A new technique for monitoring airborne pollen in rainwater

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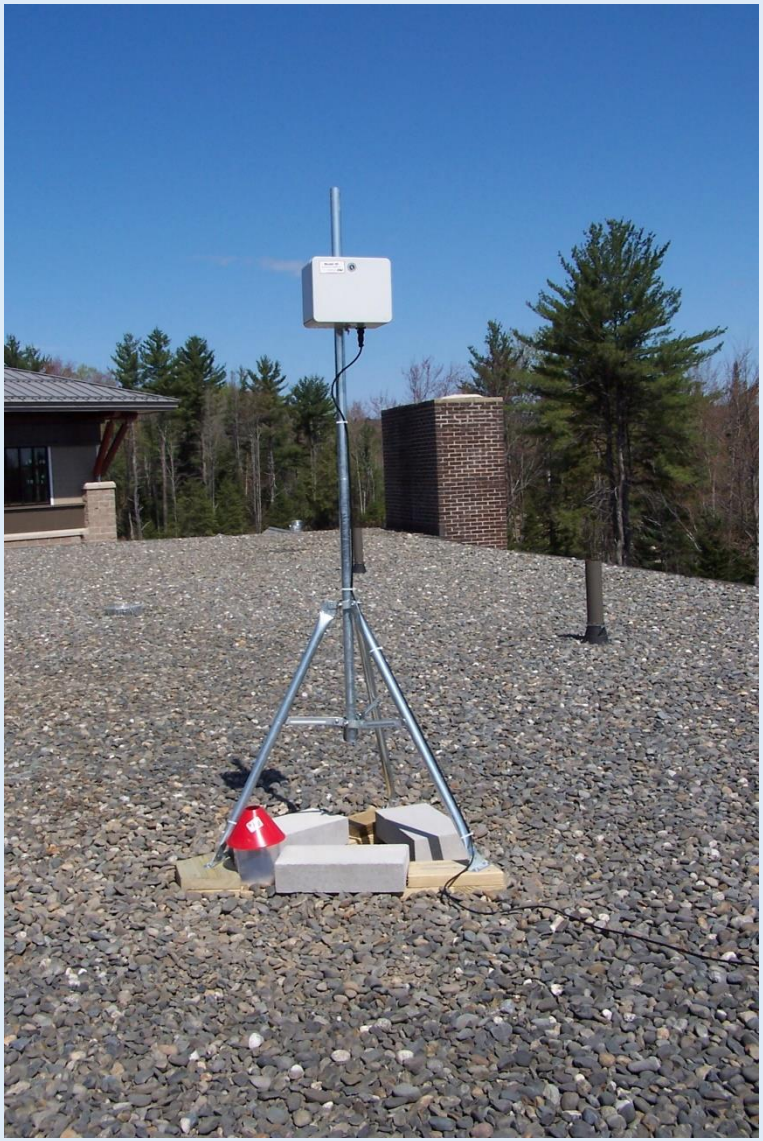
Rotor Rod capture of airborne pollen

Advantages:

1. Real time monitoring
2. Quantitative and qualitative analysis

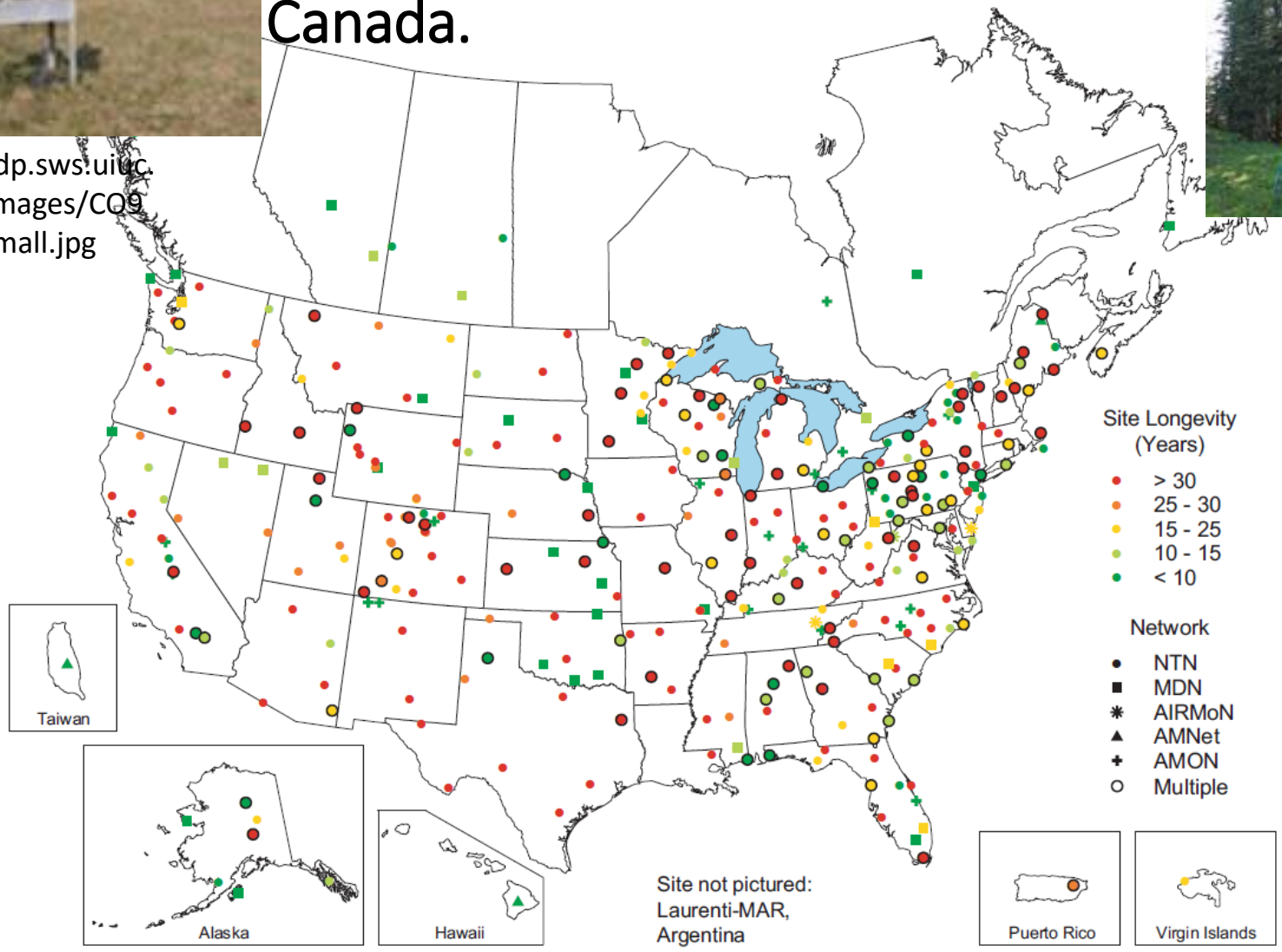
Disadvantages:

1. Expensive – sampler cost $1720 plus ongoing supplies and personnel time
2. Limited number of sites
3. Inconsistent reporting
4. Little quality control



The National Atmospheric Deposition Program (NADP) monitors precipitation chemistry at 250 sites in the U.S. and Canada.

http://nadp.sws.uiuc.edu/cal/images/CO96_NTN_small.jpg

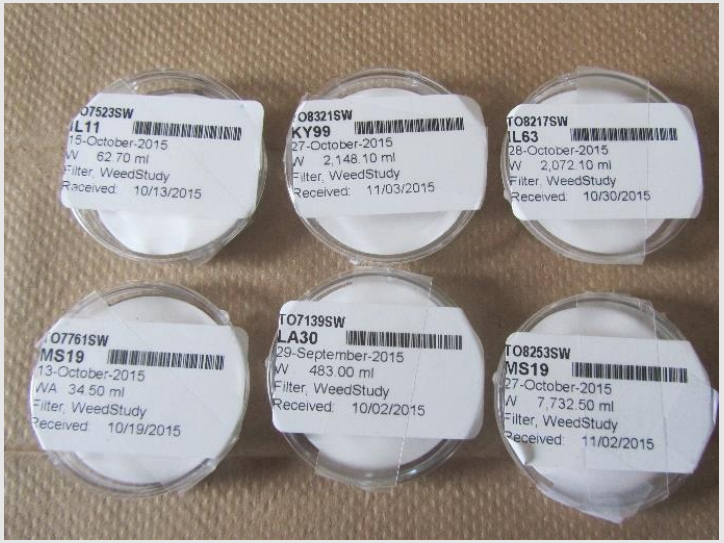


NADP is administered by the University of Illinois Central Analytical Laboratory.

.45µm Polyethersulfone membrane filter

- Rain water collected every 7 days
- Sent to Central Analytical Laboratory
- Particulates filtered out
- Water analyzed for N, S, acidity, etc.

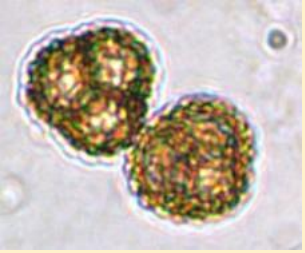
The website for additional information: nadp.isws.illinois.edu/NADP/



.45um Polyethersulfone membrane filter

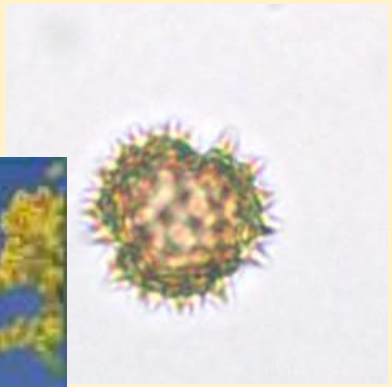
Reverse filtration – wash pollen from filter: 89% recovery (n=1)

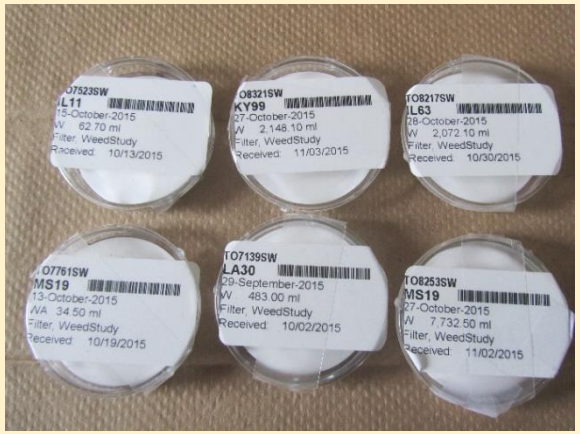
- ❖ Soak filter in 5% KOH to loosen pollen cells
- ❖ Rinse 5% KOH through filters under pressure
- ❖ Centrifuge to concentrate pollen cells
- ❖ Add measured quantity of microbeads and safranin stain
- ❖ Wash pollen cells in deionized water to remove KOH
- ❖ Wash pollen cells in ethanol to remove water
- ❖ Add silicon oil for storage



Dissolve filters in n-methyl-2-pyrrolidone for 100% pollen recovery

- ❑ Soak filters in NMP 5 minutes at room temperature. Vortex. Centrifuge. Repeat until filter dissolved.
- ❑ Wash with glacial acetic acid to remove all water.
- ❑ Wash with deionized water
- ❑ Disarticulate pollen cells with 5% KOH and 10% HCl
- ❑ Add known quantity of microbeads and safranin stain
- ❑ Wash with deionized water
- ❑ Dehydrate with tertiary butyl alcohol
- ❑ Store in silicone oil



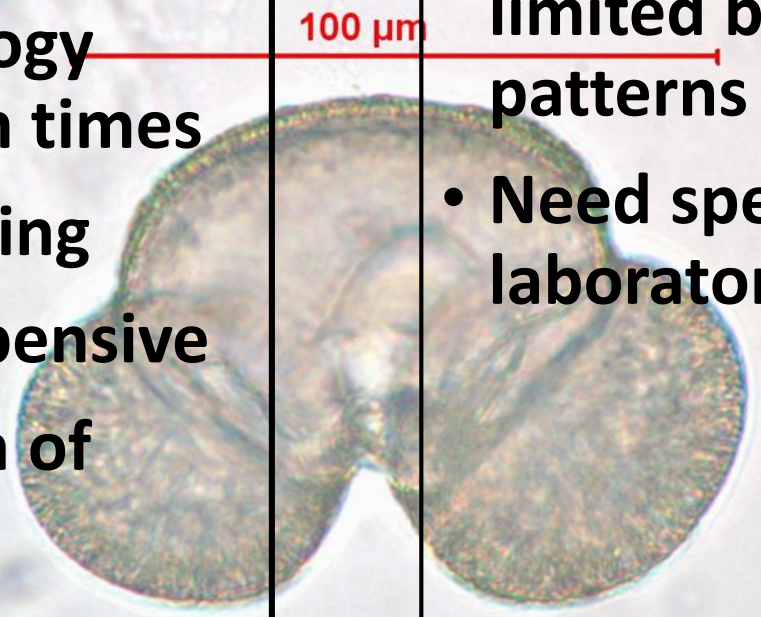


Advantages

- 250 monitoring sites
- Expand phenology studies – bloom times
- Central processing
- Relatively inexpensive
- Standardization of reporting
- Quality control

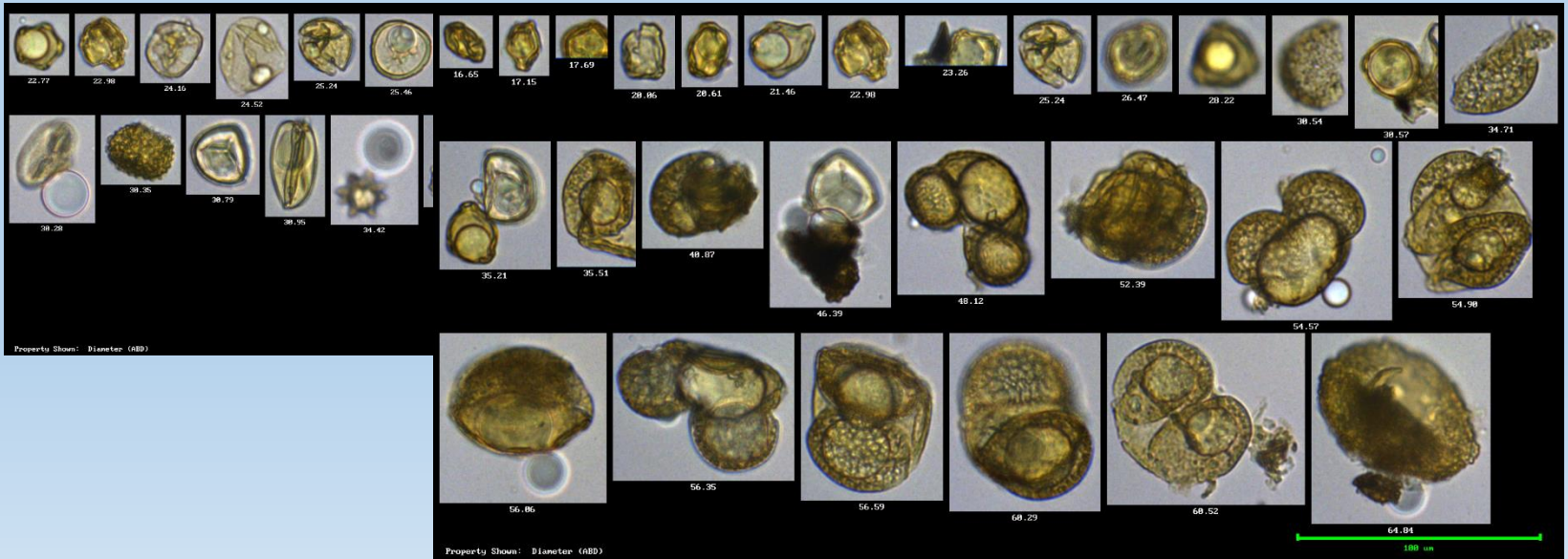
Disadvantages

- Quantitative studies limited by precipitation patterns
- Need specialized laboratory equipment



FlowCam

http://photos.labwrench.com/equipmentPhotos/9000/9572-7201-m.jpg



Questions / Options/ Challenges

- ✓What is the scope of the next logical study?
- ✓Are there funds available?
- ✓Is there funding for a graduate student?
- ✓What are the technical questions going forward?
- ✓???