Analysis of  
Ambient Air vs Honey**  
*and*  
**The Challenge of Identifying  
Pollen Types**

# SCBA Meeting – January 29, 2016

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Environmental Health Laboratories

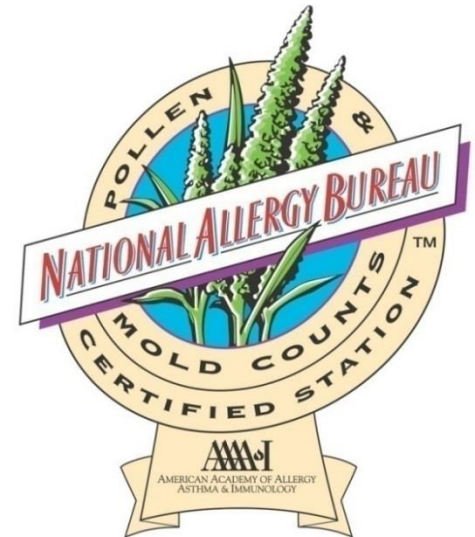
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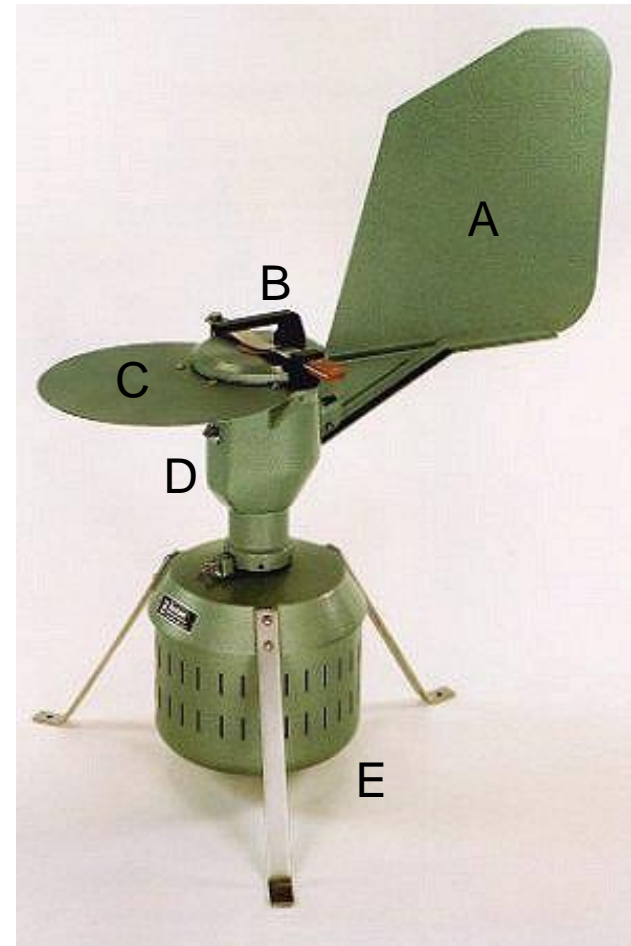
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# Air Sampling

- A – Wind vane
- B – 24 hr or 7 day drum
- C – Rain shield
- D – Intake orifice
- E – 10 L/min vacuum pump



**Burkard sampler**  
2000 - present

# Honey Sampling

- Beekeeper submits honey sample.



# Analyzing (Air Sample)

Stained Microslide

Compound Microscope

- Magnification: **400X**

Trained Analyst



*Olympus BX43*

# Analyzing (Honey)

*Honey Analysis for Pollen Content*

Vaughn Bryant, PhD

Professor of Anthropology

Texas A&M University

Director of Palynology Laboratory



*Dr. Bryant refined the analytical protocol, diluting small amounts of honey (10 g) in water and 95% ethanol, then washing in various acids, some very volatile. Then he centrifuged, washed, vortexed, centrifuged, rewashed, treated with more acid, heated and centrifuged one last time.*

*NOTE: Tracer spores (Lycopodium tablet via Sweden) added for recovery/QC.*

# Identifying

- Aeroallergen courses – AAAAI, A.I.R., Ochsner
- Identification Manuals
  - **E. Grant Smith, *Sampling and Identifying Allergenic Pollens and Molds.* 1990**
  - Walter H. Lewis, Prathibha Vinay, Vincent E. Zenger, *Airborne and Allergenic Pollen of North America.* 1983
  - Ronald O. Kapp, *How to Know Pollen and Spores.* 1969

# Identifying

## Pollen morphology

- Size: 20-60  $\mu\text{m}$  (wind-pollinated)
- Shape – elongated, spheroidal, flattened
- Apertures (0-4+) – pores, furrows, pores in furrows
- Exterior – sculpturing
- Interior detail
- *Seasonal/Regional*



# Identifying (Air)

## **Tree Season (14): February - May**

- Juniper, Elm, Maple, Poplar
- Oak, Ash, Mulberry, Birch, Sycamore
- Sweet Gum, Pine, Walnut, Hickory, Willow

## **Grass Season (1): May – June**

- Grass

## **Weed Season (5): June – October**

- Plantain, Ragweed, Chenopod, Nettle, Sage

# Identifying (Honey)

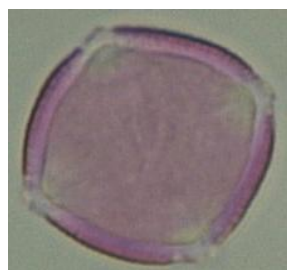
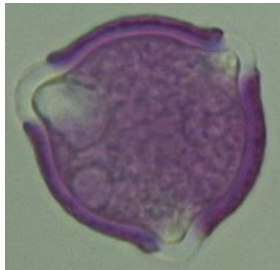
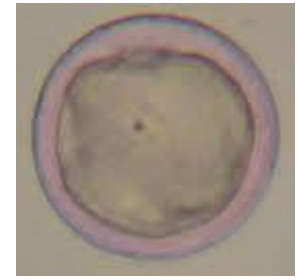
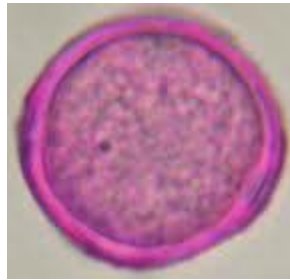
There are 250,000+ different plants/flowers just in the United States that can be used by a honey bee.

## Common Varieties in Illinois

Alfalfa	Sunflower	<b>Basswood</b>	Trefoil	Black Locust
Black Willow	Blackberry	Butterweed	Dandelion	<b>Goldenrod</b>
Henbit Deadnettle	Japanese Honeysuckle	Late-flowering Boneset	Purple or Red Deadnettle	Tulip Tree / Yellow <b>Poplar</b>
Red Bud	Red Clover	<b>Silver Maple</b>	Smartweed	Soybean
White Dutch Clover	White Sweet Clover	Wild Mustard	Yellow Rocket	Yellow Sweet Clover

# Tree Pollen

- Juniper, Elm, Maple, Poplar, Oak, Ash, Pine, Willow



Images from College of St. Benedict/St. John's University

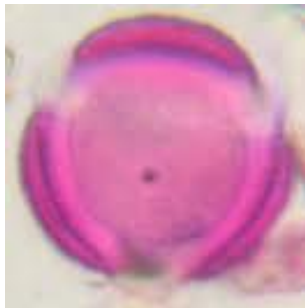
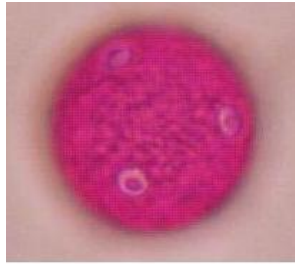
[www.csbsju.edu/pollen/links/basic\\_key.htm](http://www.csbsju.edu/pollen/links/basic_key.htm)

# Grass Pollen



# Weed Pollen

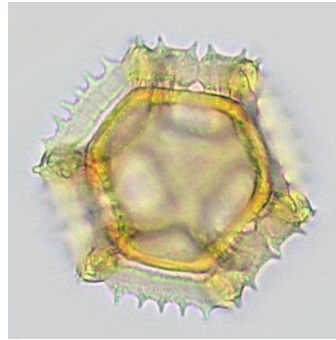
- Plantain, Ragweed, Chenopod, Sage, Nettle



# Common Pollen in Illinois



Alfalfa



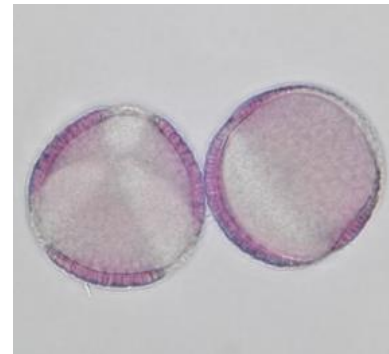
Dandelion



Red  
Deadnettle



White Sweet  
Clover



Wild Mustard

# Reporting Purpose (Air)

## NAB Chart

Aeroallergen (per cubic meter)				
	Tree	Grass	Weed	Mold
Low	1-14	1-4	1-9	1-6499
Moderate	15-89	5-9	10-49	6500-12999
High	90-1499	20-199	50-499	13000-49999
Very High	>1500	>200	>500	>50000

These levels set by National Allergy Bureau correspond to typical allergy symptoms.

# Reporting Purpose (Honey)

## Pollen content in Honey

- Determine plants harvested by bees
- Accurate labeling of honey (“truth in labeling”)
- Determine origin of honey\*
  - Foreign or Domestic
  - Safe or Unsafe

\* *Processed honey (ultra-filtration) removes nearly all pollen but improves appearance and extends shelf life.*



# Summary

## Honey Analysis for Pollen Count

- Sample Preparation - time / labor
- Training (long-er learning curve)
- Database/References of pollen
- Microscopic Analysis – time, effort
- Expense – chemicals, equipment, etc.
- Limited amount of pollen in honey

# Reporting

- Environmental Health Laboratories updates two web pages and a phone hotline each day.

National Allergy Bureau

<http://www.aaaai.org/nab/index.cfm?p=allergenreport&stationid=35>

Saint Louis County Health: Pollen and Mold Center

<http://www.stlouisco.com/HealthandWellness/EnvironmentalServices/PollenandMoldCenter>

Saint Louis County Health: Pollen Hotline

(314) 615-6825

# Acknowledgements

- American Academy of Allergy Asthma and Immunology  
[www.aaaai.org](http://www.aaaai.org)
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