SUGAR MAPLE LEAF SURVEY

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Introduction

The purpose of this survey is to obtain site-specific, baseline information on the variety of insects, diseases and weather phenomena manifest on sugar maple leaves. Little information is available on minor damage to leaves caused by numerous factors. It is our goal to establish a long-term database of temporal information on organisms and symptoms present on canopy leaves.

Methods

Five codominant, mature sugar maples located at the Proctor Maple Research Center [1360 ft (415 m)] were sampled 5 times during the growing season to collect leaves for evaluations. Twenty leaves per tree and collection period were taken from each of the 5 sample trees for a total of 100 leaves per collection period. A 20-gauge shot gun with steel shot was used to collect leaves from mid-canopy. Five leaves from each of 4 sides of each tree were sampled to obtain maximum diversity of growing conditions. Leaves were refrigerated until examinations could be made.

Laboratory evaluations included macro- and micro-scopic examinations of each leaf by entomologists and pathologists. Records were made of the presence of any symptom and organism on each leaf. Most leaves had numerous symptoms or organisms present, and each separate one was noted.

Photographs, specimens and Riker mounts of common symptoms and organisms were taken for use in identifying subsequent specimens.

In addition, pear thrips egg deposition sites were counted to establish baseline information on incidence and timing of deposition at this site.

Results

A total of 25 different symptoms and organisms were identified from the maple leaves throughout the growing season. Fifteen symptoms and 10 different organisms were observed.

In general, the number of leaves with symptoms and organisms increased over the growing season (Table 1). The six most common types of damage to leaves were from: pear thrips oviposition scars, maple leaf cutter defoliation, leaf hopper feeding,

tattering of leaves from wind, mining associated with webbing from an unrecovered insect, and feeding at internodes (Figure 1

On a tree by tree basis, tree number 3 had more symptoms and organisms on leaves than the other trees (Table 2). Pear thrips oviposition scars were present on more leaves than any other symptom or organism, and by later collections, high numbers of oviposition sites were recorded (Table 3).

The other most frequent symptoms or organisms present were: maple leaf cutter feeding, leaf hopper feeding, necrotic feeding at internodes and purple mottling apparently caused from hot, dry weather. One unique occurrence was that leathery leaves occurred on the 3 last collection periods on tree 5, only. Tree 5 also was the only tree to have single occurrences of Aceria regulus, eyespot (Phyllosticta minima) and a birch leaf miner larva.

Although this study is not designed to determine the impact on leaves from the different damage agents, general comments on the condition of leaves in 1991 may assist in comparing years. The leaves collected in 1991 were generally healthy. Little major defoliation was present. Light defoliation from maple leaf cutter was present on lower foliage of the sample trees, but this did not extend up into the mid-canopy leaves. Overall damage from pear thrips was considered very light to none.

Our initial intent in this study was to survey sugar maple leaf diseases. Due to unusually dry conditions early in the growing season, few diseases were present, but many other damage agents were. We therefore expanded our survey to better represent true leaf conditions, including all symptoms and organisms present.

Funding Sources

Funding was provided, in part, from a USDA Forest Service grant for Vermont Monitoring Cooperative activities and USDA Forest Service Forest Health Protection funds for accelerated forest pest detection activities.

Future Plans

In 1992, we plan to expand this study to include 2 additional tree species and one additional site at a higher elevation (2200 ft) on Mt. Mansfield.

Figure 1. Disease symptom present on sugar maple leaves collected from Proctor Maple Research Center, 1360 ft.(415 m), on Mount Mansfield, Vermont.

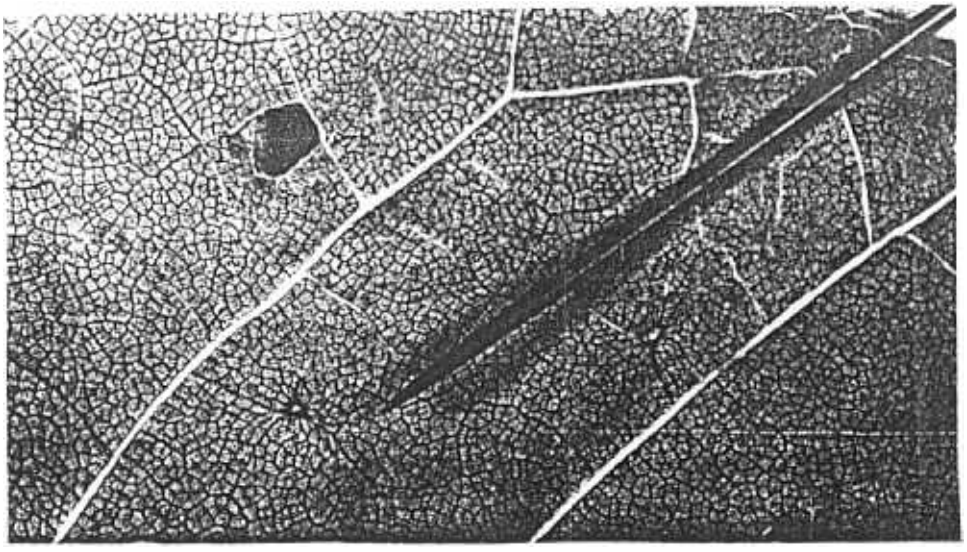

Figure 2. Internodal insect feeding present on sugar maple leaves collected from Proctor Maple Research Center, 1360 ft. (415 m), on Mount Mansfield, Vermont. No causal agent was recovered.

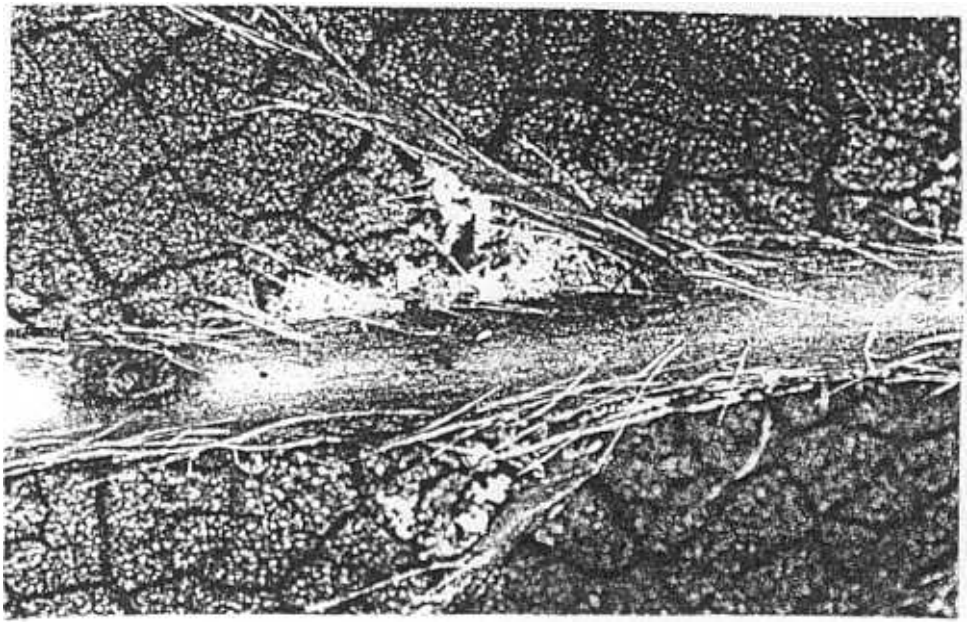

Table 1. Symptoms and organisms present on sugar maple leaves collected on five dates in 1991 from mature, codominant sugar maple trees at the Proctor Maple Research Center [1360 ft (415 m)], Mt. Mansfield, VT.

DATE	THREE MOST COMMON SYMPTOMS AND ORGANISMS	% OF LEAVES WITH DAMAGE OR ORGANISM
149	MAPLE LEAF CUTTER	55
	PEAR THRIPS EGG SCARS	48
	WIND TATTERING	31
165	MAPLE LEAF CUTTER	75
	PEAR THRIPS EGG SCARS	72
	WEBBING INSECT FEEDING	65
177	PEAR THRIPS EGG SCARS	91
	LEAF HOPPER FEEDING	68
	MAPLE LEAF CUTTER	58
193	PEAR THRIPS EGG SCARS	93
	LEAF HOPPER FEEDING	71
	NECROTIC INTERNODES	57
220	PEAR THRIPS EGG SCARS	94
	NECROTIC INTERNODES	88
	LEAF HOPPER FEEDING	84

Table 2. Symptoms and organisms present on sugar maple leaves collected from 5 different sugar maple trees growing at the Proctor Maple Research Center [1360 ft (415 m)], Mt. Mansfield, VT.

TREE NO.	5 MOST COMMON SYMPTOMS OR ORGANISMS PRESENT	% OF LEAVES WITH DAMAGE OR ORGANISM
1	PEAR THRIPS EGG SCARS	66
	MAPLE LEAF CUTTER	56
	LEAF HOPPER FEEDING	51
	DISEASE SYMPTOM (Figure 2)	41
	WIND TATTERING	35
2	PEAR THRIPS EGG SCARS	75
	LEAF HOPPER FEEDING	71
	MAPLE LEAF CUTTER	69
	DISEASE SYMPTOM (Figure 2)	42
	INTERNODAL INSECT FEEDING (Figure 1)	40
3	PEAR THRIPS EGG SCARS	87
	LEAF HOPPER FEEDING	71
	PURPLE MOTTLING	58
	MAPLE LEAF CUTTER	47
	INTERNODAL INSECT FEEDING (Figure 1)	43
4	PEAR THRIPS EGG SCARS	82
	MAPLE LEAF CUTTER	75
	INTERNODAL INSECT FEEDING (Figure 1)	66
	LEAF HOPPER FEEDING	63
	RASPING INSECT FEEDING	34
5	PEAR THRIPS EGG SCARS	88
	INTERNODAL INSECT FEEDING (Figure 1)	73
	MAPLE LEAF CUTTER	69
	LEATHERY LEAVES	60
	LEAF HOPPER FEEDING	54

Table 3. Frequency of pear thrips oviposition on sugar maple leaves collected over the spring and summer, 1991, Proctor Maple Research Center [1360 ft (415 m)], Mount Mansfield, Vermont.

Julian date	Ave. No. Egg Scars/Leaf
149	1.48
165	3.88
177	5.33
193	6.64
220	5.68