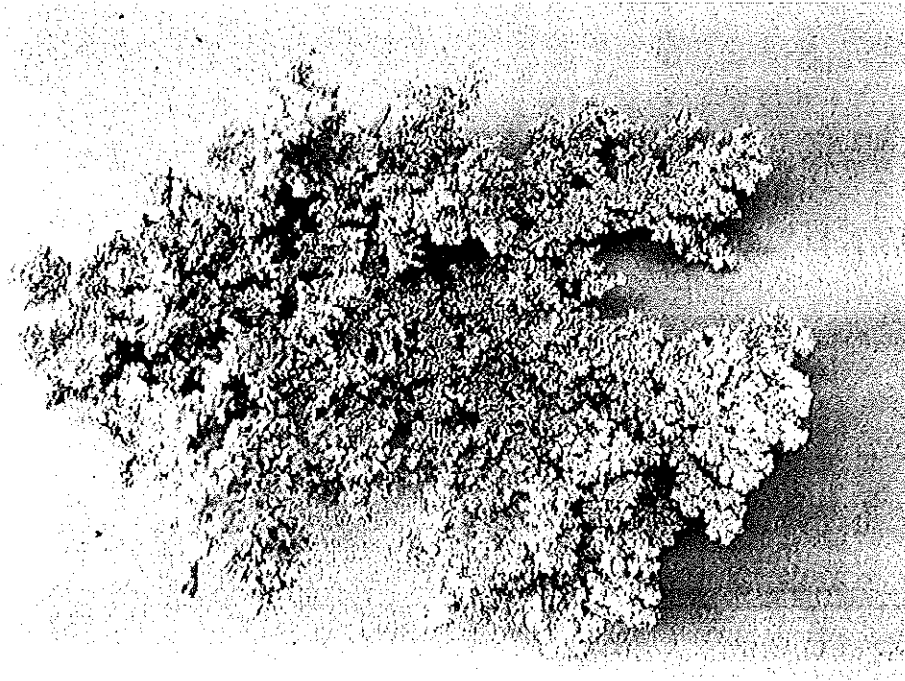


# Lichens as Indicators of Sustainability

Sandy Wilmot and Tom Simmons  
Vt. Dept. Forests, Parks & Recreation



*Why Lichens are good indicators of  
Air Contaminants and Biodiversity*

- Lichens have no cuticle
- Total reliance on atmospheric sources for nutrition
- Species vary in response to light and humidity conditions
- Species vary in sensitivity to air pollutants
- Species vary in response to forest management practices
- Slow growing, response and recovery period is slow

*Lichens as Indicators of Sustainability*  
*National Forest Health Monitoring Program*

**Environmental Stressors**

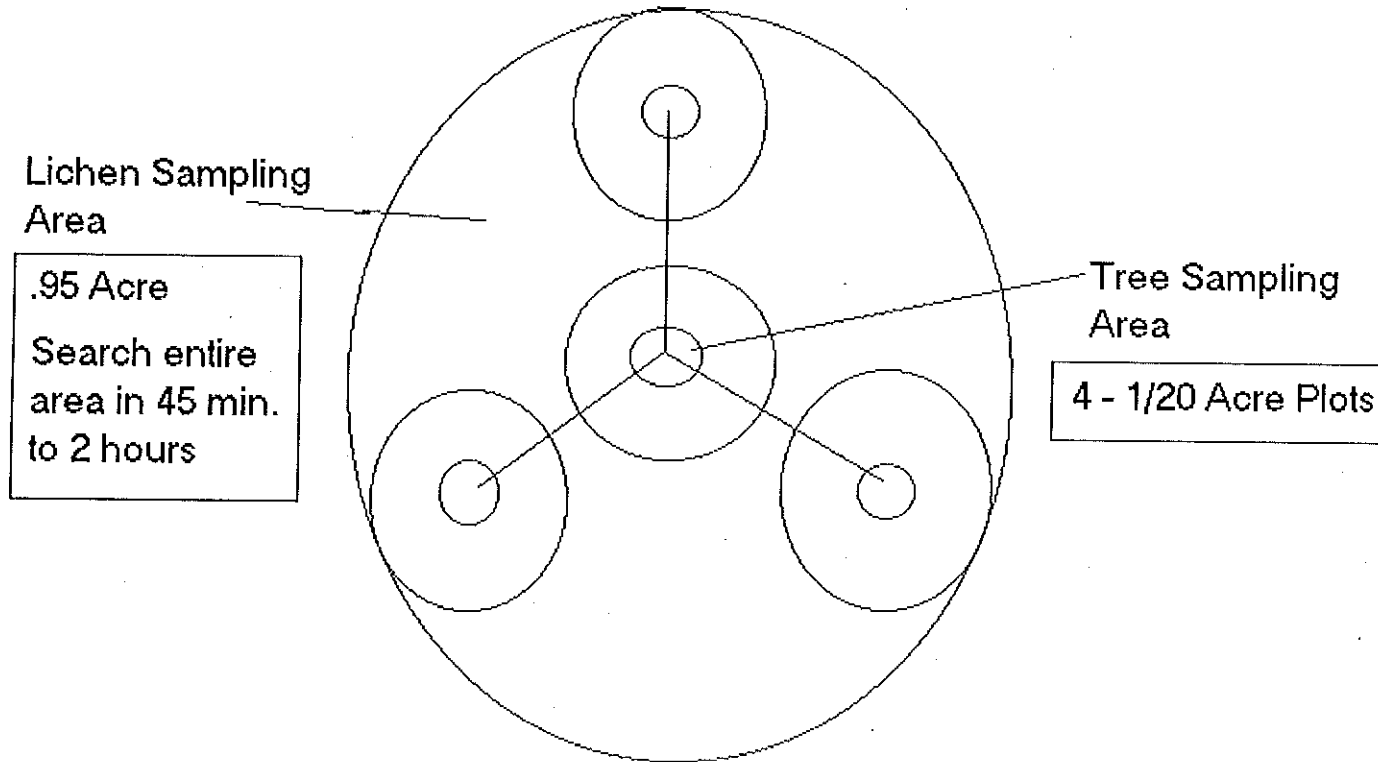
**Condition of Forest Resource**

**Lichen Community**

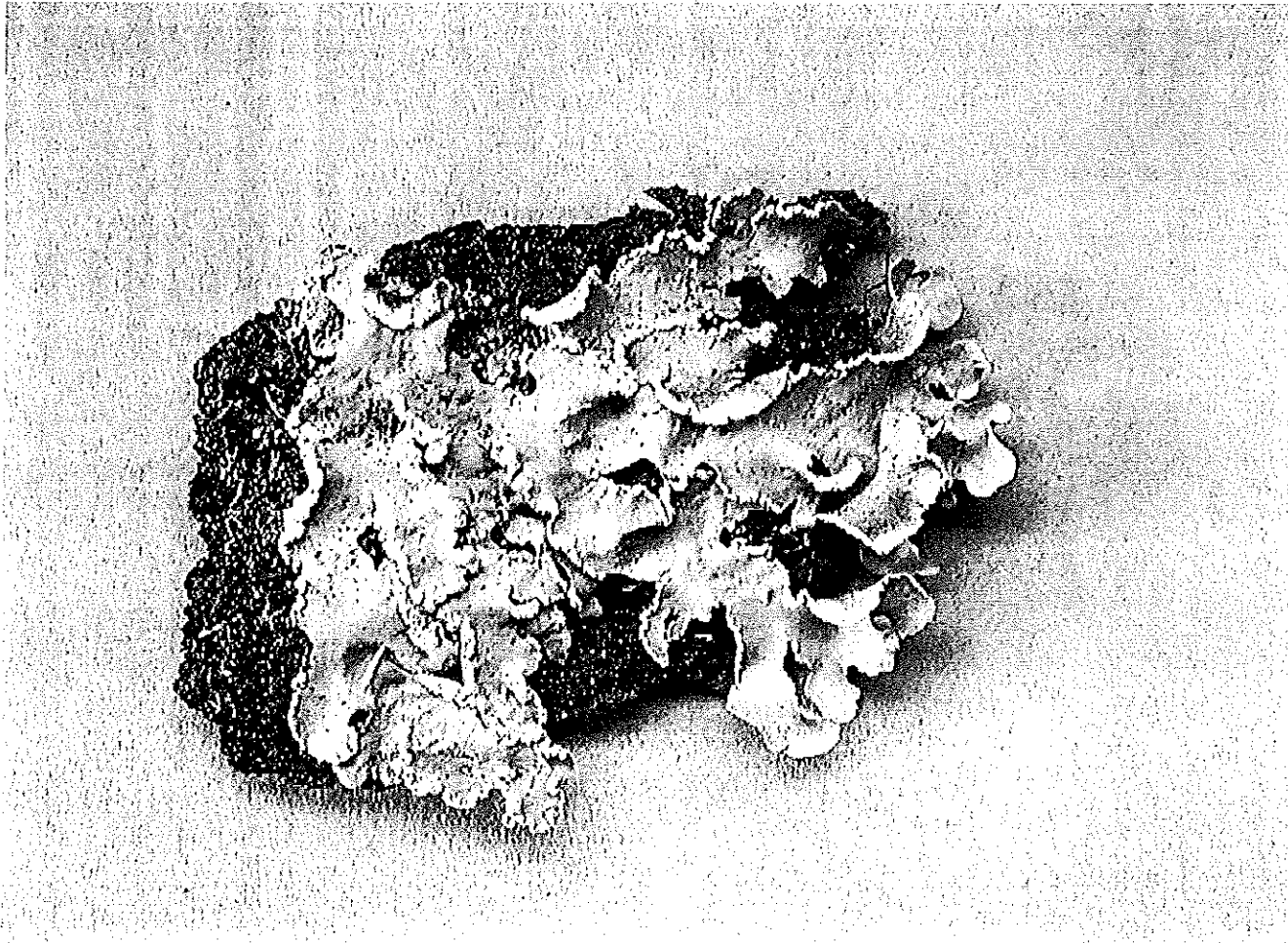
*Species Diversity*

*Species Composition*

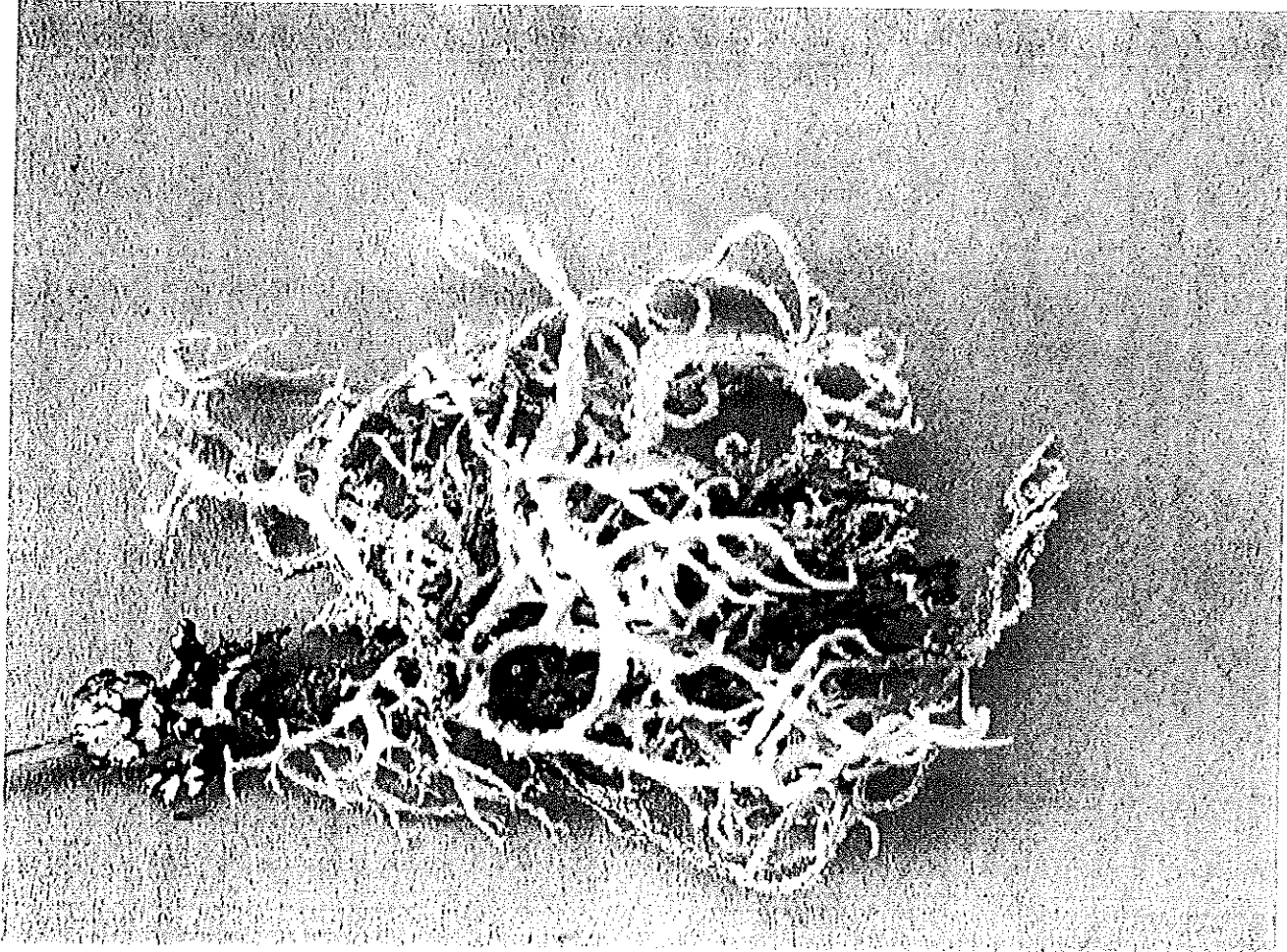
# Forest Health Monitoring Plot Design



*Allocetraria oakesiana*



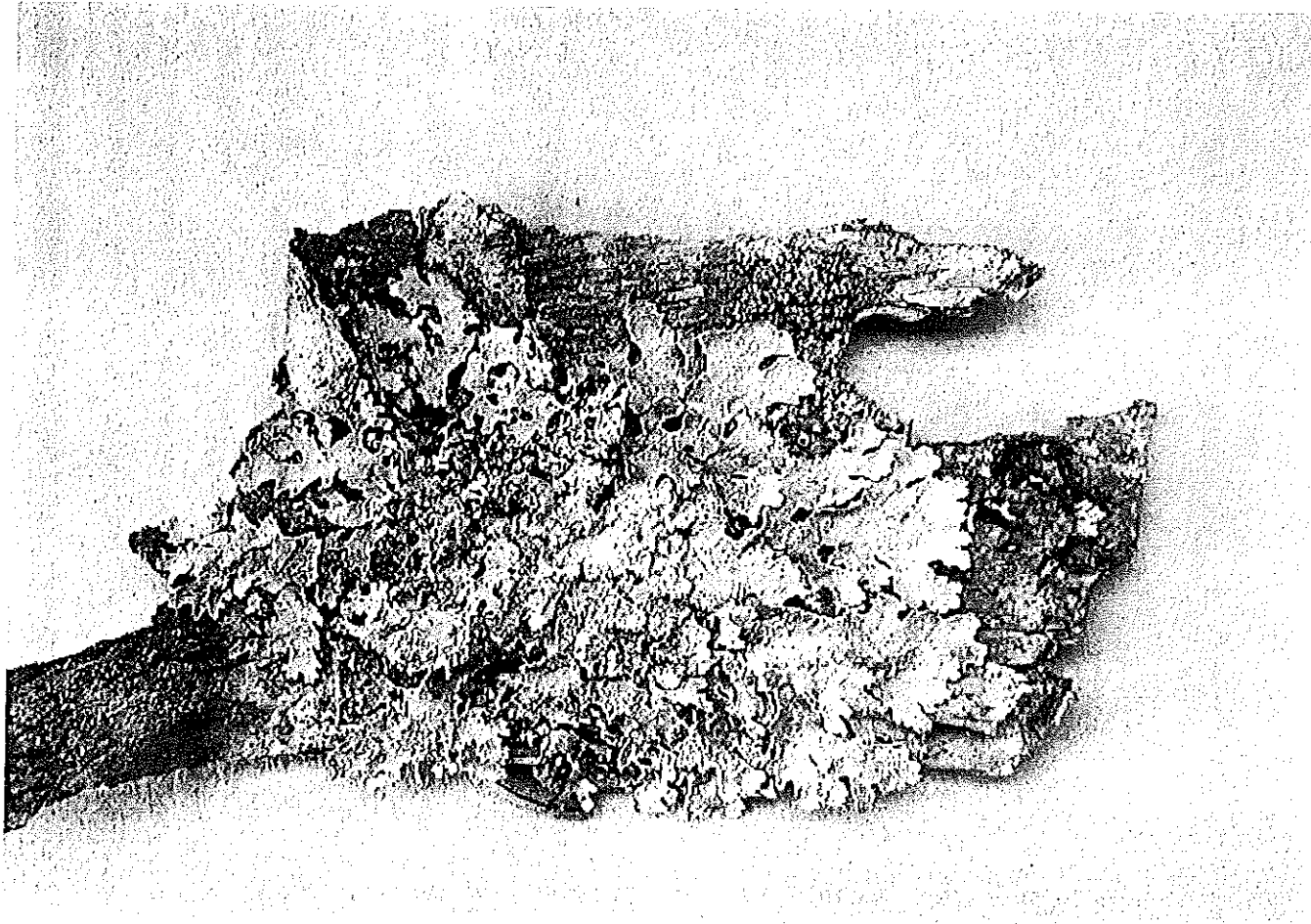
*Evernia mesomorpha*



*Hypogymnia physodes*

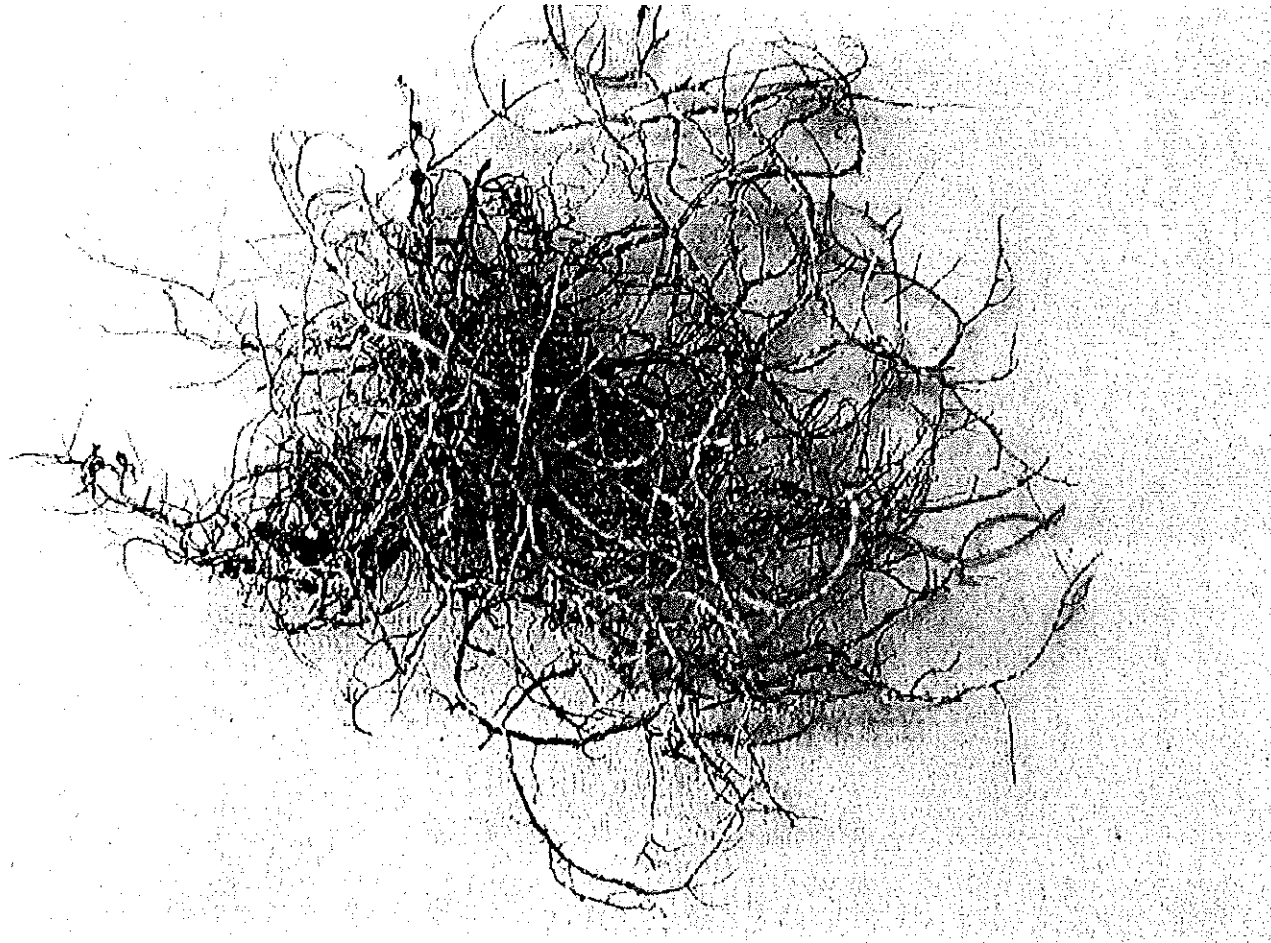


*Parmelia squarrosa*  
Sulfur Sensitive

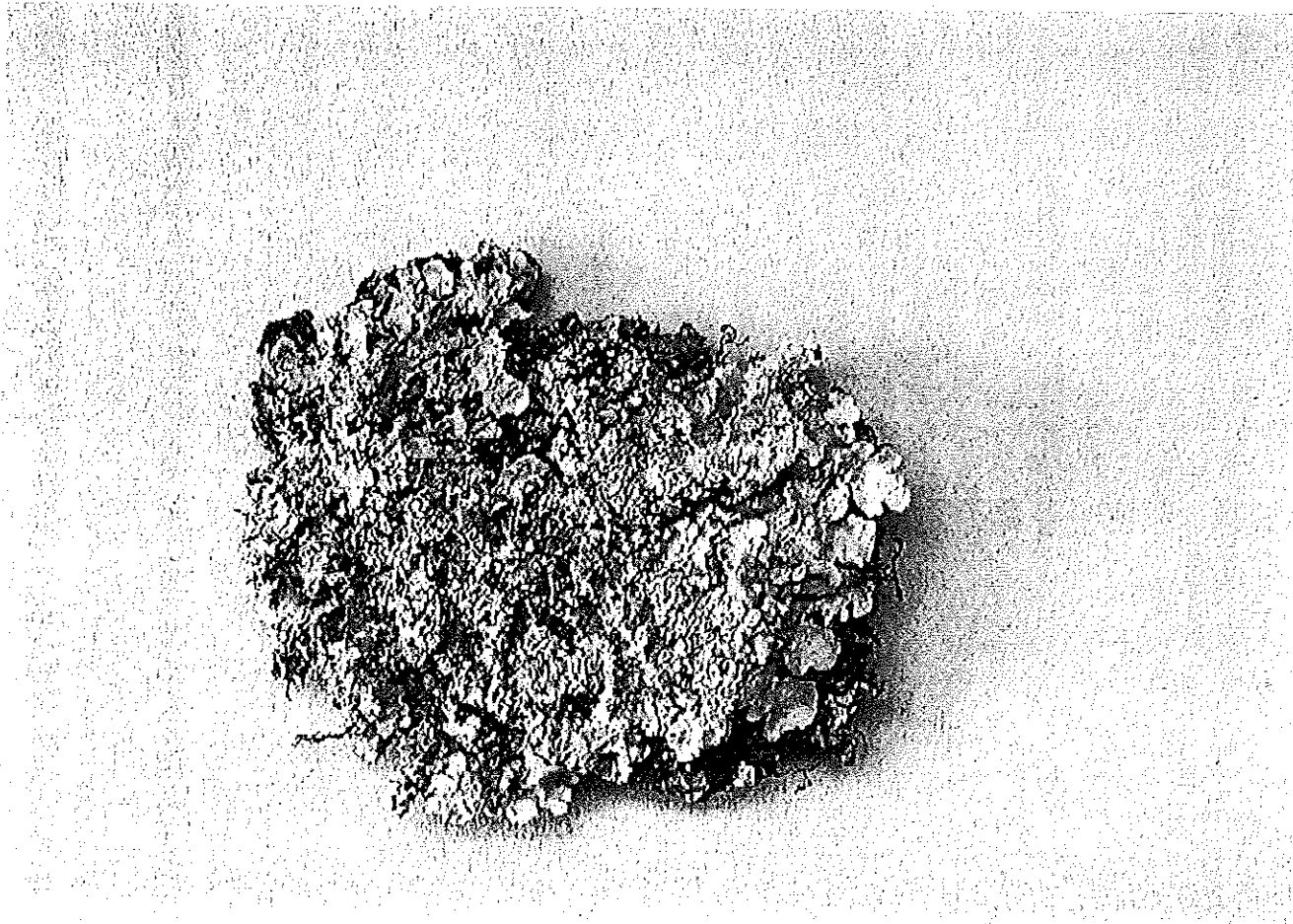




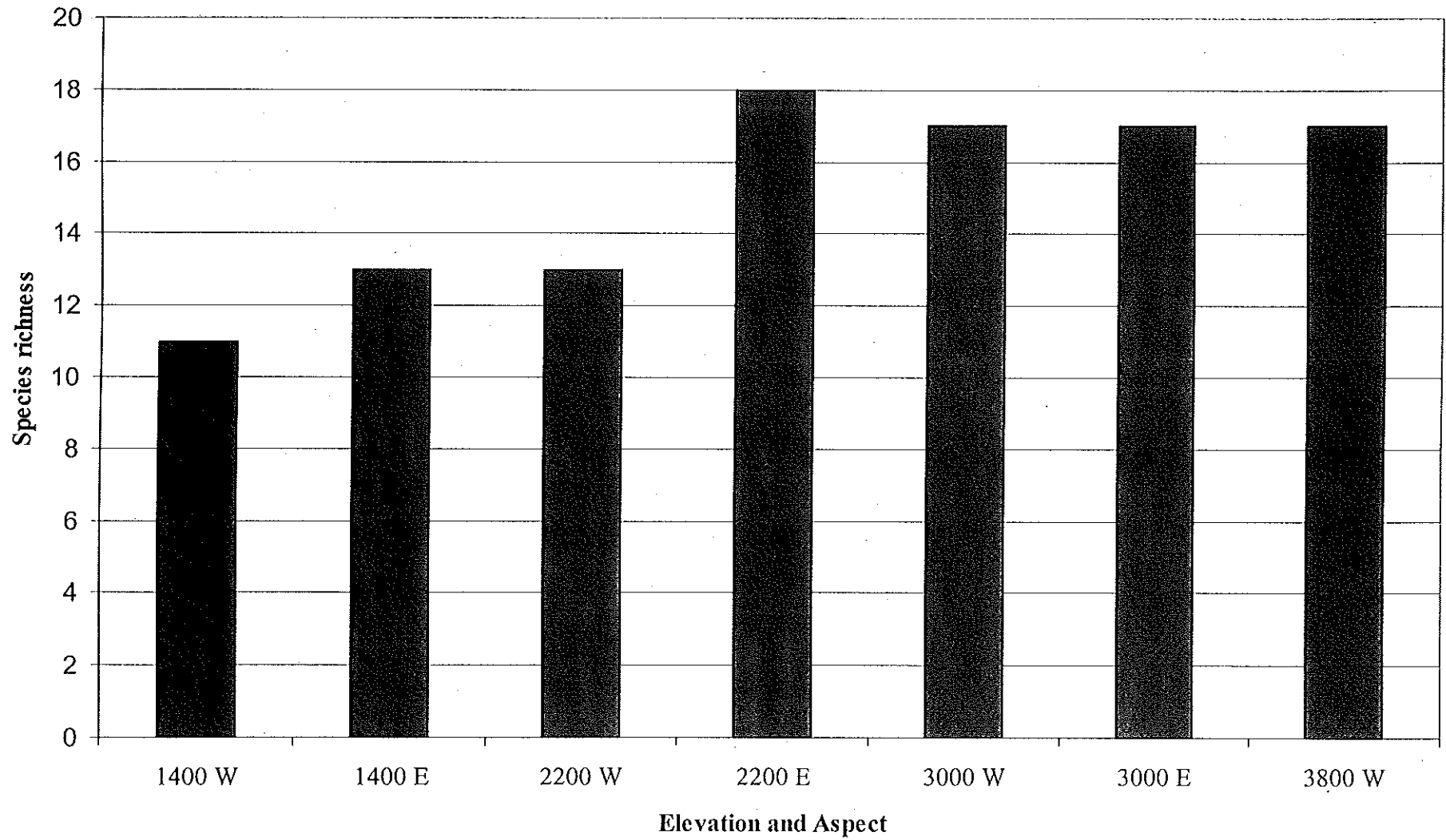
*Bryoria furcellata*  
Sulfur Sensitive



*Punctelia appalachensis*  
Regionally Uncommon Species



## Lichen Species Richness on Mount Mansfield



**Statewide Occurrence of Sulfur Sensitive Lichen Species:**  
*Percent of plots with species*

Species	Mansfield '98-'00	Lye Brook '93	Statewide '94	Statewide '98
<i>Bryoria furcellata</i>	14	17	0	0
<i>Flavoparmelia caperata</i> *	57	P	60	83
<i>Hypogymnia tubulosa</i>	0	11	0	0
<i>Lobaria pulmonaria</i>	0	11	0	0
<i>Parmelia squarrosa</i>	43	44	20	0
<i>Punctelia rudecta</i> *	57	P	80	83
<i>Ramalina obtusata</i>	0	6	0	0
<i>Usnea filipendula</i>	0	6	0	0

\* Used in Ohio monitoring program

## Results to date

- Sulfur sensitive species present at all elevations
- Species richness higher at higher elevations (favorable moisture, light, harvesting history)
- One regionally uncommon species found:  
*Punctelia appalachensis*

## More to learn

- Need more lichen plots and longer period of record
- Need to work on community groupings based on species ecology: light, humidity, and temperature preferences, and pollutant sensitivity.