

| ST | CTY | HEXAGON | MO | DAY | YR | TALLY1 | TALLY2 | TALLY3 | TALLY4 | TALLY5 |
|----|-----|---------|----|-----|----|---------|---------|---------|---------|---------|
| XX | XXX | XXXXXXX | XX | XX | XX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX |

| PHOTO IDENTIFIER | SCALE | CONVERSION | DATA RECORDER SERIAL NUMBER |
|------------------|-------|------------|--------------------------------|
| | f: | = | |

| STARTING POINT (DESCRIBE SP BY SPP/DBH IF TREE) (REFERENCE AND DESCRIBE SP, IF NECESSARY) | | | SP TO PC | | |
|---|--|--|---------------|----|-------------------|
| | | | AZMUTH (DEG.) | | SLOPE DIST. (FT.) |
| | | | AZ | SD | DESCRIPTION |
| | | | | | |
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| PLOT CENTER WITNESSED BY - | | | | |
|----------------------------|-----|----|----|---------|
| SPP | DBH | SD | AZ | NOTES - |
| | | | | |
| | | | | |

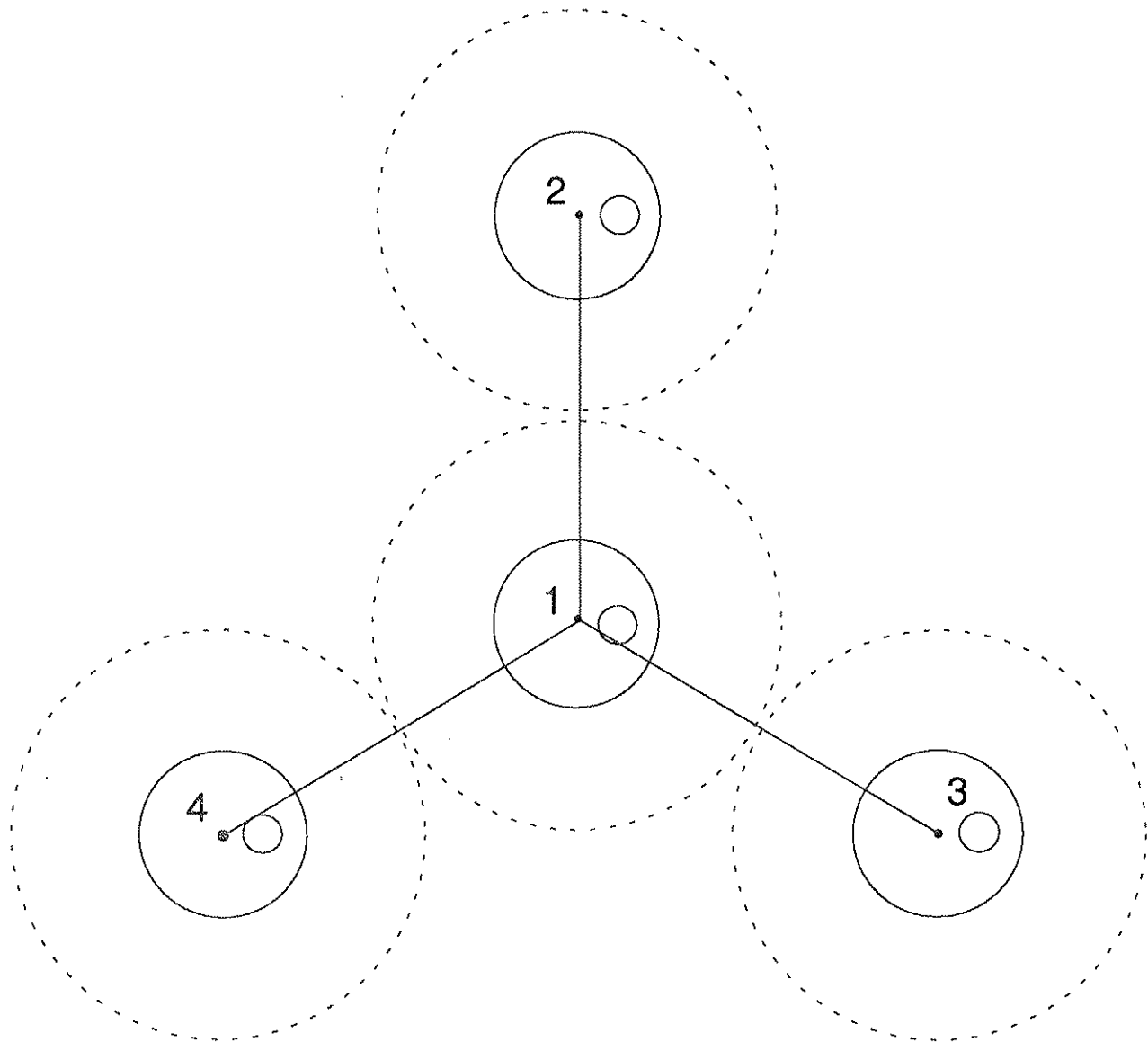
| SP TO PC MAP | | | | | | | | | |
|------------------|--|--|--|--|--|--|--|--|--|
| Map area content | | | | | | | | | |
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CONT. (Y/N)

| ST | CTY | HEXAGON | MO | DAY | YR |
|----|-----|----------|----|-----|----|
| XX | XXX | XXXXXXXX | XX | XX | XX |
| | | | | | |

| GENERAL NOTES | PLOT INFORMATION |
|---------------|---|
| | Distance between points is 120.0ft Annular Plot = 58.9 ft.radius |
| | Azimuth 1 -> 2 = 360degrees Subplot = 24.0 ft.radius |
| | Azimuth 1 -> 3 = 120degrees Microplot = 6.8 ft.radius |
| | Azimuth 1 -> 4 = 240degrees (Offset 12.0 ft. east) |

Plot Diagram
w/boundaries



Special damage to record in tree notes

| | |
|-----|--------------------------------|
| 101 | balsam woolly adelgid |
| 102 | white pine weevil |
| 103 | hemlock woolly adelgid |
| 104 | beech bark scale only |
| 105 | beech bark necrotia only |
| 106 | both beech scale and necrotia |
| 107 | southern pine beetle |
| 108 | sugar maple borer |
| 109 | other borers |
| 110 | other bark beetles |
| 111 | defoliation > 20% |
| 201 | butternut canker |
| 202 | necrotia canker (not on beech) |
| 203 | eutypella canker |
| 204 | hypoxylon canker |
| 206 | European larch canker |
| 207 | other canker |
| 208 | conks |
| 209 | dwarf mistletoe |
| 210 | white pine blister rust |
| 441 | animal browse |
| 444 | beaver damage |
| 445 | porcupine damage |
| 446 | sapsucker damage |
| 447 | other animal damage |
| 501 | wind thrown/uprooted |
| 504 | brooming |
| 505 | other weather damage |
| 702 | logging damage (>20% of circ.) |

Appendix 6.A OZONE BIOINDICATOR PLANTS -1994

Site Characteristics

| ST | CTY | HEXAGON | MO | DAY | TALLY 1 | TALLY 2 |
|----|-----|---------|----|-----|---------|---------|
| | | | | | | |

✓ Please put a checkmark beside the correct information.

Plot size:

- > 3.0 acres
- 0.5 to 3.0 acres
- < 0.5 acres

Terrain position:

- lowland
- hillside
- ridgetop

Approximate elevation (feet): _____

Slope (Aspect):

- flat
- 10-45%
- > 45%

Soil drainage:

- well-drained
- wet
- very dry

Soil depth:

- bedrock not exposed
- bedrock exposed

Disturbance:

- no disturbance
- evidence of overuse
- other

Comments:

OZONE BIOINDICATOR PLANTS - 1994
Foliar Injury Data

Plot Type
 ___ Detection Monitoring
 ___ Reference
 ___ Remeasurement

Record species code number from the list below (choose up to 3):

915 Blackberry 762 Black cherry 365 Common milkweed 621 Yellow poplar
 541 White ash 364 Big leaf aster 366 Dogbane

Use the codes below (percent injury scale, 0-5) to:

0 = No injury; 1 = 1-6 %; 2 = 7-25 %; 3 = 26-50 %; 4 = 51-75 %; 5 = >75 %

Record the percent of the leaf area injured relative to the total leaf area (amt).

Record the average severity of symptoms on the injured leaves (sev).

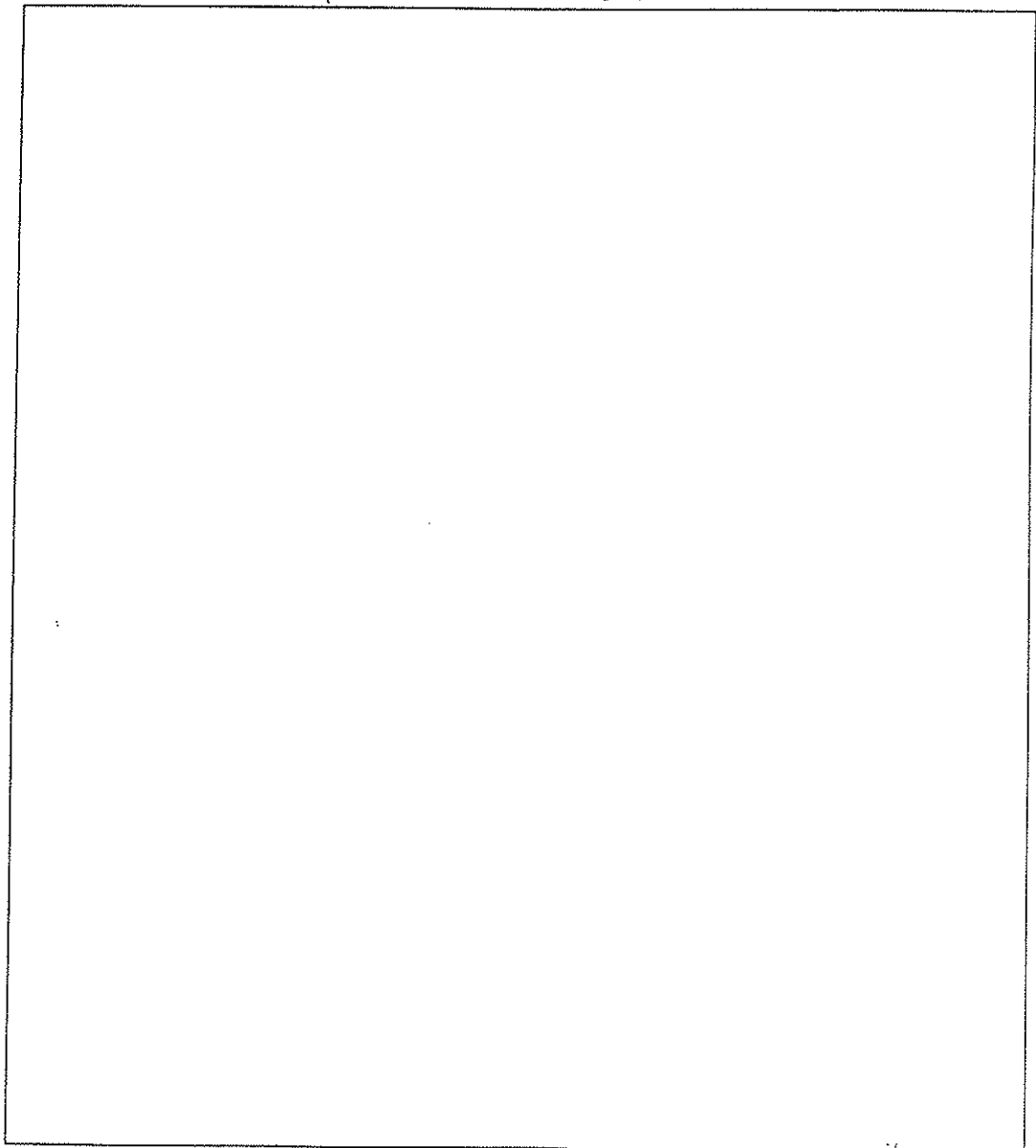
| Plant | SPECIES CODE | | | SPECIES CODE | | | SPECIES CODE | |
|-------|--------------|-----|--|--------------|-----|--|--------------|-----|
| | amt | sev | | amt | sev | | amt | sev |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
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| 30 | | | | | | | | |

Notes: _____

OZONE BIOINDICATOR PLANTS - 1994

| ST | CTY | HEXAGON | MO | DAY | TALLY 1 | TALLY 2 |
|----|-----|---------|----|-----|---------|---------|
| | | | | | | |

Map of the Bioindicator Site Location



Please include the following information on the map:
Location of site relative to detection plot; road names and distance as needed; North arrow

OZONE BIOINDICATOR PLANTS - 1994 General Information

Preferred site characteristics:

- largest, most easily accessible opening
- within 3 miles & +/- 300 feet in elevation of FHM detection monitoring plot
- good soil conditions
- at least 10 individuals of one bioindicator species present
- free from chemical contaminants

- avoid suppressed or shaded plants
- evaluate foliage on each plant for amount and severity of injury

Ozone injury characteristics:

- usually present on mid-aged and older leaves
- on the upper leaf surfaces
- overlapped leaves will have no injury on the bottom leaf
- spots are uniform in size and shape, most often tiny purple-red to black spots
- almost all leaves exposed to sunlight will have injury

Sampling the bioindicator site:

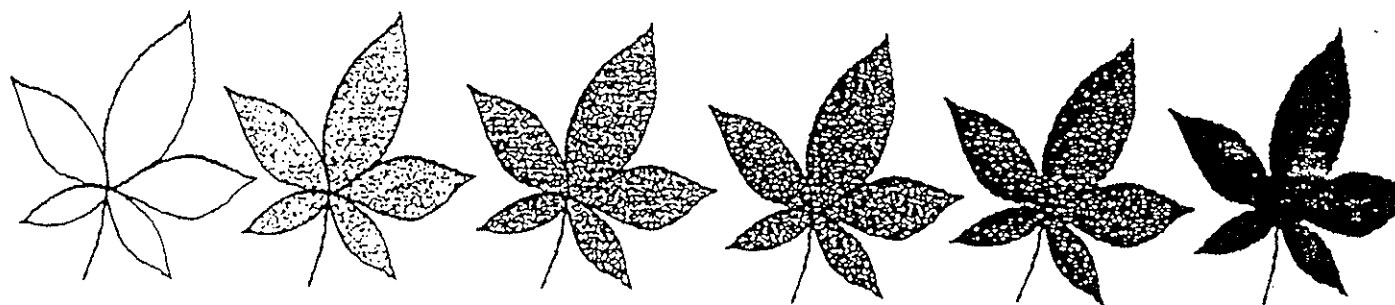
- identify starting point (put on map)
- move towards center of opening
- locate plants in a sweeping pattern
- do not skip plants with little or no injury

Amount = Percent of leaf area injured relative to the total leaf area.

Severity = Average severity of symptoms on the injured leaves.

| Rating scale for amount and severity of ozone injury: | |
|---|-------------|
| 0 = 0 % | 3 = 26-50 % |
| 1 = 1-6 % | 4 = 51-75 % |
| 2 = 7-25 % | 5 = >75 % |

Leaf images are upper bounds of each rating class for the severity estimates:



0 % 6 % 25 % 50 % 75 % 100 %

1 = 1-6 % 2 = 7-25 % 3 = 26-50 % 4 = 51-75 % 5 = >75 %

OZONE BIOINDICATOR PLANTS - 1994

Voucher Leaf Samples

FIELD CREW _____

| ST | CTY | HEXAGON | MO | DAY | TALLY 1 | TALLY 2 |
|----|-----|---------|----|-----|---------|---------|
| | | | | | | |

Name, address, and phone number where you can be contacted:

Bioindicator species: _____

Notes: _____

Mail this sheet with the leaf sample to:

GRETCHEN SMITH
Dept. Forestry, Holdsworth Hall
University of Massachusetts
Amherst, MA 01003

QA/QC PERSON _____

_____ Positive for ozone symptom _____ Negative for ozone symptom

Explanation:

Date received: _____ Sample condition: _____

Notes:

Questions? Call your regional bioindicator lead:

Northeast and Mid-Atlantic: Gretchen Smith (413) 545-1680

South and Southeast: Beth Brantley (704) 257-4857

Lake States: Ed Hayes (507) 285-7428