Survey of Airborne Pollen and Fungus Spores of New York State

A PRELIMINARY REPORT

By
Eugene C. Ogden
State Botanist
New York State Museum
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INTRODUCTION

During 1953 and 1954, samplers were operated in 35 localities in New York State to determine the abundance of various microscopic organic particles in the air. The Durham sampler, a device approved by the Pollen Survey Committee of the Research Council of the American Academy of Allergy, was used at each station. The samplers were in operation for 200 days each growing season: April 1 through October 17 during 1953 and March 15 through September 30 during 1954. During these periods over 14,000 samples were obtained requiring approximately 2,500,000 determinations. The data for 1953 are now ready and are presented here. The 1954 samples are still being studied.

The localities where sampling stations were installed were chosen to place the samplers about 50 miles apart and, where possible, near centers of population. Fortunately, dependable cooperators were found to service the stations seven days a week throughout the sampling periods. And this with no remuneration other than the satisfaction of contributing to a worthy cause!

The general location of these stations is shown on the map (page 20). The specific locations, names of cooperators, types of installation and other pertinent data are found in the descriptions of the individual localities.

Most of the samplers were installed on the roofs of buildings, including water filtration plants (8), sewage disposal plants (7), hospitals (6), schools (3) and other public buildings (5).

The particles that were caught, identified and recorded were primarily pollen grains and fungus spores but included spores of ferns and mosses, alga cells, plant hairs and insect scales.

PROCEDURE

The samplers were installed to give the best possible samples for the area and allow reasonably easy access for daily servicing. They were mostly well above ground to prevent undue influence of local conditions and a sufficient distance from objects that would obstruct or divert air movement. The sampler uses greased microscope slides on which the tiny airborne particles are impinged. The slides were uniformly greased in the laboratory in Albany. During 1953 this was with petrolatum jelly. Experiments conducted by us indicated that

silicone grease worked equally well, gave the same readings and lessened the danger of melting in summer heat, so it was used in 1954.

Boxes of 25 slides each were mailed periodically to the cooperators who exposed each slide for a 24-hour period on consecutive days. The slides were changed each morning at the same time which varied somewhat from station to station but usually at 9 a.m. The cooperator wrote the date of exposure on the frosted end of each slide and periodically mailed the exposed slides to our laboratory.

As soon as convenient, our technicians stained the slides with Calberla's solution, which employs basic fuchsin as a dye, and added a No. 1, 22 mm. square cover glass. Identification and counting was done using a binocular microscope with an apochromatic lens system and a built-in light. Most of the determinations were made at 100 diameters but greater magnifications were used when necessary. An extensive collection of check slides, from authentically identified material, and several useful publications were constantly at hand.

Two square centimeters of each sample were examined and the data recorded on tally sheets. If counts were low, three or four square centimeters were examined. The data were reported as the average per square centimeter.

The tally sheets were processed by the Bureau of Statistical Services of the State Education Department where the data were recorded on IBM cards allowing the sorting and tabulation of the information for study and presentation as graphs.

In Albany, two sampling stations were installed approximately one mile apart to determine the uniformity of particles in the air over a given locality. These stations were operated continuously from April 1, 1953, through September 30, 1954. During the summer of 1955, two samplers were operated 15 feet apart on the roof of the Education Building in Albany. The data from these supplementary stations are mentioned under Station 25.

The primary purpose of this survey is to furnish information of value in studies on pollinosis (hayfever). Although it is designed for use by patients and physicians who need to know what, where and when organic particles are in the air in sufficient quantities to cause medical concern, the presentation and discussion is from a botanical standpoint only.

ACKNOWLEDGMENTS

Our first and most grateful thanks go to the many cooperators who accepted the responsibility for collecting the daily samples and mailing them to the Albany laboratory. Many of them assisted in the installa-

tion of the sampling stations and several constructed elaborate devices to insure that proper samples were obtained. They are individually named in the descriptions of sampling stations.

Numerous persons helped in various ways but special thanks are due the following:

Fay Hyland, professor of botany, University of Maine, whose similar survey in Maine has been used as a model, has been continuously generous with much appreciated advice.

F. Wellington Gilcreas, formerly assistant director, Division of Laboratories and Research, New York State Department of Health, for advice, loan of equipment and making several of the research laboratory facilities available.

Doris McGlynn, now on the staff of the State Department of Health, was responsible for most of the routine identification and counting. She handled all of the samples for 1953 as well as the 1954 samples through most of the tree pollens. Assistance in completing the samples for 1954 and preparation of the graphs has come from Margaret Curtin, Charles Downing and Donald Lewis. Mrs. Emily Dixon helped with the analysis of data and planning of graphs.

Stanley J. Smith, curator of botany in the New York State Museum, has assisted in numerous ways, especially in the identification of troublesome plant parts and even taking time from his own research to help in the installation of the sampling stations. John Wilcox, curator of entomology, has frequently helped with the identification of insect parts.

Dr. Louis H. Conger of the Bureau of Statistical Services of the State Education Department has been our source of advice on mathematical matters. Without the aid of the bureau's machine room, the analysis of the data would have taken a much longer time.

O. C. Durham of Abbott Laboratories, North Chicago, Illinois, advised relative to procedures acceptable to the Pollen Survey Committee of the American Academy of Allergy.

PLANTS PRODUCING AIRBORNE POLLEN

Pollen is produced by flowering plants and conifers. The individual grains of pollen are too small to be seen with the unaided eye but in quantity they appear to be a yellowish powdery mass. The conifers and some flowering plants are wind-pollinated. Such plants usually produce large quantities of dry buoyant pollen grains. Most flowering plants are insect-pollinated; their pollen is not transported any appreciable distance by air currents. For convenience, those plants that

produce buoyant pollen in large quantities may be divided into trees, grasses and weeds. Most airborne tree pollens are shed during spring and early summer, the grasses during midsummer while the weed pollen is in the air during the late summer and fall. Overlaps occur as will be seen from an examination of the graphs.

Trees

While the order of appearance of the various tree pollens varies slightly among localities, the average order of appearance in quantity is somewhat as follows: juniper (*Juniperus*), hazel (*Corylus*), alder (*Alnus*), willow (*Salix*), elm (*Ulmus*), maple (*Acer*), poplar (*Populus*), larch (*Larix*), birch (*Betula*), sweet fern (*Comptonia*), blue beech (*Carpinus*), hop hornbeam (*Ostrya*), oak (*Quercus*), fir (*Abies*), hemlock (*Tsuga*), sycamore (*Platanus*), pine (*Pinus*), spruce (*Picea*), beech (*Fagus*), ash (*Fraxinus*) and hickory (*Carya*). Small amounts of walnut (*Juglans*), basswood (*Tilia*), cedar (*Thuja*), tree-of-heaven (*Ailanthus*) and black gum (*Nyssa*) were recorded from some stations.

It is very difficult to separate the pollen of birch, sweet fern, blue beech, hop hornbeam, alder and hazel. The last two are mostly shed earlier than the others and cause less confusion. Birch pollen exhibits variation due to the different species. During May 1953, especially between the 5th and 15th of the month, nearly all of the stations collected pollen that did not match well with birch and did not correlate with the occurrence of blue beech and hop hornbeam. It was therefore recorded as unidentified pollen and for most of the stations the amount was too low to warrant mention. However, for several stations amounts were recorded too large to ignore. This type of pollen was not seen in the 1954 samples and it now appears likely that at least some of the 1953 unidentified pollen should be included with birch. It is probable that the counts of birch, especially for May 9, 10 and 11, should be increased for Gloversville, Liberty, Turin and Oneonta.

There is some question about the counts on sweet fern. Its occurrence on the graphs does not correlate well with its occurrence in the State. It is possible that some birch pollen has been recorded under sweet fern. Further remarks will be postponed until the 1954 data are studied; until then it may be well to regard the sweet fern data with suspicion.

Grasses

There are over 400 species of grasses in New York but it is likely that most of the grass pollen is from 20 to 25 of the common species. Among those producing pollen in large quantities are: sweet vernal grass (*Anthoxanthum odoratum*), timothy (*Phleum pratense*), redtop

(*Agrostis alba*), Kentucky blue grass (*Poa pratensis*), and orchard grass (*Dactylis glomerata*). We found it impossible to distinguish the different grasses by their pollen grains.

Weeds

In their production of pollen, all of the weeds are of minor importance, except ragweed (*Ambrosia*). The total count of the latter exceeded that from all other entities, with the exception that the total grass pollen was slightly more. Most of this pollen is from short ragweed (*A. artemisiifolia*) but in some areas giant ragweed (*A. trifida*) supplies large amounts. The time of year when ragweed will be pollinating can be predicted rather closely for, unlike most plants, the flowering period is dependent upon latitude. When the daylight period reaches a certain length the ragweed plants come into bloom regardless of their size.

Experiments conducted by O. C. Durham indicate that the factor 3.6 may be used to convert the number of ragweed pollen grains per square centimeter of greased slide surface, when exposed in the Durham sampler for 24 hours, to the average number per cubic yard of air. Thus a count of 7 as shown on the ragweed graph would indicate an average of 25 grains per cubic yard. The first three columns of the following figures are converted to the cubic yard basis. From such data the "ragweed pollen index" is obtained by assigning one point for each day when the count reaches or exceeds 25, one point for each 100 grains of pollen on the day of the highest count and one point for each 200 grains of pollen in the seasonal total.

STATION	NUMBER OF DAYS WITH COUNTS OF 25 OR GREATER	MAXIMUM DAILY COUNT	TOTAL SEASONAL COUNT	RAGWEED POLLEN INDEX
1. Montauk Point	3	50	302	5
2. Riverhead	21	490	2,941	41
3. Farmingdale	27	270	2,898	44
4. Yonkers	25	191	2,300	38
5. Newburgh	19	155	1,897	30
6. Zena	13	76	814	18
7. Belle Ayre Mt.	18	173	1,382	27
8. Liberty	17	284	1,678	28
9. Oneonta	19	284	2,250	33
10. Binghamton	20	158	1,757	31
11. Cortland	21	259	2,599	37
12. Elmira	27	306	2,660	43
13. Hornell	21	216	2,272	34
14. Olean	28	216	2,304	42
15. Celoron	24	447	2,538	41
16. Springville	25	371	3,910	49
17. Lockport	33	565	6,494	71
18. Perry	31	2,376	11,722	114
19. Rochester	31	994	7,340	79

STATION	NUMBER OF DAYS WITH COUNTS OF 25 OR GREATER	MAXIMUM DAILY COUNT	TOTAL SEASONAL COUNT	RAGWEED POLLEN INDEX
20. Geneva	29	518	4,611	57
21. Oswego	18	256	2,844	35
22. Syracuse	24	472	3,478	46
23. Utica	23	670	3,906	50
24. Gloversville	18	245	1,829	29
25. Albany	15	176	1,602	25
25A. Albany	19	295	2,801	35
26. Hudson Falls	20	407	2,524	37
27. Ticonderoga	18	252	1,570	29
28. Indian Lake	10	222	1,091	17
29. Turin	10	72	738	12
30. Watertown	21	572	3,215	43
31. Wanakena	10	83	760	15
32. Saranac Lake	18	461	2,494	34
33. Dannemora	12	140	1,138	19
34. St. Regis Falls	17	443	2,373	33
35. Ogdensburg	21	666	3,564	46

Other weeds that produced sufficient buoyant pollen to be recorded on at least some of the graphs are, in order of their appearance: dock (*Rumex*), plantain (*Plantago*), pigweed (*Chenopodium* and *Amaranthus*), wormwood (*Artemisia*), marsh elder (*Iva*) and goldenrod (*Solidago*).

FUNGI

The total number of fungus spores for the season from the stations usually closely approached (and often surpassed) the total number of pollen grains. *Cladosporium* (including *Hormodendrum*) gave the highest readings, often being more than half the total count. *Alternaria* averaged second in abundance. It is probable that some *Stemphylium* spores were included in the counts for *Alternaria* as the spores of these genera are difficult to distinguish. In the counts of *Fusarium* it is likely that we have included spores of *Cylindrocarpon* and possibly *Curvularia*. Spores of rusts and smuts were recorded as such whenever possible but undoubtedly some were tallied under miscellaneous fungi.

Most fungi are impossible to recognize from spores alone. It is extremely likely that most of the spores recorded as miscellaneous fungi were from *Aspergillus* and *Penicillium* but included many from *Pullularia, Mortierella, Epicoccum, Botrytis, Phoma* and various mushrooms.

A multicellular spore was always counted as a single spore but a clump of spores was counted (or estimated) as the number of individual spores in the clump. Some of the high daily counts are due to one or more large clumps; these are often specifically mentioned under the discussion for each station. Bits of fungus tissue (hyphae) were recorded as spores.

MISCELLANEOUS

Ferns

The spores of most ferns are apparently too heavy to be plentiful in the air far from the source. Our counts include the club mosses (*Lycopodium*) with the true ferns (*Polypodiaceae* and *Osmundaceae*). The total for fern spores was roughly 3 percent of total pollen. Spores of the horsetails (*Equisetum*) were encountered occasionally.

Mosses

It is possible, though not probable, that the low counts for mosses are due to our inability to recognize them as such. If so, some of them are included with the ferns.

Algae

Small amounts of alga cells and filaments were encountered, but never in important amounts.

Plant Hairs

Our records from approximately 15,000 samples show plant hairs on every one. The counts were usually very high; too high to be conveniently included on the graphs with pollen and spores. At the Albany stations 25 and 25A, which were operated continuously from spring 1953 to fall 1954, plant hairs were found daily during the winter. Plant hairs vary greatly in size and no attempt was made to separate on that basis or on any other characteristic. With such high counts, the averages would be uniform and quite comparable between stations. Further discussion is best left until the 1954 samples are analyzed.

Animal Parts

Scales of insects were usually common and often abundant in the samples. They have been recorded but are not included in the present graphs. This category is comprised of tiny roundish scales, long narrow scales (hairs), portions of wings, legs and even whole insects (usually mites).

Hairs of animals such as dogs, cats, horses and bats and down from birds were occasionally noticed but were never common.

LIST OF STATIONS

1. Montauk Point

Cooperators: for 1953, Archie W. Jones, B.M.1, Montauk Point Light Station; for 1954, C. E. Schumacker who succeeded Mr. Jones as B.M.1.

The sampler was on the lawn about 70 feet from the lighthouse. It was 6 feet above the ground which is 60 feet above sea level. There were few plants that produce airborne pollen in the immediate vicinity of the sampler. A few flowers of crab grass (*Digitaria*) escapes the lawnmower. Bayberry (*Myrica*) is abundant on the east side several hundred feet away.

As would be expected from a station nearly surrounded by water, the total count from Montauk Point was the lowest of all the stations. This may be due, in part, to the early season causing juniper, elm, maple and poplar to shed pollen during March. The highest total count was from grass, with birch following a close second. The ragweed count was much lower than at any other station, with less than half the number of particles recorded for the next lowest (Turin) and approximately one-tenth that of Riverhead and Farmingdale.

2. Riverhead

Cooperator: Dr. Stuart Dallyn, director, Long Island Vegetable Research Farm.

This station is 3 miles northeast of Riverhead and 1 mile south of the Sound, at an elevation of 100 feet. The sampler was 25 feet above the ground and 3 feet above the roof of a flat-topped building, well in the open and surrounded by flat farmland. It was lowered by rope and pulley for changing the slides.

It is likely that the low counts for juniper, elm, poplar, maple and alder are due to lack of March samples. Maple, alder, hemlock and cedar were too low to warrant inclusion. Smut spores were too sporadic to graph: 11 on June 7, 6 on October 3 and 3 on October 15. There were traces of blue beech, hop hornbeam, black gum and tree-of-heaven in May.

3. Farmingdale

Cooperator: Dr. Louis Pyenson, Long Island Agricultural and Technical Institute.

The sampler was mounted on the roof of one of the Institute buildings, attached to an unused chimney. This locality is 90 feet above sea level; the sampler was 25 feet above the ground and in the open, being surrounded by greenhouses, low shrubs and mowed lawn. The nearest trees were more than 100 feet distant: pine, maple, elm and cedar. There are many small spruce trees in the vicinity but probably too young to shed pollen.

The low counts for juniper, elm, poplar, maple and alder may be due to lack of March samples. Alder, hemlock and cedar were too low

to include. *Fusarium* spores were occasionally seen but too sporadic to graph. There was a small amount of hazel in April and of blue beech, hop hornbeam, tree-of-heaven and black gum in May.

4. Yonkers

Cooperators: for 1953, Arthur Wallach, director, Division of Environmental Sanitation, Department of Public Health, Yonkers; for 1954, George J. Kupchik, who succeeded Mr. Wallach as Director.

This station is at the health center building which is 200 feet above sea level. The sampler was mounted on the roof parapet over 100 feet above the ground entirely free from anything that would divert normal air currents. It was well above plants producing airborne pollen such as the usual street trees, mostly elm and maple.

The low counts for juniper, elm, poplar, maple and alder are likely due to lack of March samples. There were small amounts of blue beech, tree-of-heaven, hop hornbeam and black gum in May.

5. Newburgh

Cooperator: John F. Kingsley, superintendent of water.

This station was located at the southwest edge of the city at 240 feet above sea level. The sampler was on the roof of the filtration plant, well in the open. The usual street trees are apparently the only near source of airborne pollen in quantity.

Low counts for juniper, alder and perhaps poplar and elm may be due to lack of March samples. The relatively high count for sycamore may be due to local street trees. There was a small amount of blue beech and traces only of hop hornbeam, black gum and tree-of-heaven.

6. Zena

Cooperator: William Colsten, chief filter plant operator, Kingston Water Department.

This station was 400 feet above sea level. The sampler was some 30 feet above the ground, mounted on the peak of the gable roof of a filtration plant building, well in the open. Trees in the vicinity were sugar maple, red oak, sycamore, hickory, white pine and ash. The lawn on the south and west close to the building had plantain, dock and daisy fleabane (*Erigeron*).

Probably much of the juniper and elm pollen was shed before April and perhaps poplar also. During May there were small amounts of blue beech and traces of hop hornbeam, tree-of-heaven and black gum.

7. Belle Ayre Mountain

Cooperator: Arthur G. Draper, superintendent, Belle Ayre Mountain Ski Center.

This station was our highest above sea level: 3,325 feet. The sampler was perched 30 feet above the ground on top of the tower at the upper end of the ski lift. It was in the open; the nearest trees, beech and maple, being 30 feet away.

The count for ragweed indicates the situation on Belle Ayre Mountain and does not reflect the condition at Pine Hill in the valley, where the ragweed count is known to be low. There was some blue beech and traces of hop hornbeam, tree-of-heaven and black gum.

8. Liberty

Cooperator: Henry Eichenauer, superintendent of Sewage Disposal Plant.

This station was at the Sewage Disposal Plant, at an elevation of 1,400 feet above sea level. The sampler was 20 feet above the ground and in the open.

During May, especially on the 8th, 9th and 10th, there were large amounts of pollen that could not be identified. It was probably birch or blue beech. Also during May there were traces of hop hornbeam, tree-of-heaven and black gum. Smut spores were not graphed; the total was high but due to one clump of 170 grains on September 7; otherwise low and sporadic.

9. Oneonta

Cooperator: C. M. Taylor, superintendent of water; assisted by Frank Adamowicz.

This station was at the Sewage Disposal Plant, 1,070 feet above sea level. The sampler was on a flat roof 20 feet above the ground. There were hayfields nearby and a few trees: elm, sycamore, beech and willow. A forested area on the south is of mixed woods, mostly maple and pine with some hemlock.

Unidentified pollen collected on May 9 and 10 may be birch or blue beech.

10. Binghamton

Cooperator: H. G. Koach, administrator of Binghamton City Hospital.

The sampler was on the roof of the hospital, about 50 feet above the ground, which is 870 feet above sea level. Plants in the vicinity producing airborne pollen are the usual street trees: elm, maple and sycamore.

This station began operation on April 3. It is probable that juniper, alder, willow, elm and poplar had shed some pollen during March.

11. Cortland

Cooperator: H. B. Holcomb, superintendent of Sewage Treatment Plant.

This station is at the Sewage Treatment Plant, 1,100 feet above sea level. The sampler was on the flat roof, about 20 feet above the ground. The station is surrounded by hayfields. Along the river close by there are willows and some elms. The outlying woods are mostly maple with some beech and occasional poplar and walnut.

Juniper and alder had mostly shed during March; probably some elm, poplar and maple also. The high count for grass may be due to the nearby hayfields.

12. Elmira

Cooperator: J. W. Colby, assistant superintendent of Arnot-Ogden Memorial Hospital.

The sampler was mounted about 50 feet above the ground on the roof parapet of the hospital, which is 880 feet above sea level. The station is surrounded by the usual street trees: maple and elm. There are a few spruce and pine trees on the hospital grounds.

Probably juniper, alder and elm had shed pollen during March and perhaps also poplar and maple. During May, there were traces of blue beech and tree-of-heaven.

13. Hornell

Cooperator: J. G. Cary, superintendent of water.

This station is at the Water Filtration Plant, 1,400 feet above sea level. The sampler was perched on the peak of the gable roof, 25 feet above the ground, of a building near the top of a hill. This hilltop is covered with young growth, mostly poplar (trembling aspen). On the north is a deep gorge with elm, maple, oak, blue beech, hop hornbeam, willow and scattered hickory. On the west are farms with hayfields. Plantain is abundant on the lawn near the station.

Probably much juniper, alder and elm had shed during March. It is very likely that the record for sweet fern is too high; this station had the highest count for this plant; the known distribution does not warrant it; its pollen is easily confused with birch.

14. Olean

Cooperator: Alfred H. Mann.

This station is at the Sewage Disposal Plant, 1,420 feet above sea level. The sampler was 15 feet above the ground and in the open, except for cedar trees nearby that are a few feet taller. Along the river

near the station are elm, maple and willow. Goldenrod is abundant in the area.

15. Celoron

Cooperator: Homer Feidler, Sewage Treatment Plant operator.

The station is at the Sewage Treatment Plant, 1,320 feet above sea level. The sampler was on the roof, 15 feet above the ground and in the open. The nearest trees were willow and poplar. Elm and maple were scattered on all sides. There were two small, but flowering, cedars planted beside the building. A small swamp of cattail (*Typha*) was just east of the station. Goldenrod was plentiful. There were a few plants of plantain, pigweed (*Chenopodium*) and short ragweed nearby.

16. Springville

Cooperator: Elmer Ganschow, superintendent of water.

The sampler was 15 feet above the ground on the roof of a pumping station, 1,350 feet above sea level. The sampler was in the open, being surrounded by lawn and a large schoolyard. Farther away were houses, street trees (mostly sugar maple) and weed patches. Other trees in the area are pine, elm, willow and spruce.

It is possible that one or more high points on the graph for maple may be due to the sugar maples nearby and the low position of the sampler.

17. Lockport

Cooperator: Roger Foltz, superintendent of Water Filtration Plant.

This station is at the filtration plant, 620 feet above sea level. The sampler was on a corner of a flat roof 25 feet above the ground and more than 50 feet from a higher part of the building. There were large hayfields near and the usual street trees: maple and elm, also poplar and willow.

The large amount of grass pollen recorded may be due, in part, to the hayfields in the vicinity. This was the second highest count for grass; being surpassed only by Turin.

18. Perry

Cooperator: Ralph Laney.

This station is at the Perry Waterworks, 1,380 feet above sea level, on the shore of Silver Lake. The sampler was only 12 feet above the ground but in the open on a rise above the lake. The nearest trees were 100 feet distant, mostly elm. Willow, maple and elm fringe the lake.

The ragweed count at Perry was the highest for all stations with the high point (September 4) reaching 660 grains per square centimeter

or approximately an average of 2,400 per cubic yard of air. The slides for July 19 and 20 were knocked out by young sparrows so the data were not used.

19. Rochester

Cooperator: Dr. John M. MacMillan, director of Iola Sanatorium.

This station is at the Sanatorium, at the south edge of the city, at an elevation of 550 feet. The sampler was on a flat roof, in the open, approximately 50 feet above the ground. Trees producing airborne pollen in the immediate vicinity are: sycamore, maple, spruce and ash. There is quite a bit of cultivated farmland in the area.

The high counts for *Cladosporium* on July 23 and miscellaneous fungi for September 13 are due primarily to large clumps of spores.

20. Geneva

Cooperator: Robert E. Johnson, administrator of Geneva General Hospital; assisted by Andrew Christensen, maintenance engineer.

This station is at the Hospital, 520 feet above sea level. The sampler was on the roof parapet, in the open, approximately 50 feet above the ground. Plants producing airborne pollen in the vicinity are the usual shade trees, mostly elm.

21. Oswego

Cooperator: Dr. George E. Pitluga, professor of science, Teachers College, State University of New York.

The station is at the College, 320 feet above sea level. The city is on the east; Lake Ontario on the north and west. The sampler was on the flat roof of the Union Building, in the open, approximately 30 feet above the ground. It was surrounded by lawn and campus trees, mostly maple, spruce, poplar and birch.

22. Syracuse

Cooperator: for 1953, William P. Gyatt, superintendent of the Bureau of Sewage Treatment; for 1954, Joseph D. Kieffer, who succeeded Mr. Gyatt as Superintendent.

The station is at the Sewage Disposal Plant, near the south end of Onondaga Lake, 380 feet above sea level. The sampler was mounted, 30 feet above the ground, above the roof of the building. It was well in the open on a platform that was lowered, by means of rope and pulley sliding the platform down guiding rods, for changing slides. Plants producing airborne pollen in the vicinity are street trees, mostly elm and poplar. A swamp between the station and the lake has cattail (*Typha*) and reed grass (*Phragmites*).

The station was operated from April 17 to October 12 during 1953. The lack of pollen from juniper, alder, poplar and low counts from willow, elm and maple may be due to their shedding before samples were taken.

23. Utica

Cooperator: H. F. Hoffman, senior public health engineer.

The station was at the YMCA Building, 500 feet above sea level, during 1953. The sampler was on the roof, well in the open, approximately 100 feet above the ground. During 1954 the sampler was on the roof of the Health Office Building, about 40 feet from the ground. Plants producing airborne pollen are essentially the same in the vicinity of both stations, being the usual street trees, mostly elm and maple.

Probably some alder, juniper, poplar and elm was shed during March. The uniformity of counts from July 21 through July 27 is because one slide was left on the sampler for those seven days; each day's record was obtained by dividing the total count by seven.

24. Gloversville

Cooperator: Stuart Heald, filtration plant operator.

This station is the Gloversville Water Works, approximately 2 miles north of the city, at 1,040 feet above sea level. The sampler was on the roof parapet, in the open, about 25 feet above the ground. There is a pine plantation nearby on the north.

The high count for pine on May 18 is likely due to the proximity of the sampler to the plantation. On May 8, 9, 10 and 11 there was quite a bit of pollen that could not be identified; it is likely that some of it was birch.

25. Albany

Cooperator: John Bartnick, custodian, New York State Museum.

This station is the Education Building on Washington Avenue in downtown Albany, 160 feet above sea level. The sampler was on the roof, in the open, 140 feet above the ground. Plants in the vicinity producing airborne pollen are the usual city trees, mostly elm, maple and tree-of-heaven.

A comparison of graphs for the two Albany stations, 25 and 25A will indicate the amount of variation that may be expected between samplings in the same general area but separated by a mile or so. Experiments are now being conducted to determine the effect of height above ground and local weather conditions on the pollen count. The two samplers operated 15 feet apart during 1955 gave rather uniform readings.

25A. Albany

Cooperator: Miss Eleanor Weeber, sanitary chemist, Division of Laboratories for Sanitary and Analytical Chemistry, New York State Department of Health.

This station is at the Health Department's Division of Laboratories and Research on New Scotland Avenue, 220 feet above sea level. The sampler was on the roof parapet, 70 feet above the ground.

26. Hudson Falls

Cooperator: J. A. Fitzgerald; assisted by Peter Keegan.

This station is the Sewage Treatment Plant, 240 feet above sea level. The sampler was mounted on top of an 8-foot upright column on the roof of the Plant, which placed it approximately 25 feet above the ground and in the open. Plants producing airborne pollen in the vicinity are box elder maple, elm, oak, poplar, pine and willow. There were small amounts of ragweed nearby. Forests in the area are of spruce, fir, blue beech, maple, birch and some larch.

The high count for miscellaneous fungi on July 24 is due to a large clump of spores.

27. Ticonderoga

Cooperator: Herbert Barber; assisted by Fred Warren.

This station is the Moses-Ludington Hospital, 200 feet above sea level. The sampler was on the roof, above the parapet, with no obstruction to modify air currents nearer than 60 feet. It was approximately 50 feet above the ground. Plants producing airborne pollen in the vicinity are elm, maple, poplar, birch and cedar. On the west side are hayfields with occasional elms. Forests in the general area are mixed hardwoods.

On May 11 and 12 there were rather large amounts of pollen that could not be identified. It is likely that some of it was birch.

28. Indian Lake

Cooperator: Guy Pelon, superintendent of water.

This station is the home of Mr. Pelon in the village, 1,740 feet above sea level. The sampler was mounted 25 feet above the ground on top of a pole in the open. The sampler was lowered by rope and pulley for changing slides. Principal plants producing airborne pollen in the immediate vicinity of the sampler were grasses as the pole was in a hayfield. Trees in the area are the typical Adirondack forest of maple and spruce.

29. Turin

Cooperators: for 1953, S. S. Sweet; for 1954, Donald Hughes.

This station is at the home of Mr. Sweet, 1,260 feet above sea level. The sampler was mounted 8 feet above the ground in an open hayfield. There were few plants (other than grasses) producing airborne pollen in the immediate vicinity of the sampler.

The large amount of grass pollen recorded is likely due to the surrounding hayfield and low position of the sampler. This may be the reason for the high count for plantain.

30. Watertown

Cooperator: Dale Lawson, who has charge of water purification for Watertown.

This station is at the pumping plant of Watertown Water Works, 500 feet above sea level. The sampler was perched above the roof of one of the buildings using a device that allowed it to be lowered for changing slides. It was 20 feet above the ground and in the open. There were only a few scattered trees nearby that produce airborne pollen: maple, elm, poplar, cedar, willow and oak.

It is possible that some of the pollen recorded as sweet fern is actually birch.

31. Wanakena

Cooperator: James Dubuar, superintendent of State Rangers School.

This station is at the sunshine-transmitter tower near the School, 1,600 feet above sea level. The sampler was mounted on top of the tower, 30 feet above the ground. It was in the open except for three large pine trees on the north side, approximately 10 feet distant. It was in the midst of a pine-spruce forest.

The large amount of pine pollen recorded is probably due, in part at least, to the tall white pine trees close to the sampler. The high count for miscellaneous fungi on April 11 is due to a clump of spores.

32. Saranac Lake

Cooperator: for 1953, Lyall DeLamater, sanitary inspector of Saranac Lake; for 1954, several cooperators assisted in succession, all proving to be unsatisfactory with the exception of Frank Buck, Jr. who took over late in the season.

This station during 1953 was at the Hotel Saranac, 1,580 feet above sea level. The sampler was on the roof of the hotel, some 50 feet above the ground. Unfortunately it was not realized until the end of the season that the sampler was not installed in the place approved. It cleared the parapet by only a few inches rather than the recommended

30 inches and was only 10 feet from construction that would divert normal air currents. The sampler was moved to the roof of the Paul Smith Building for 1954. This was an excellent location but poor cooperation resulted in a discontinuous record. The forested hills at this station are mostly maple and birch with pine and some spruce.

Some of the counts for birch pollen were too large to show on the graph; May 9: 3,171 grains, May 10: 55, May 11: 888 and May 12: 463. This station had the highest total count for birch, being more than twice the next highest (Indian Lake). It also led with fir, spruce, hemlock and maple. It was surpassed only by Belle Ayre Mountain for beech and only by Newburgh for ash. The sum total for all pollen grains was higher than at any other station. The ragweed count was higher than would be expected at Saranac Lake and may not well reflect the situation at the lower levels. Large amounts of algae were found on the slides, probably due to the position of the sampler.

33. Dannemora

Cooperator: Warden J. V. Jackson, Clinton Prison. The slides were changed by Woodbury Wallace, assisted by Charles Stewart.

This station is at the prison, 1,400 feet above sea level. The sampler was 35 feet above the ground on the roof parapet of the Administration Building. Plants producing airborne pollen in the immediate vicinity are the street trees: maple, elm and birch. The surrounding woods are of maple, ash, beech, birch and poplar, with spruce and some pine at the higher levels.

34. St. Regis Falls

Cooperator: Arthur Fadden.

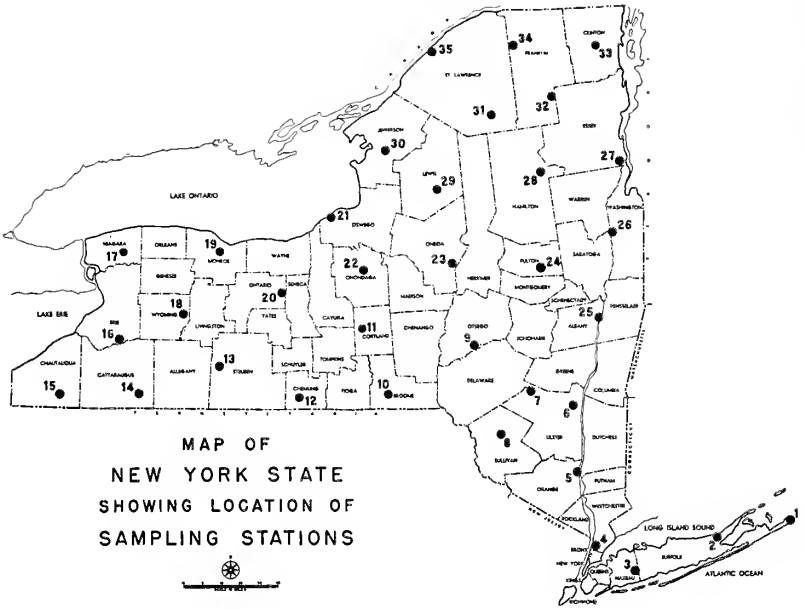
This station is 1,300 feet above sea level with the sampler about 40 feet above the ground on the flat roof of the school building, in the open. Plants producing airborne pollen in the general vicinity are: maple, elm, pine, willow, poplar and larch. There is some ragweed and plantain in the schoolyard. Woods one-fourth mile west of the station are mostly maple.

35. Ogdensburg

Cooperator: Dr. George F. Etling, director, St. Lawrence State Hospital. The slides were changed by Mrs. Anna Martin.

This station is at the Hospital, 250 feet above sea level. The sampler was mounted on the roof parapet, approximately 25 feet above the ground. It was in the open with nothing to divert air currents except a higher portion of the building 40 feet south of the sampler position.

Plants producing airborne pollen in the vicinity are planted trees: poplar, maple, elm, oak, spruce and pine. Woods to the south are mostly maple. There are hayfields on the south and west.



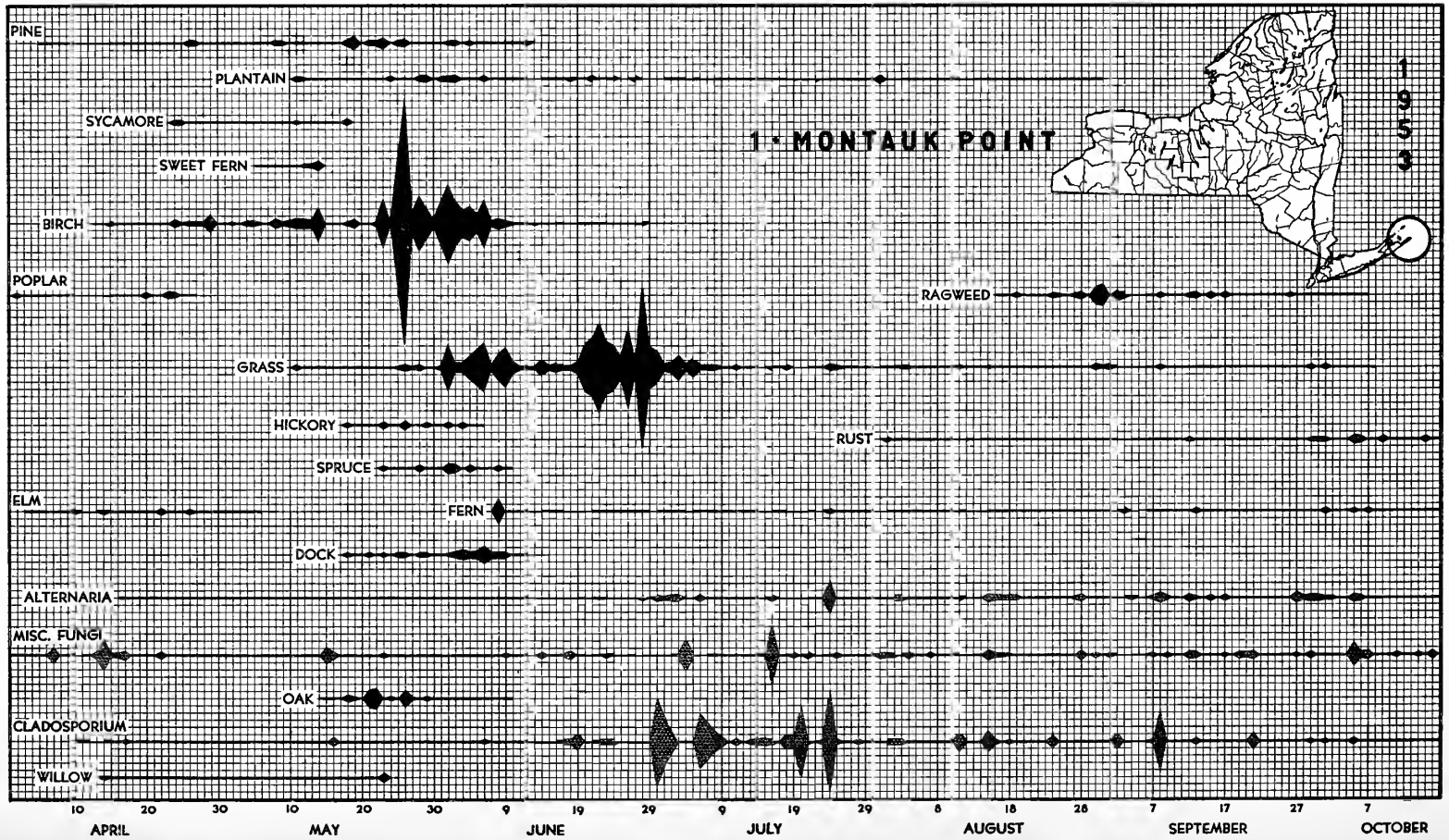
MAP OF
NEW YORK STATE
SHOWING LOCATION OF
SAMPLING STATIONS

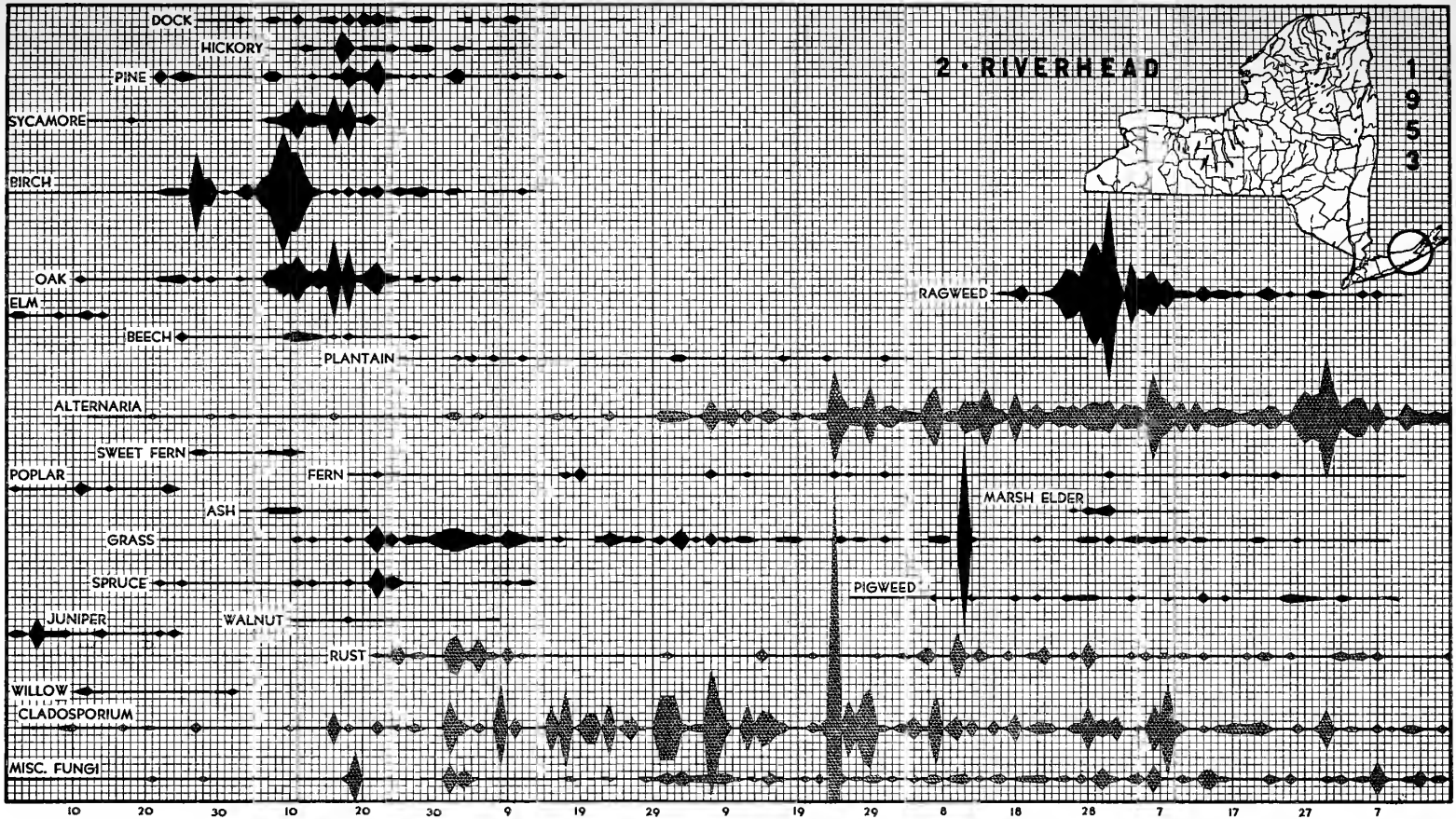
EXPLANATION OF GRAPHS

The following graphs present some of the data from the samples taken during 1953 at 36 stations in 35 localities. Pollen grains and fern spores are shown in solid black; fungus spores are indicated by a pattern. Each tiny square (vertically) represents five (5) granules per square centimeter of slide surface exposed for a 24-hour period. A solid line indicates that the average daily count was one or zero. A broken line indicates more than one week of consecutive counts of zero. Extremely high points may be due to clumped particles; where this is so, specific mention is made in the discussion of the graph. Multiple peaks may be due to different flowering dates of species in the genus or to fluctuations in the weather. The circle on the map has a 25-mile radius.

Only those pollen grains and fungus spores for which the total count for the 200-day period was 15 or more are shown, unless there was an individual day's count of 5 or higher.

It should be emphasized that the graphs indicate for any entity the average number of particles caught on a square centimeter of greased surface and do not directly indicate the average number per unit volume of air. Factors for converting greased slide data to a volumetric basis vary greatly with different plants and also vary with different conditions of weather and with different concentrations of particles. Thus, birch and pine may not be compared to the same degree that birch may be compared between stations. The graphs show what kinds of particles were in the air and their relative abundance at different times during the growing season of 1953. It must be kept in mind that other years would furnish somewhat different data and it is with some hesitancy that the 1953 information is presented before the 1954 data are available for comparison. To indicate what variation may be expected, data obtained at the Albany stations for 1954 and 1955 are included. It should be realized that these data for 1953 may only be used to describe the situation for following years in much the same way that weather data for one year may be used to indicate weather in the future. As an indication of the yearly variation, compare the Albany graphs (Nos. 25 and 25A) for 1953, 1954 and 1955.


1 • MONTAUK POINT
1953
PINE
PLANTAIN
SYCAMORE
SWEET FERN
BIRCH
POPLAR
GRASS
HICKORY
SPRUCE
ELM
FERN
DOCK
ALTERNARIA
MISC. FUNGI
OAK
CLADOSPORIUM
WILLOW
RAGWEED
RUST
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


2 · RIVERHEAD
1953
DOCK
HICKORY
PINE
SYCAMORE
BIRCH
OAK
ELM
BEECH
PLANTAIN
ALTERNARIA
SWEET FERN
POPLAR
FERN
ASH
GRASS
SPRUCE
JUNIPER
WALNUT
RUST
WILLOW
CLADOSPORIUM
MISC. FUNGI
RAGWEED
MARSH ELDER
PIGWEED
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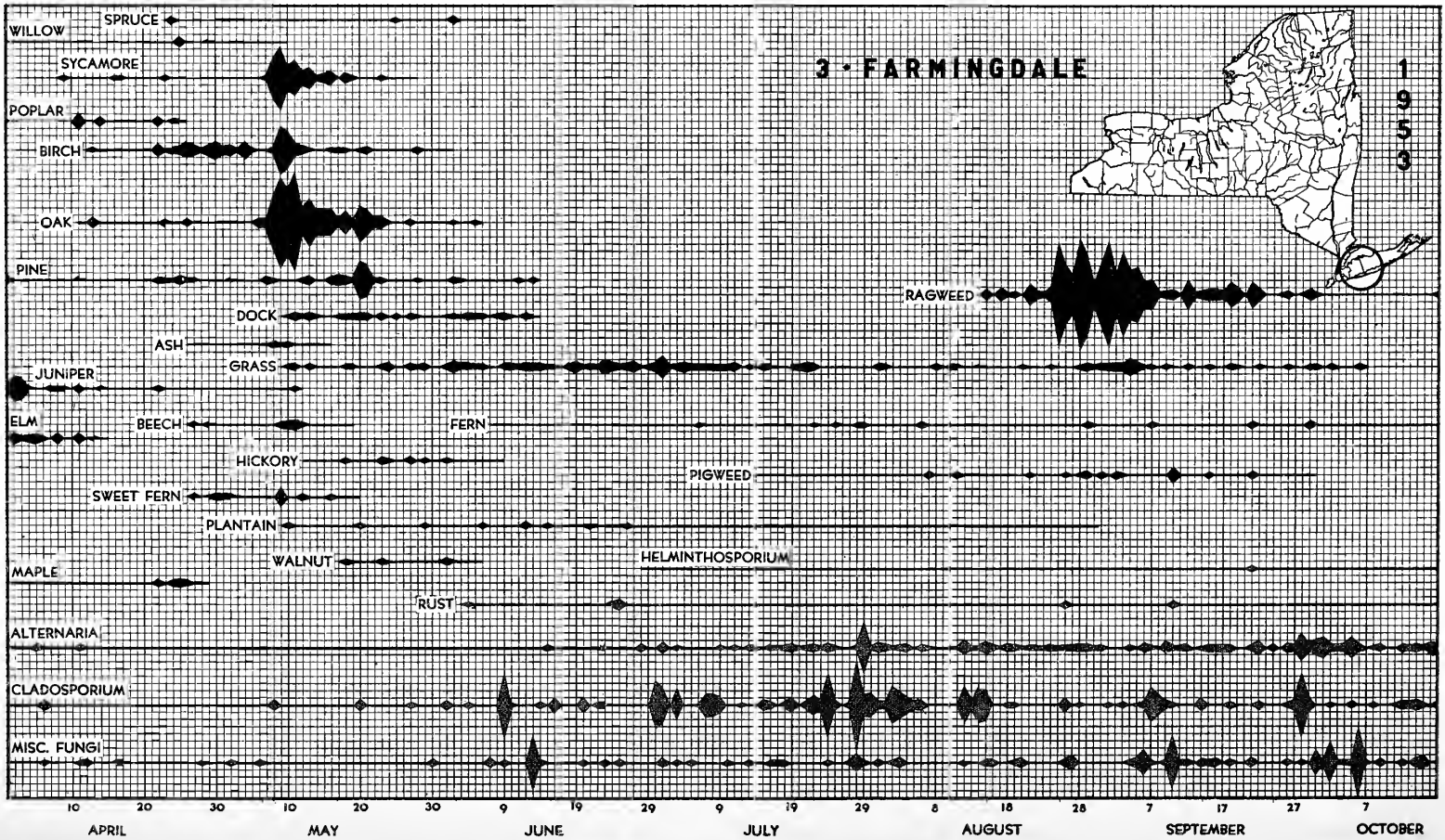
3 • FARMINGDALE
1953
WILLOW
SPRUCE
SYCAMORE
POPLAR
BIRCH
OAK
PINE
DOCK
ASH
GRASS
JUNIPER
ELM
BEECH
FERN
HICKORY
SWEET FERN
PLANTAIN
WALNUT
MAPLE
RUST
ALTERNARIA
CLADOSPORIUM
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RAGWEED
PIGWEED
HELMINTHOSPORIUM
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SEPTEMBER
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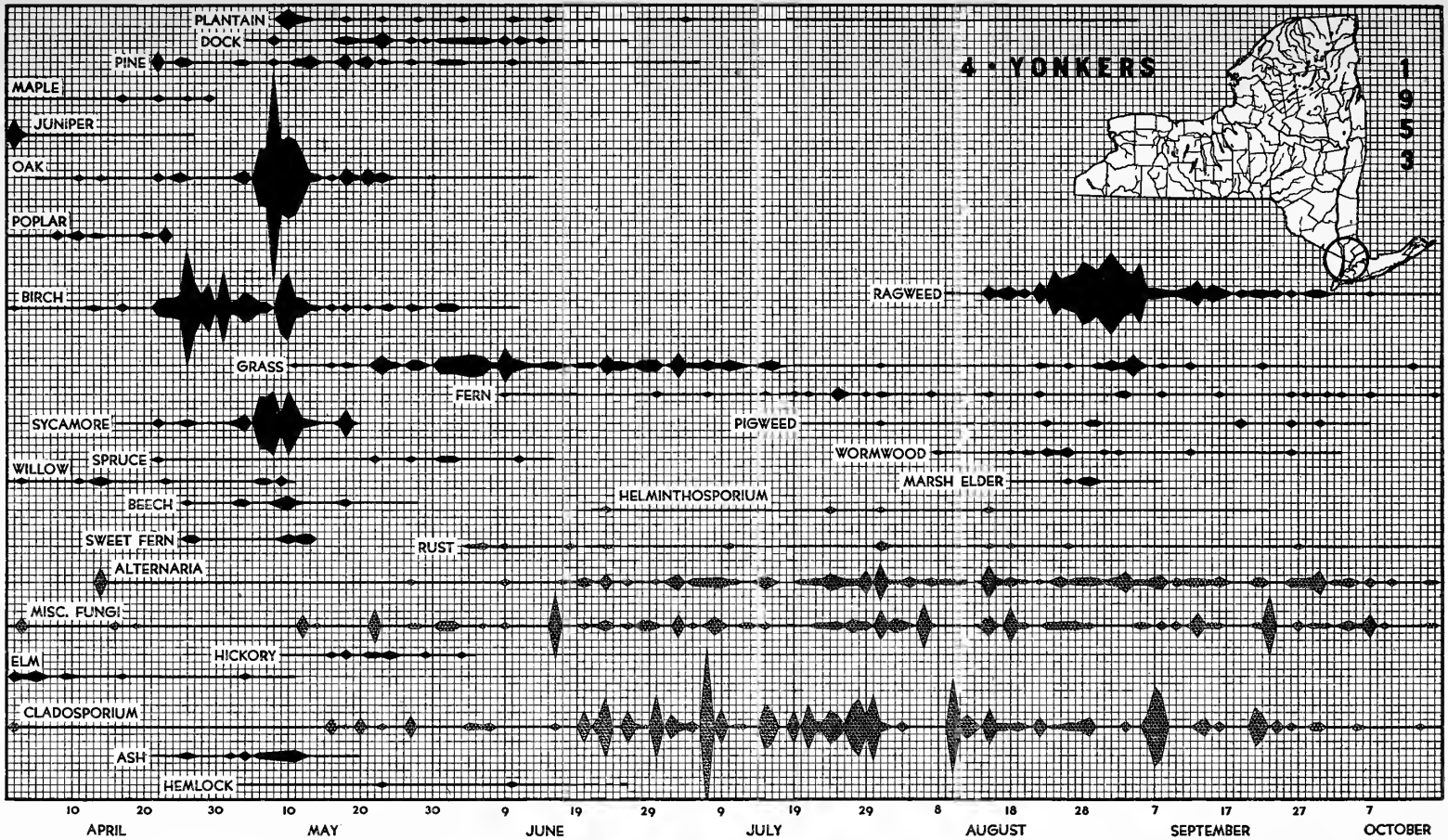
4 • YONKERS
1953
PLANTAIN
DOCK
PINE
MAPLE
JUNIPER
OAK
POPLAR
BIRCH
GRASS
FERN
SYCAMORE
WILLOW
SPRUCE
BEECH
SWEET FERN
ALTERNARIA
MISC. FUNGI
ELM
HICKORY
CLADOSPORIUM
ASH
HEMLOCK
RAGWEED
PIGWEED
WORMWOOD
MARSH ELDER
HELMINTHOSPORIUM
RUST
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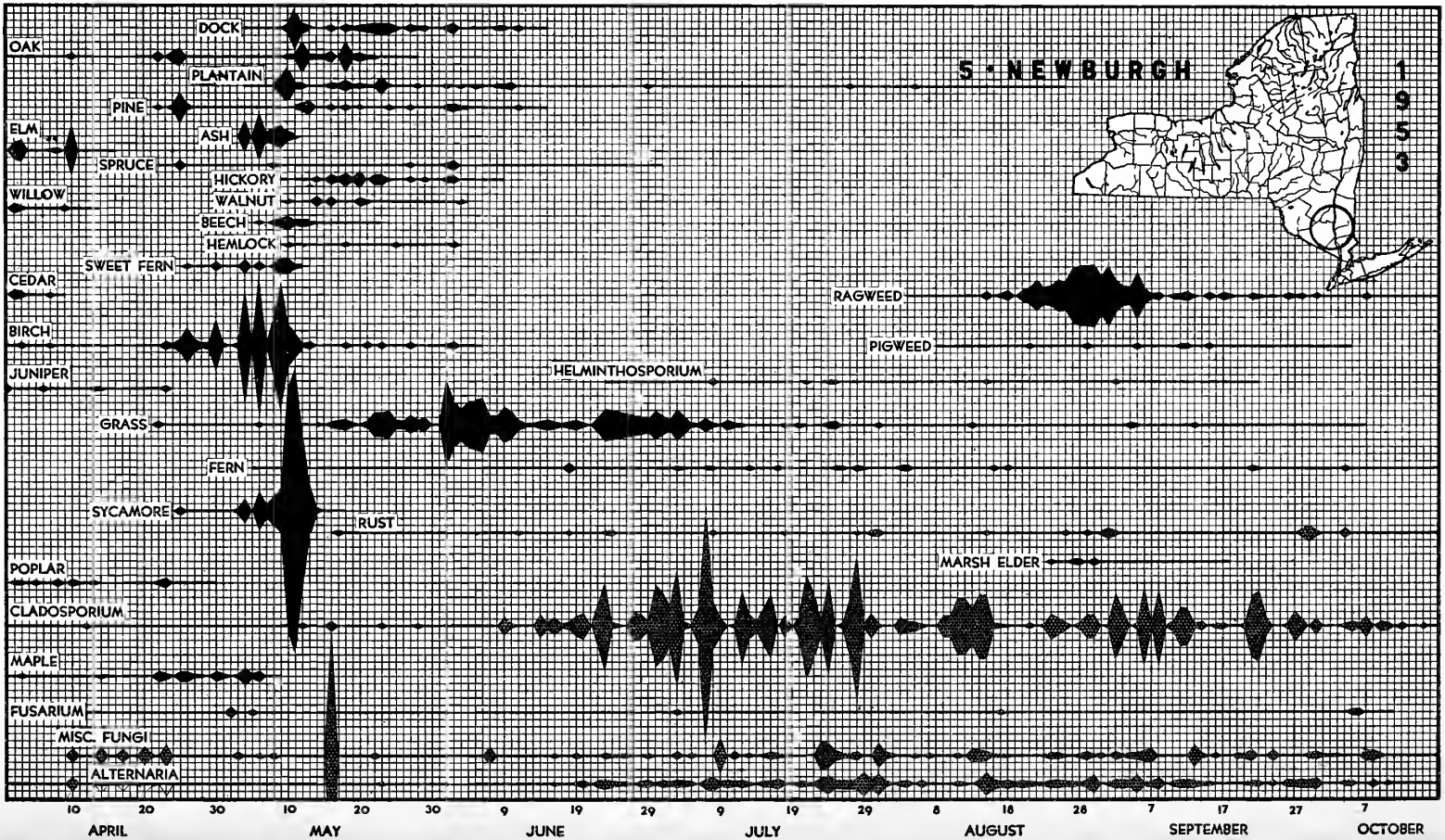
5 · NEWBURGH
1953
OAK
DOCK
PLANTAIN
PINE
ELM
ASH
SPRUCE
HICKORY
WILLOW
WALNUT
BEECH
HEMLOCK
SWEET FERN
CEDAR
BIRCH
JUNIPER
GRASS
FERN
SYCAMORE
RUST
POPLAR
CLADOSPORIUM
MAPLE
FUSARIUM
MISC. FUNGI
ALTERNARIA
HELMINTHOSPORIUM
RAGWEED
PIGWEED
MARSH ELDER
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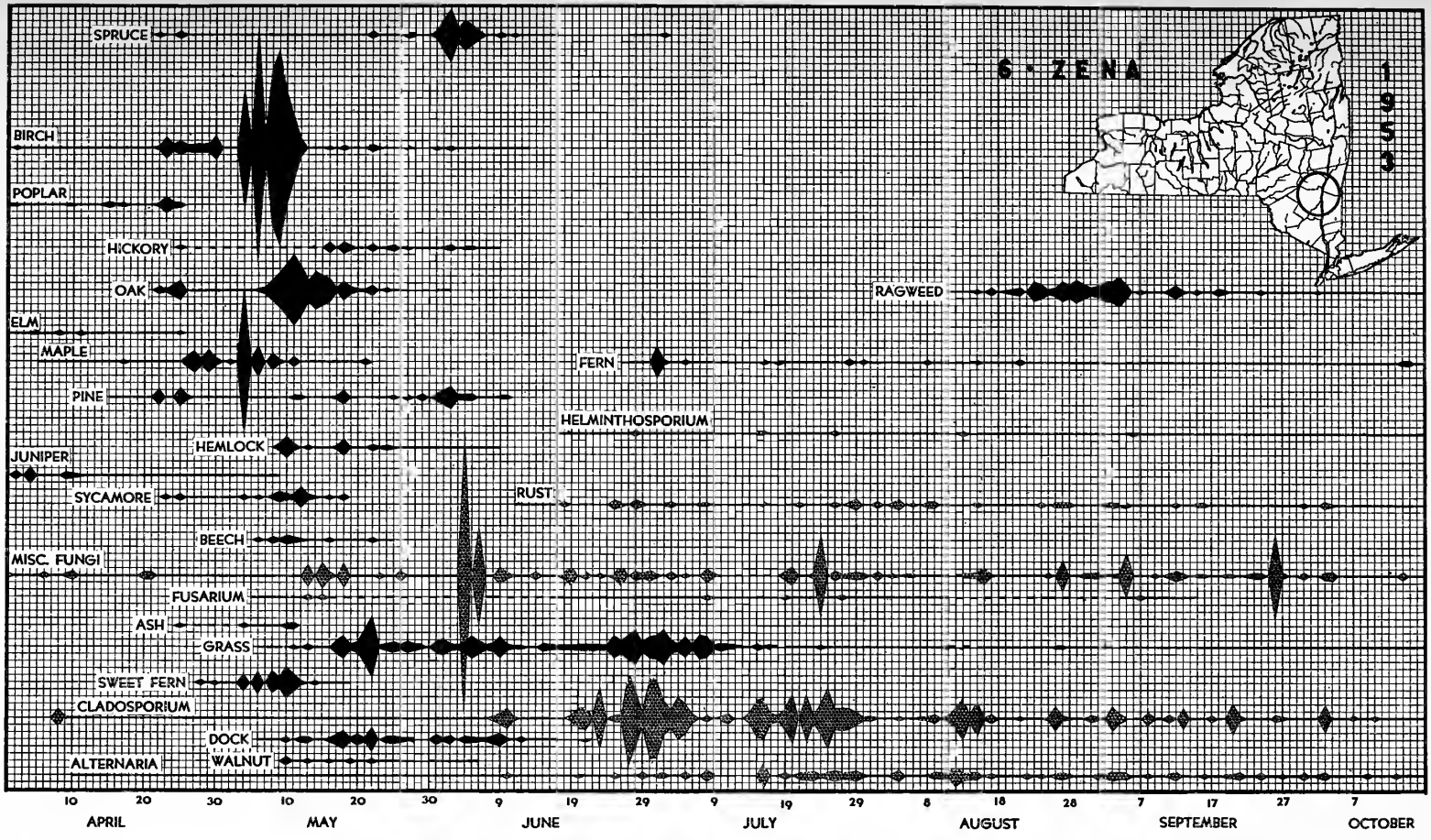
6 · ZENA
1953
SPRUCE
BIRCH
POPLAR
HICKORY
OAK
ELM
MAPLE
PINE
HEMLOCK
JUNIPER
SYCAMORE
BEECH
MISC. FUNGI
FUSARIUM
ASH
GRASS
SWEET FERN
CLADOSPORIUM
DOCK
WALNUT
ALTERNARIA
RAGWEED
FERN
HELMINTHOSPORIUM
RUST
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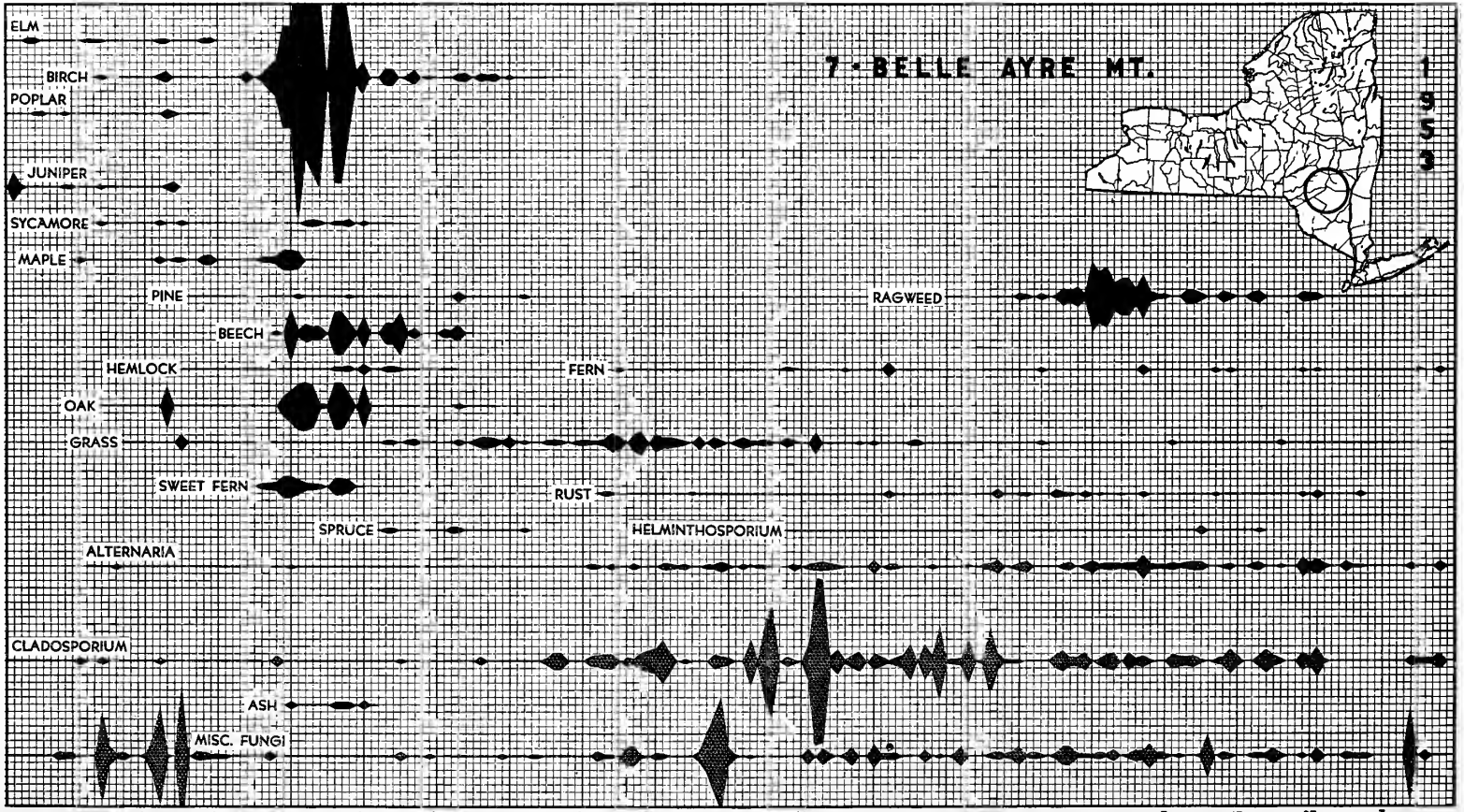
SEPTEMBER
OCTOBER


7 - BELLE AYRE MT.
1953
ELM
BIRCH
POPLAR
JUNIPER
SYCAMORE
MAPLE
PINE
BEECH
HEMLOCK
OAK
GRASS
SWEET FERN
SPRUCE
ALTERNARIA
CLADOSPORIUM
ASH
MISC. FUNGI
RAGWEED
FERN
RUST
HELMINTHOSPORIUM
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SEPTEMBER
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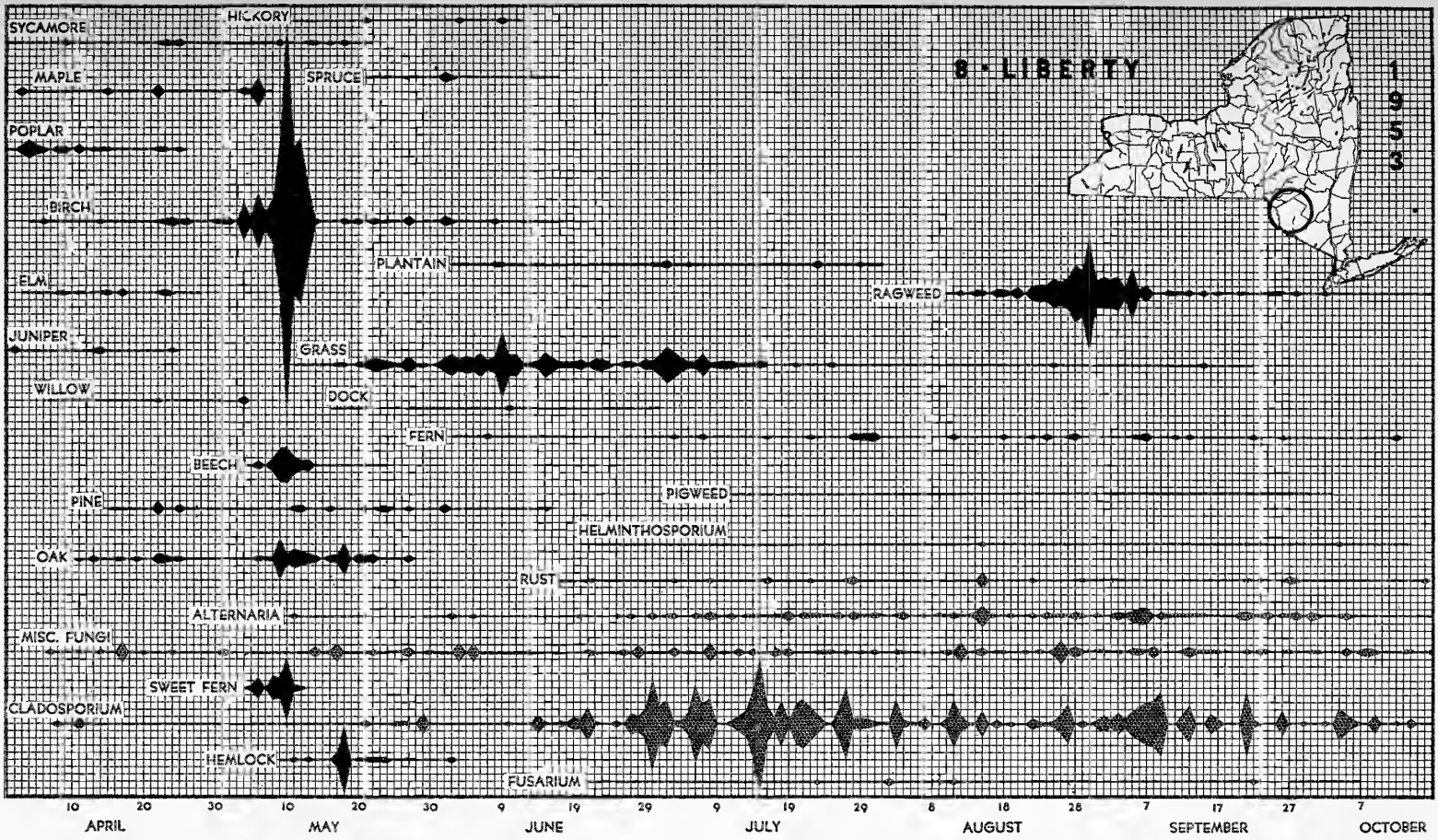
8 · LIBERTY
1953
SYCAMORE
HICKORY
MAPLE
SPRUCE
POPLAR
BIRCH
ELM
PLANTAIN
RAGWEED
JUNIPER
GRASS
WILLOW
DOCK
FERN
BEECH
PINE
PIGWEED
HELMINTHOSPORIUM
OAK
RUST
ALTERNARIA
MISC. FUNGI
SWEET FERN
CLADOSPORIUM
HEMLOCK
FUSARIUM
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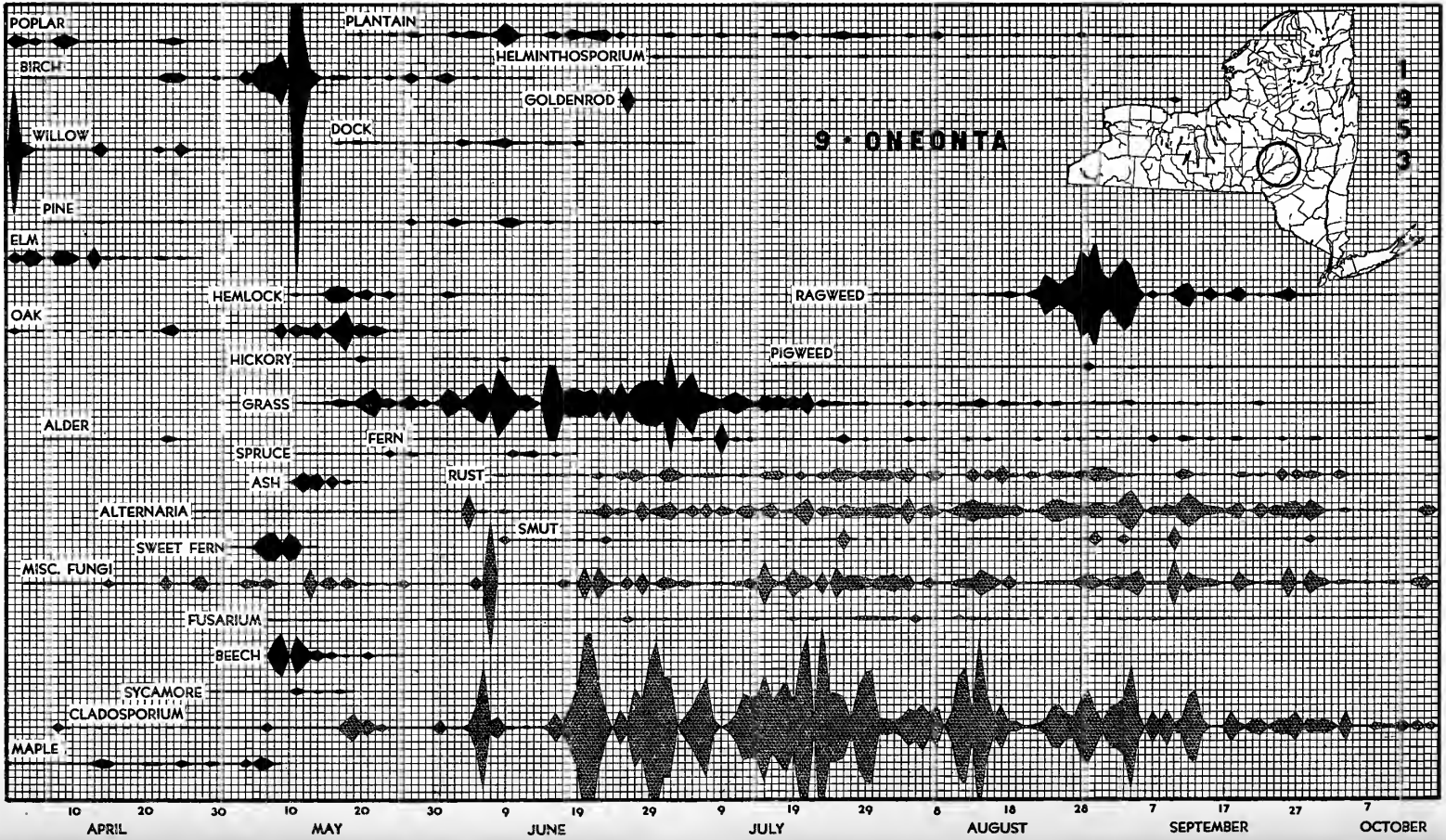
AUGUST
SEPTEMBER
OCTOBER


POPLAR
BIRCH
WILLOW
PINE
ELM
OAK
ALDER
ALTERNARIA
SWEET FERN
MISC. FUNGI
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BEECH
SYCAMORE
CLADOSPORIUM
MAPLE
PLANTAIN
HELMINTHOSPORIUM
GOLDENROD
DOCK
HEMLOCK
HICKORY
GRASS
FERN
SPRUCE
ASH
RUST
SMUT
RAGWEED
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9 · ONEONTA
1953
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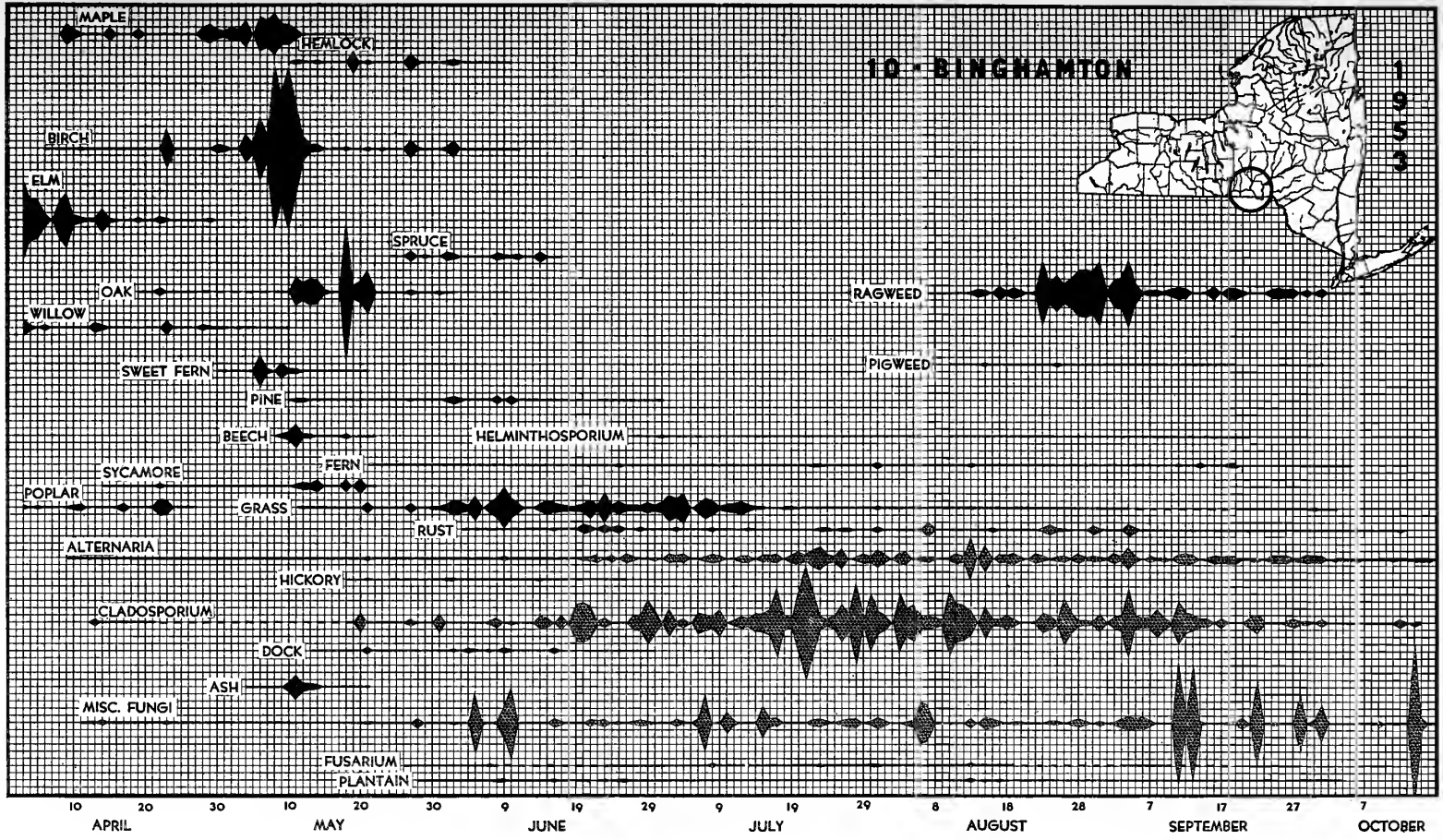
10 - BINGHAMTON
1953
MAPLE
HEMLOCK
BIRCH
ELM
SPRUCE
OAK
WILLOW
SWEET FERN
PINE
BEECH
HELMINTHOSPORIUM
SYCAMORE
FERN
POPLAR
GRASS
RUST
ALTERNARIA
HICKORY
CLADOSPORIUM
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ASH
MISC. FUNGI
FUSARIUM
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SEPTEMBER
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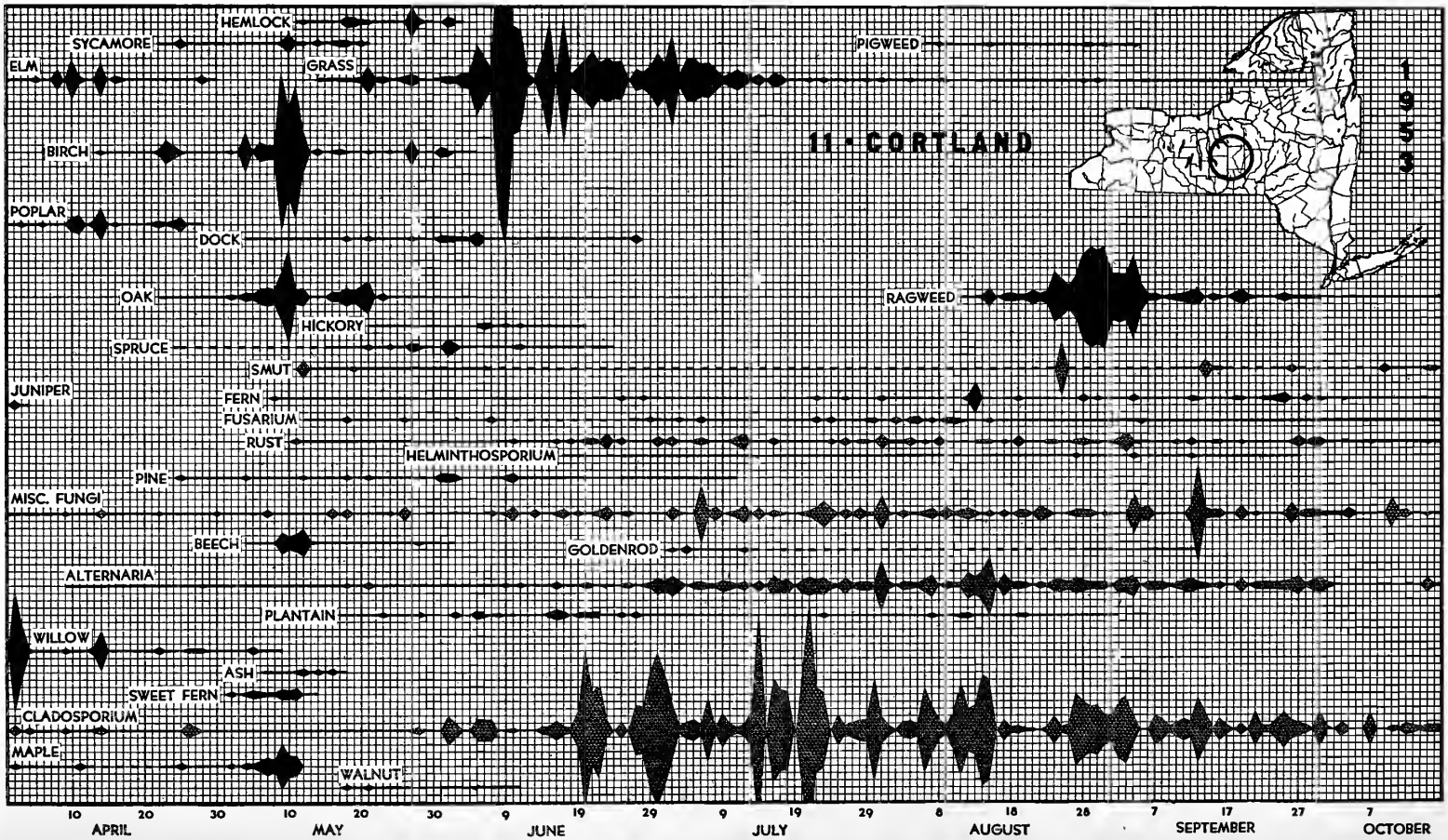
HEMLOCK
SYCAMORE
ELM
GRASS
PIGWEED
BIRCH
POPLAR
DOCK
11 - CORTLAND
1953
OAK
HICKORY
RAGWEED
SPRUCE
SMUT
JUNIPER
FERN
FUSARIUM
RUST
HELMINTHOSPORIUM
PINE
MISC. FUNGI
BEECH
GOLDENROD
ALTERNARIA
PLANTAIN
WILLOW
ASH
SWEET FERN
CLADOSPORIUM
MAPLE
WALNUT
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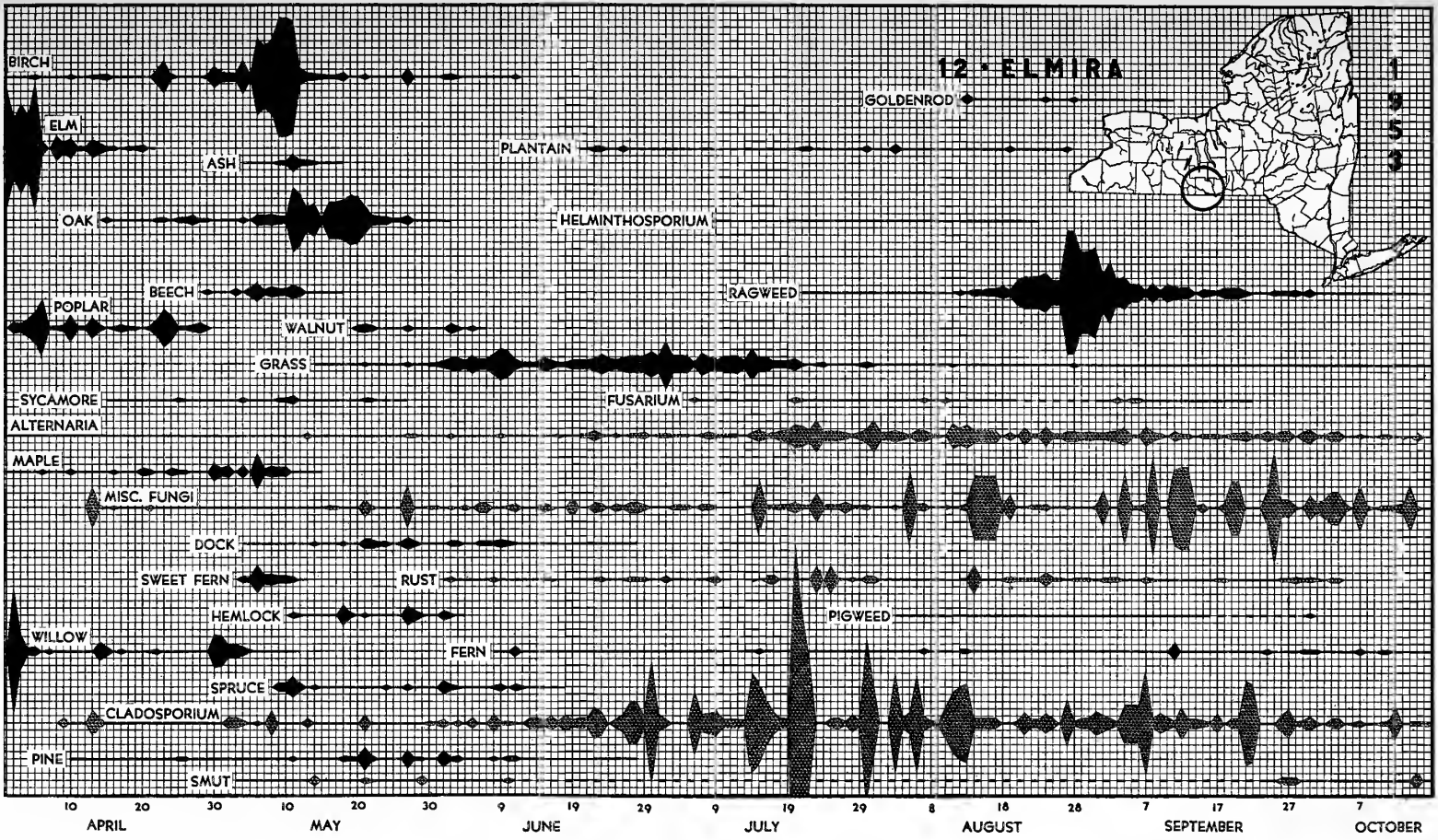
OCTOBER


12 · ELMIRA
1953
BIRCH
ELM
ASH
OAK
BEECH
POPLAR
WALNUT
GRASS
SYCAMORE
ALTERNARIA
MAPLE
MISC. FUNGI
DOCK
SWEET FERN
HEMLOCK
WILLOW
SPRUCE
CLADOSPORIUM
PINE
SMUT
RUST
FERN
PLANTAIN
HELMINTHOSPORIUM
FUSARIUM
GOLDENROD
RAGWEED
PIGWEED
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SEPTEMBER
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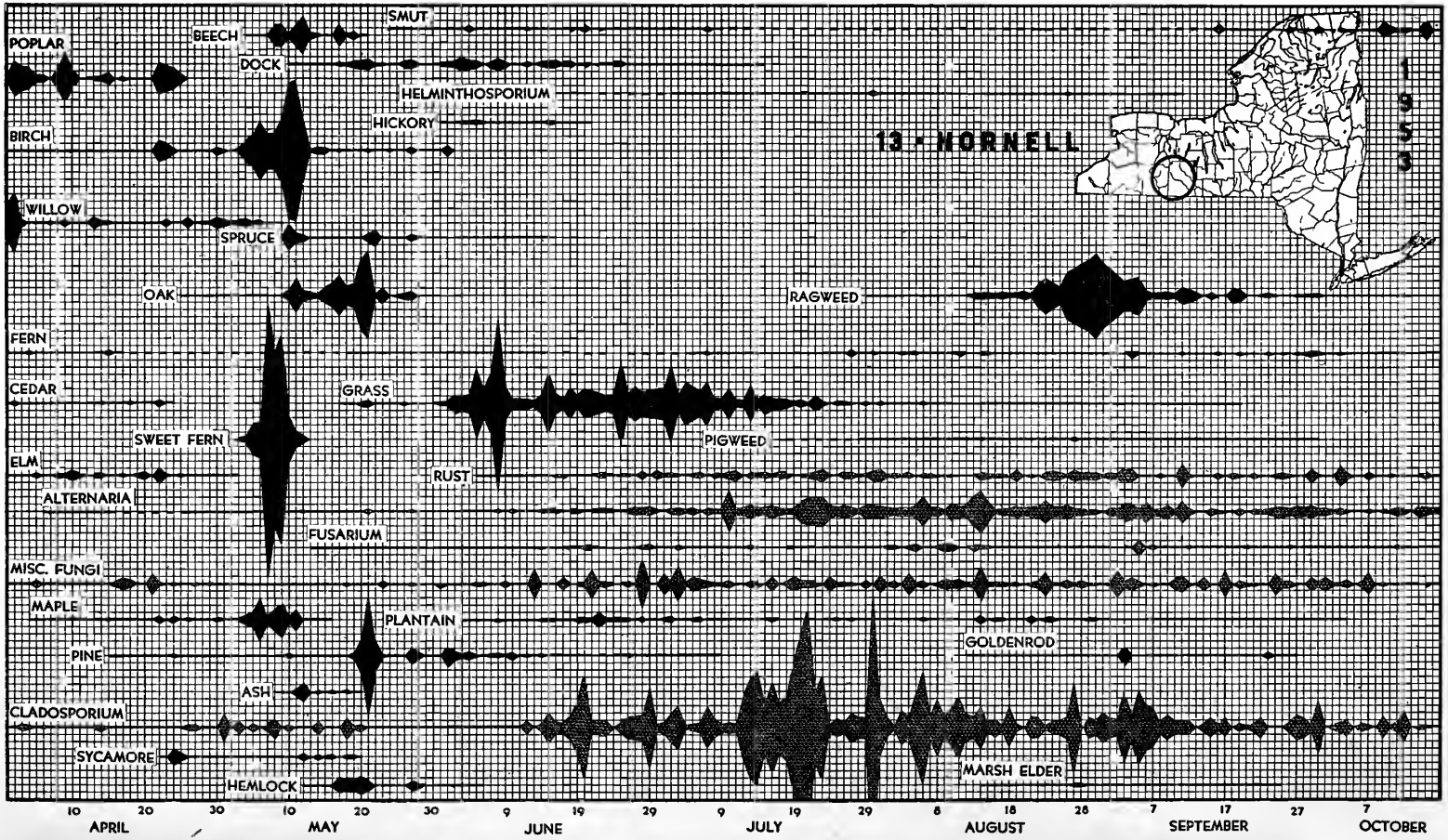
13 - HORNELL
1953
POPLAR
BEECH
SMUT
DOCK
HELMINTHOSPORIUM
HICKORY
BIRCH
WILLOW
SPRUCE
OAK
RAGWEED
FERN
CEDAR
GRASS
SWEET FERN
PIGWEED
ELM
RUST
ALTERNARIA
FUSARIUM
MISC. FUNGI
MAPLE
PLANTAIN
GOLDENROD
PINE
ASH
CLADOSPORIUM
SYCAMORE
MARSH ELDER
HEMLOCK
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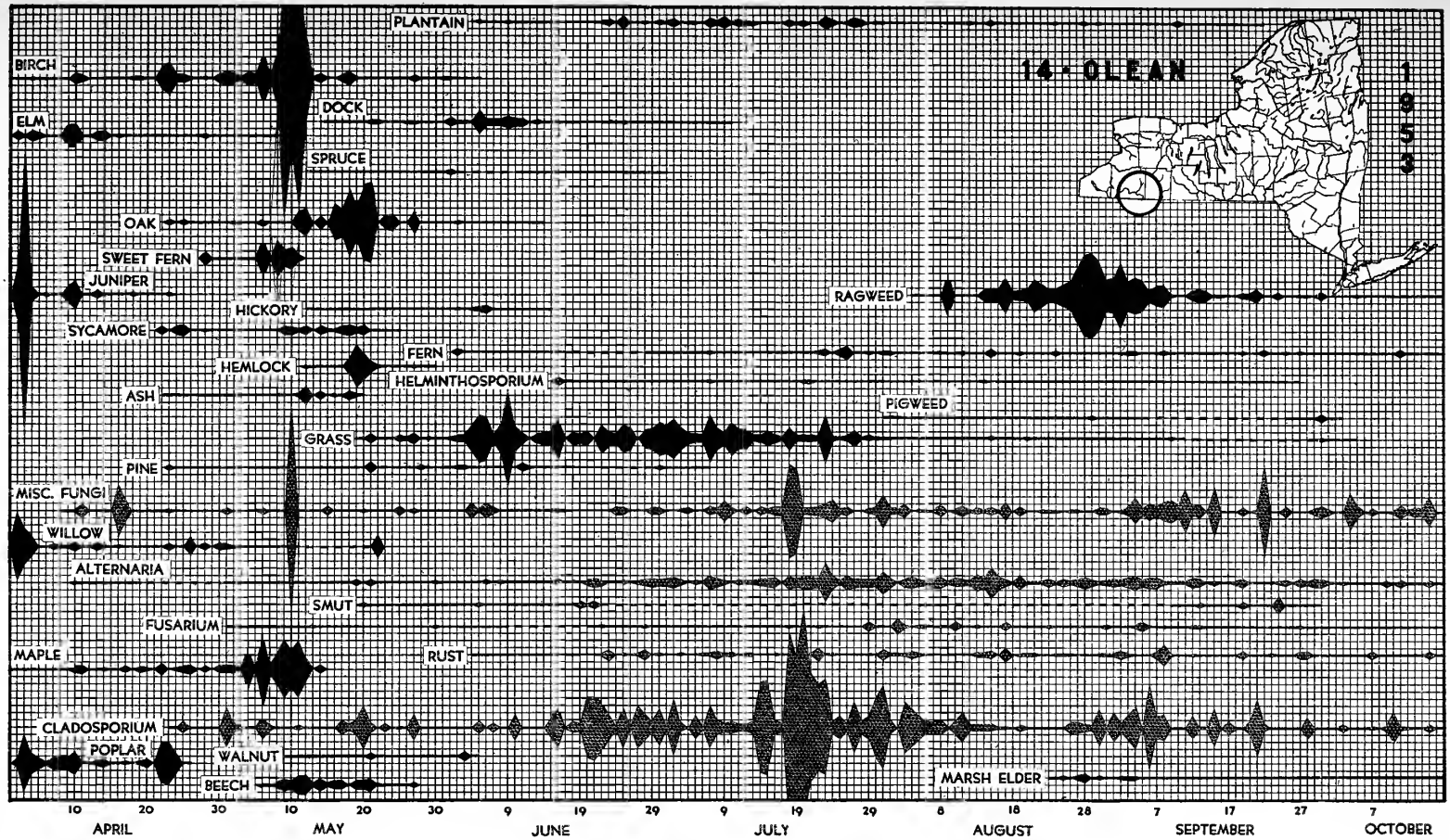
JULY
AUGUST
SEPTEMBER
OCTOBER


14 - OLEAN
1953
PLANTAIN
BIRCH
DOCK
ELM
SPRUCE
OAK
SWEET FERN
JUNIPER
HICKORY
SYCAMORE
FERN
HEMLOCK
HELMINTHOSPORIUM
ASH
RAGWEED
PIGWEED
GRASS
PINE
MISC. FUNGI
WILLOW
ALTERNARIA
SMUT
FUSARIUM
MAPLE
RUST
CLADOSPORIUM
POPLAR
WALNUT
BEECH
MARSH ELDER
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APRIL
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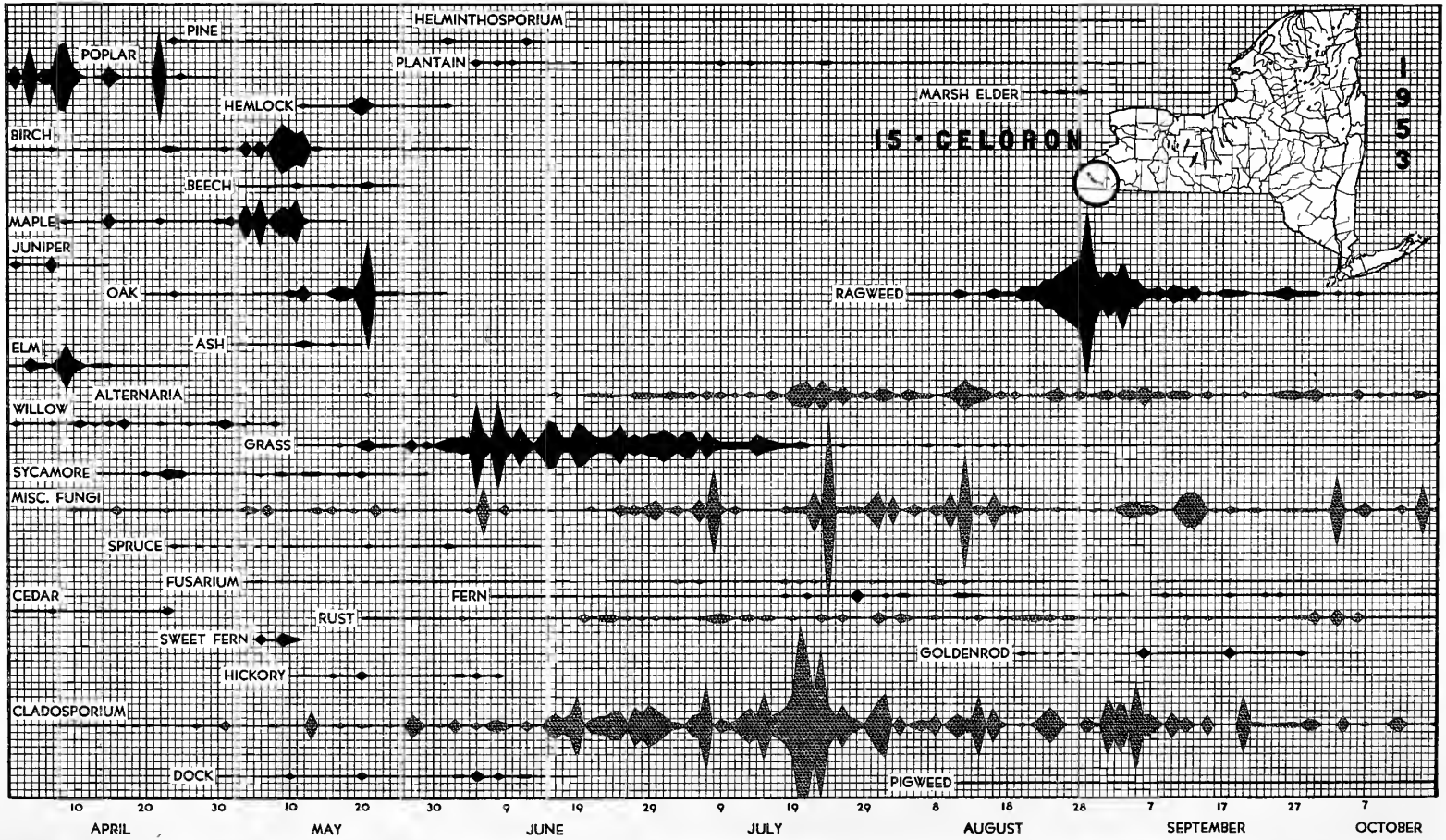
AUGUST
SEPTEMBER
OCTOBER


PINE
POPLAR
HELMINTHOSPORIUM
PLANTAIN
HEMLOCK
MARSH ELDER
BIRCH
IS · CELORON
1953
BEECH
MAPLE
JUNIPER
OAK
RAGWEED
ELM
ASH
ALTERNARIA
WILLOW
GRASS
SYCAMORE
MISC. FUNGI
SPRUCE
FUSARIUM
CEDAR
FERN
RUST
SWEET FERN
GOLDENROD
HICKORY
CLADOSPORIUM
DOCK
PIGWEED
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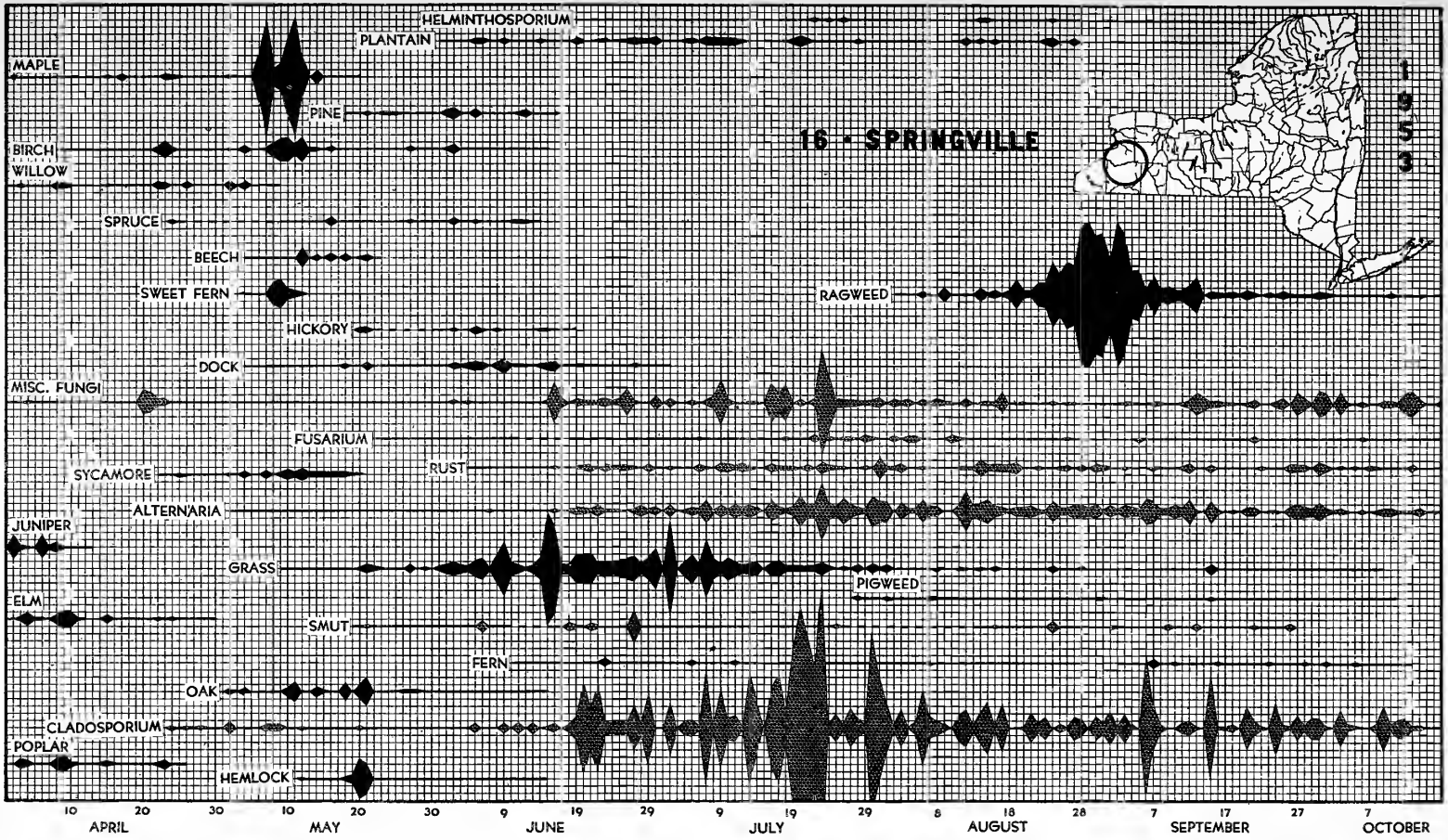
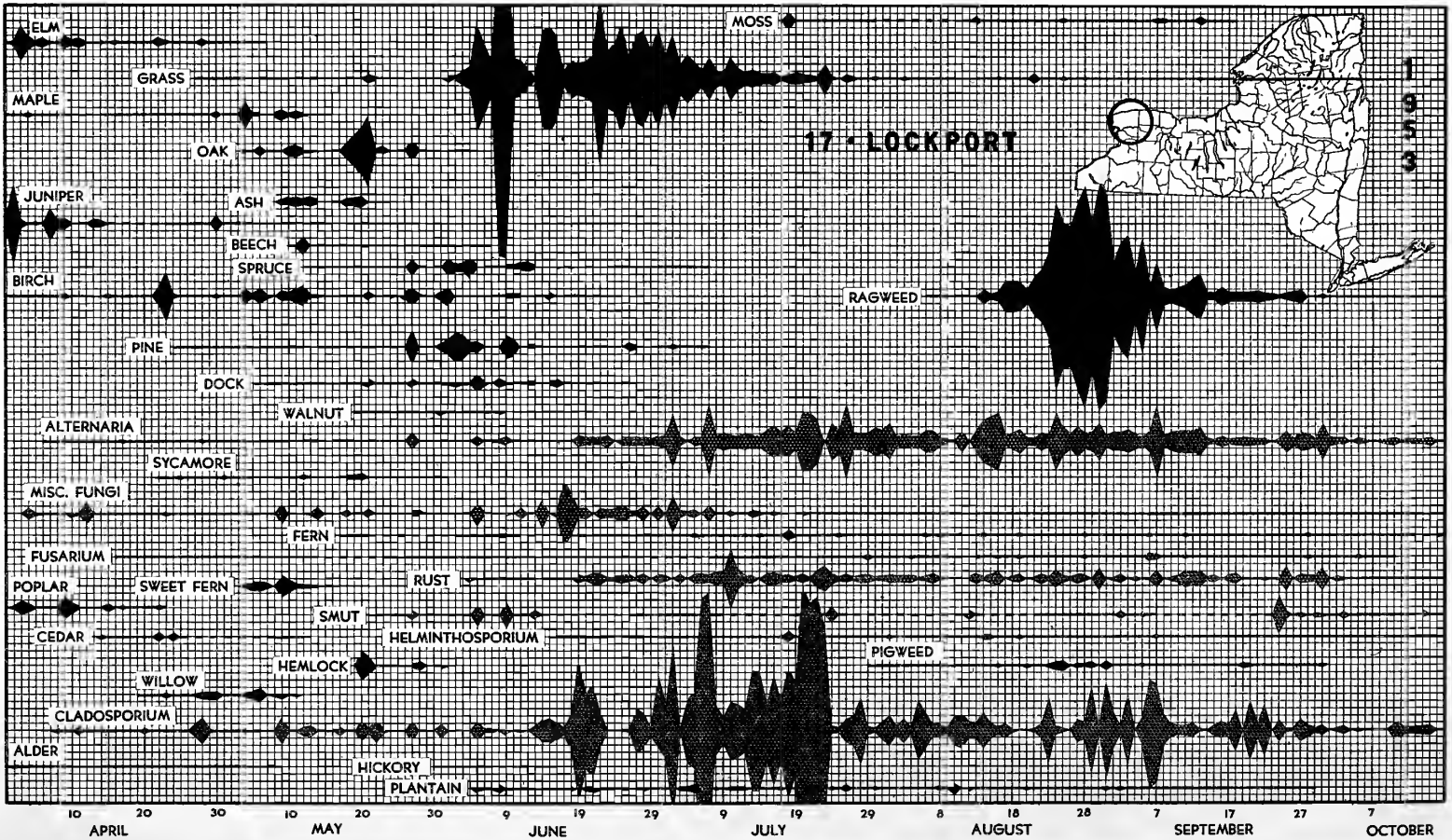
AUGUST
SEPTEMBER
OCTOBER


16 • SPRINGVILLE
1953
HELMINTHOSPORIUM
PLANTAIN
MAPLE
PINE
BIRCH
WILLOW
SPRUCE
BEECH
SWEET FERN
HICKORY
DOCK
MISC. FUNGI
FUSARIUM
SYCAMORE
RUST
ALTERNARIA
JUNIPER
GRASS
PIGWEED
ELM
SMUT
FERN
OAK
CLADOSPORIUM
POPLAR
HEMLOCK
RAGWEED
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER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ASH
BEECH
SPRUCE
BIRCH
PINE
DOCK
WALNUT
ALTERNARIA
SYCAMORE
MISC. FUNGI
FERN
FUSARIUM
POPLAR
SWEET FERN
RUST
SMUT
CEDAR
HELMINTHOSPORIUM
HEMLOCK
WILLOW
CLADOSPORIUM
ALDER
HICKORY
PLANTAIN
MOSS
17 · LOCKPORT
1953
RAGWEED
PIGWEED
10 20 30
APRIL
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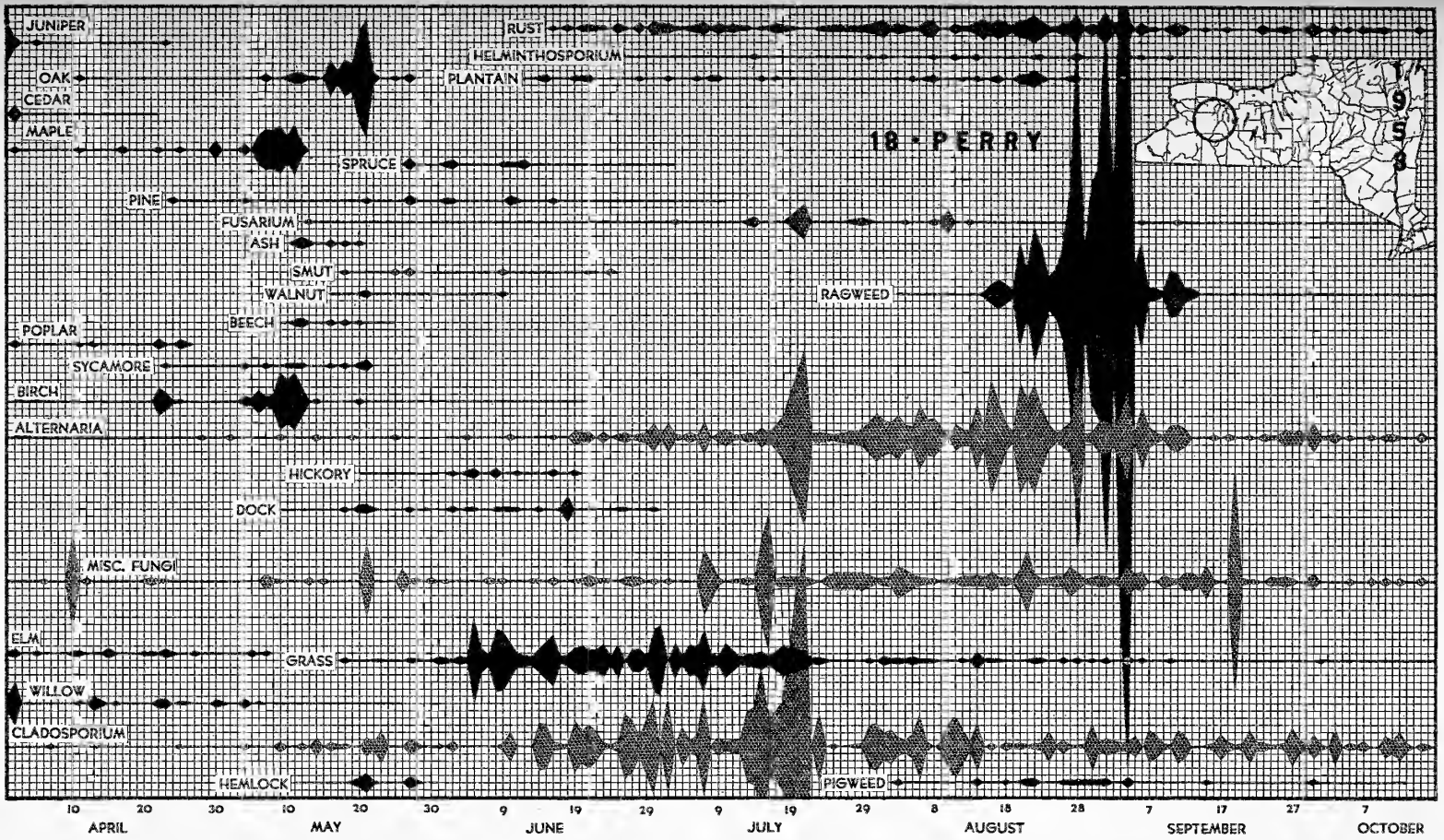
9 19 29
JUNE
9 19 29
JULY
8 18 28
AUGUST
7 17 27
SEPTEMBER
7
OCTOBER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CEDAR
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ASH
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WALNUT
BEECH
POPLAR
SYCAMORE
BIRCH
ALTERNARIA
HICKORY
DOCK
MISC. FUNGI
ELM
WILLOW
CLADOSPORIUM
HEMLOCK
RUST
HELMINTHOSPORIUM
PLANTAIN
SPRUCE
RAGWEED
GRASS
PIGWEED
18 • PERRY
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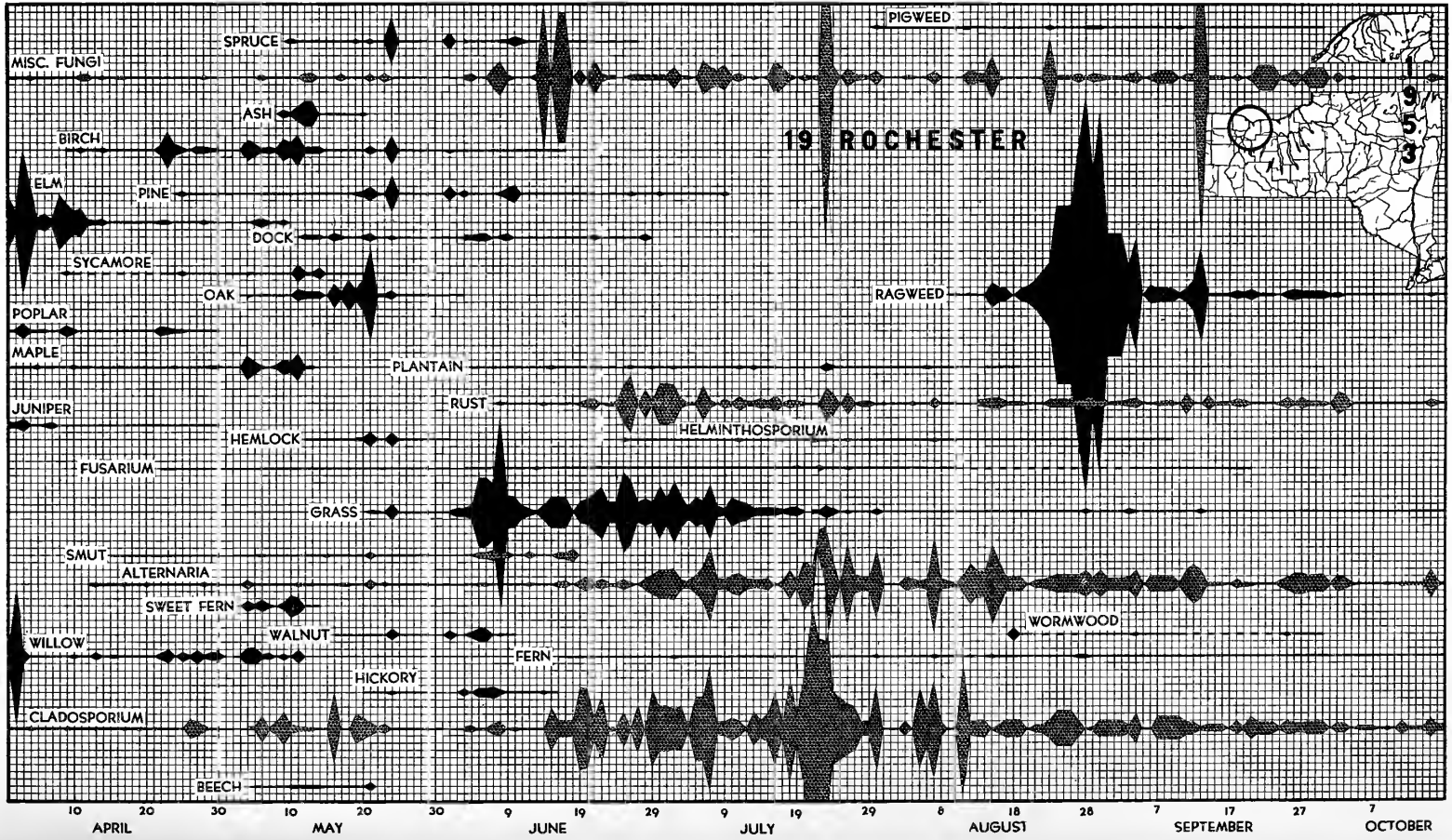
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER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POPLAR
MAPLE
JUNIPER
HEMLOCK
FUSARIUM
SMUT
ALTERNARIA
SWEET FERN
WILLOW
WALNUT
HICKORY
CLADOSPORIUM
BEECH
PLANTAIN
RUST
HELMINTHOSPORIUM
GRASS
FERN
PIGWEED
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WORMWOOD
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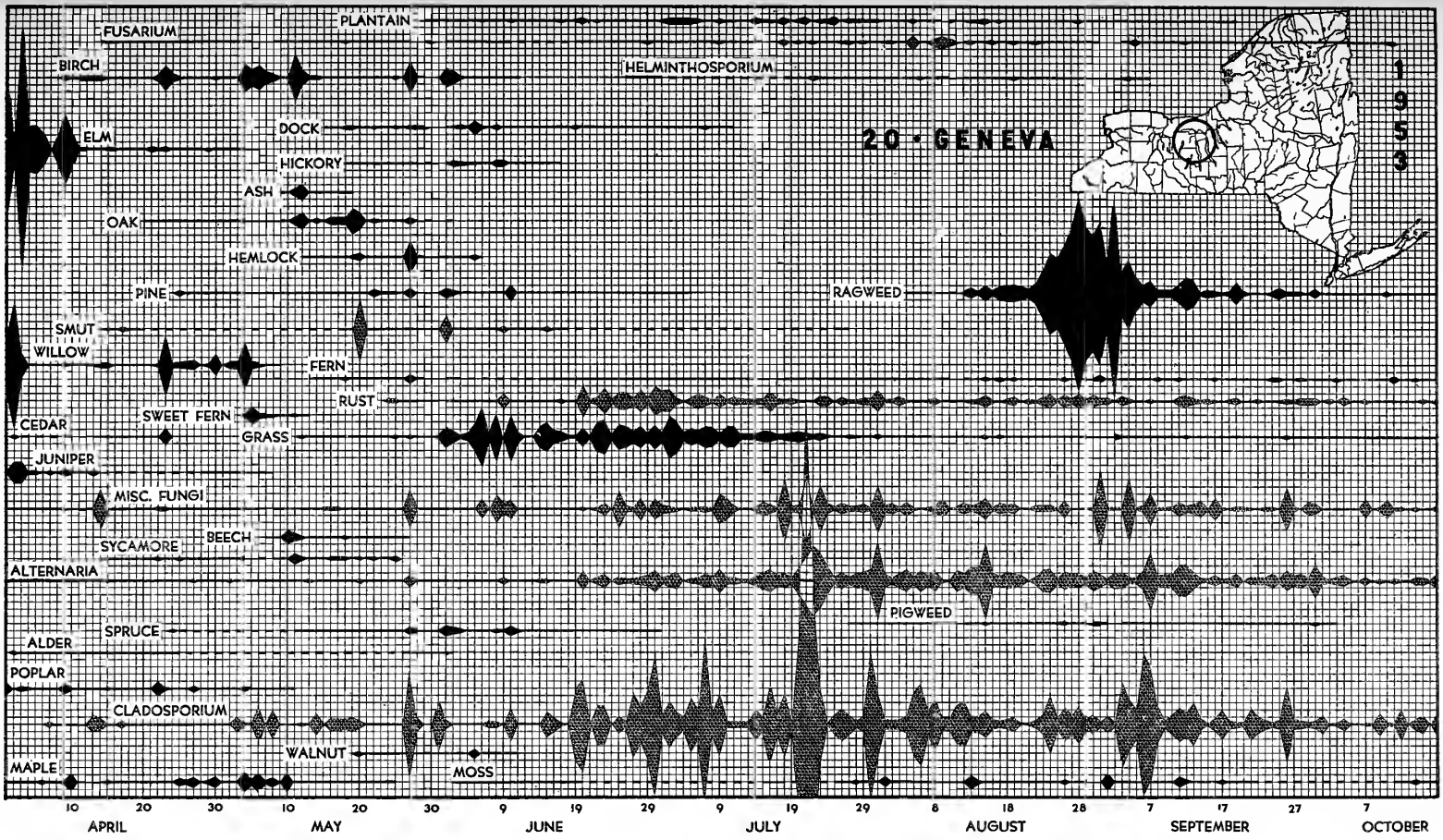
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER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DOCK
HICKORY
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HEMLOCK
PINE
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FERN
RUST
CEDAR
SWEET FERN
GRASS
JUNIPER
MISC. FUNGI
SYCAMORE
BEECH
ALTERNARIA
SPRUCE
ALDER
POPLAR
CLADOSPORIUM
WALNUT
MOSS
MAPLE
RAGWEED
PIGWEED
20 · GENEVA
1953
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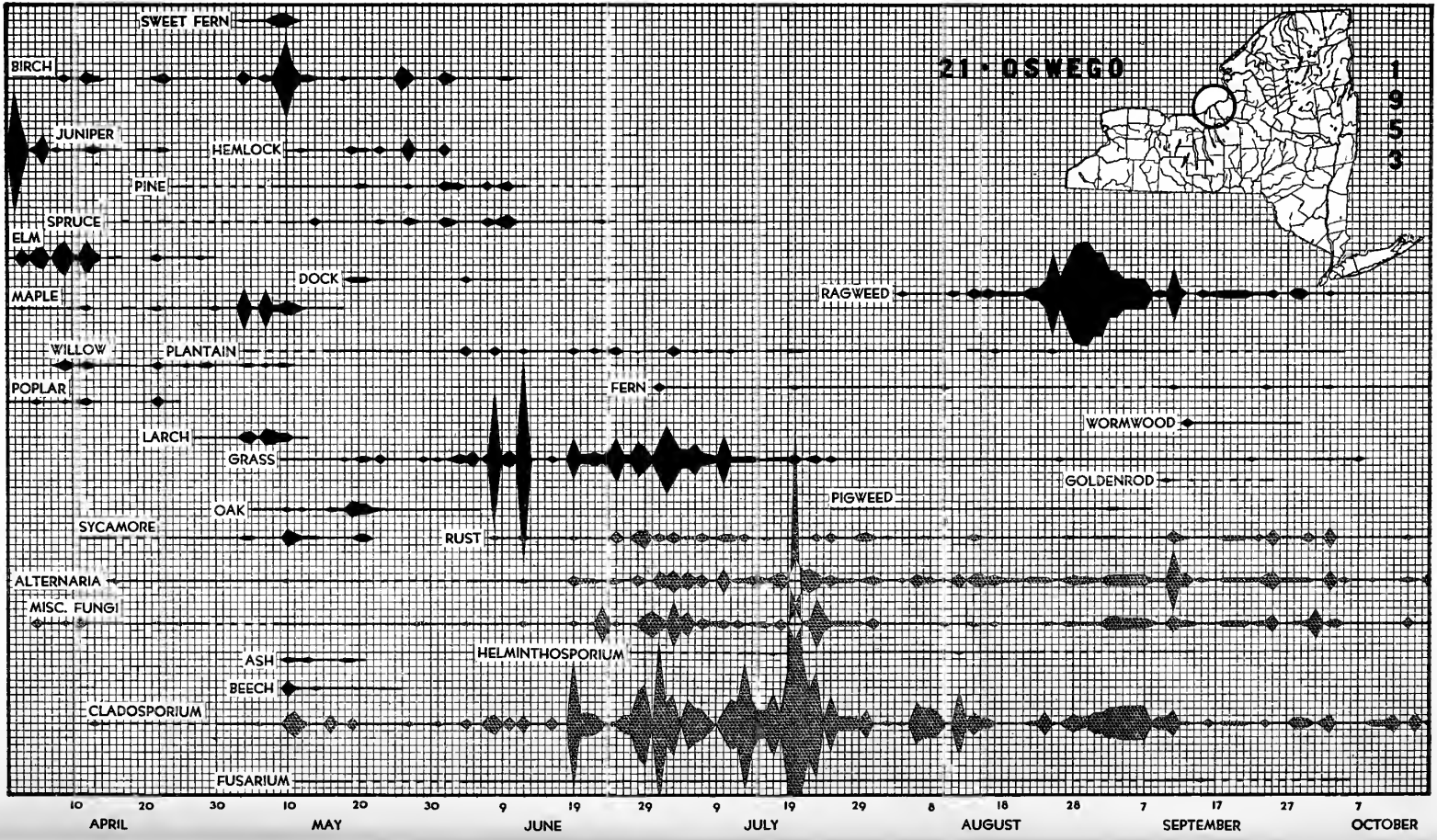
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


21 · OSWEGO
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SPRUCE
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DOCK
MAPLE
RAGWEED
WILLOW
PLANTAIN
POPLAR
FERN
WORMWOOD
LARCH
GRASS
GOLDENROD
PIGWEED
OAK
SYCAMORE
RUST
ALTERNARIA
MISC. FUNGI
ASH
HELMINTHOSPORIUM
BEECH
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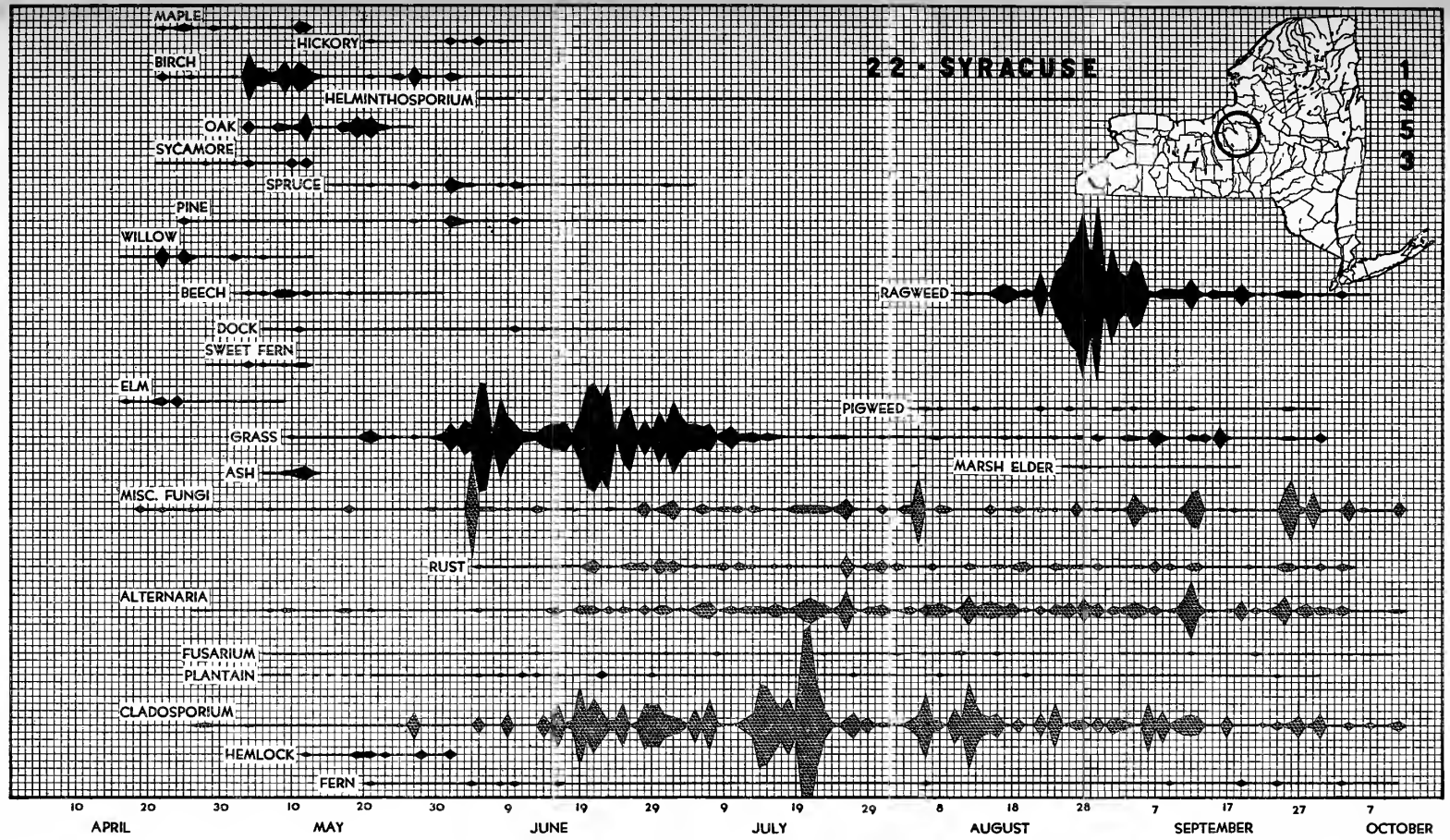
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


22 · SYRACUSE
1953
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SYCAMORE
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PINE
WILLOW
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DOCK
SWEET FERN
ELM
GRASS
ASH
MISC. FUNGI
RUST
ALTERNARIA
FUSARIUM
PLANTAIN
CLADOSPORIUM
HEMLOCK
FERN
RAGWEED
PIGWEED
MARSH ELDER
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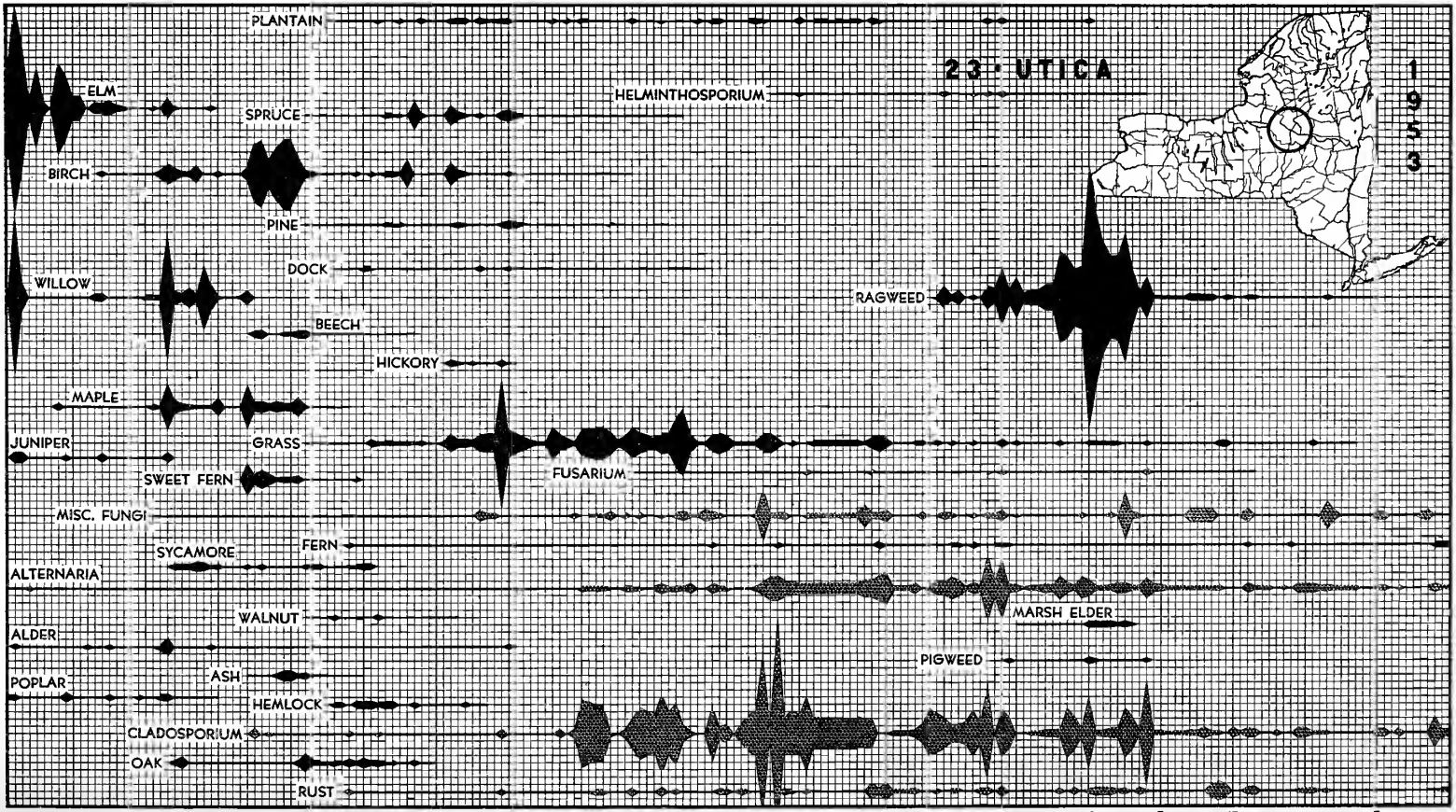
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


23 · UTICA
1953
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DOCK
WILLOW
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BEECH
HICKORY
MAPLE
JUNIPER
GRASS
SWEET FERN
FUSARIUM
MISC. FUNGI
SYCAMORE
FERN
ALTERNARIA
WALNUT
MARSH ELDER
ALDER
PIGWEED
ASH
POPLAR
HEMLOCK
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RUST
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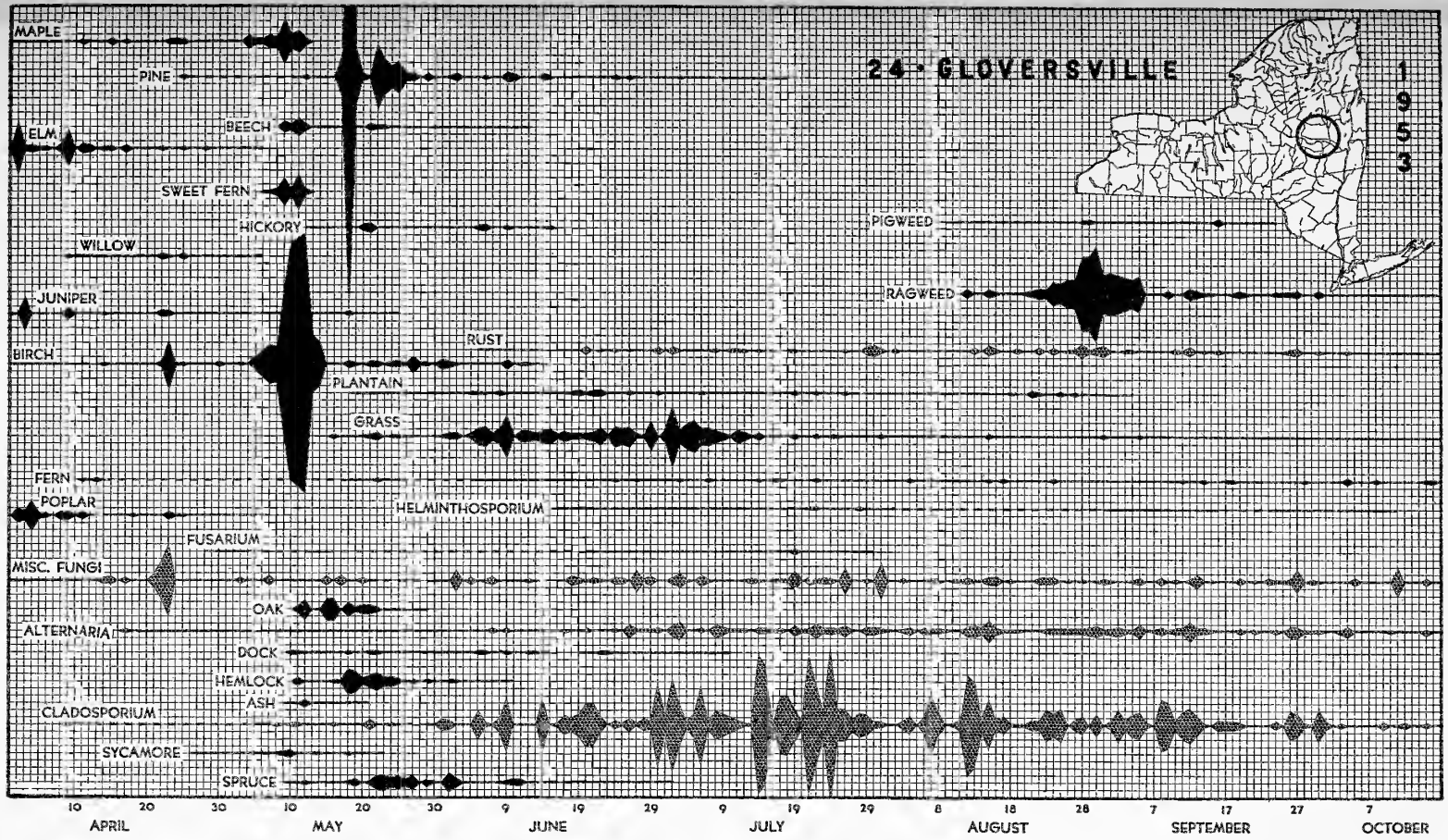
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


24 - GLOVERSVILLE
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HICKORY
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JUNIPER
BIRCH
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PLANTAIN
GRASS
FERN
POPLAR
HELMINTHOSPORIUM
FUSARIUM
MISC. FUNGI
OAK
ALTERNARIA
DOCK
HEMLOCK
ASH
CLADOSPORIUM
SYCAMORE
SPRUCE
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RAGWEED
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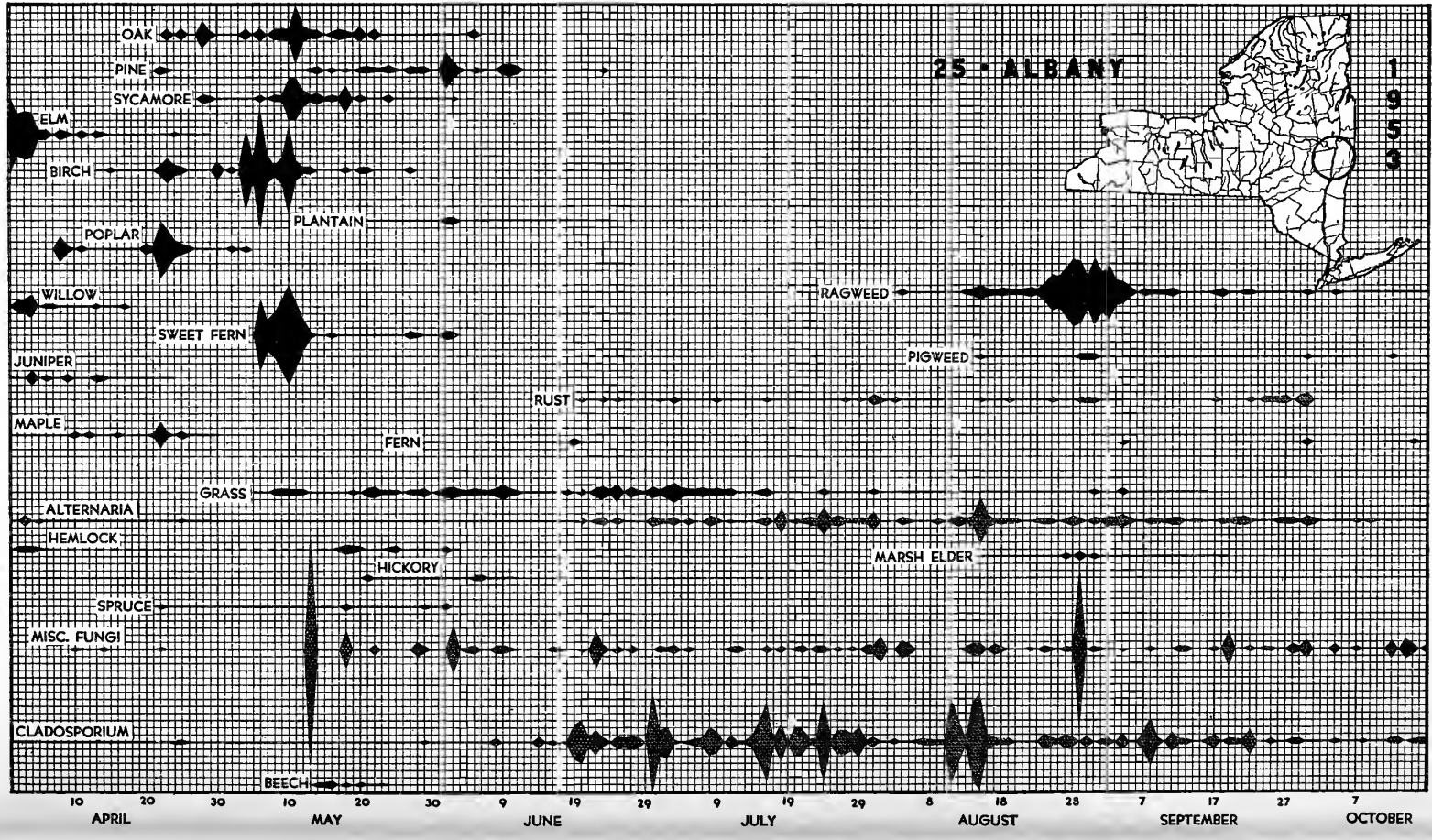
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


25 • ALBANY
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POPLAR
WILLOW
SWEET FERN
JUNIPER
MAPLE
FERN
GRASS
ALTERNARIA
HEMLOCK
HICKORY
SPRUCE
MISC. FUNGI
CLADOSPORIUM
BEECH
RAGWEED
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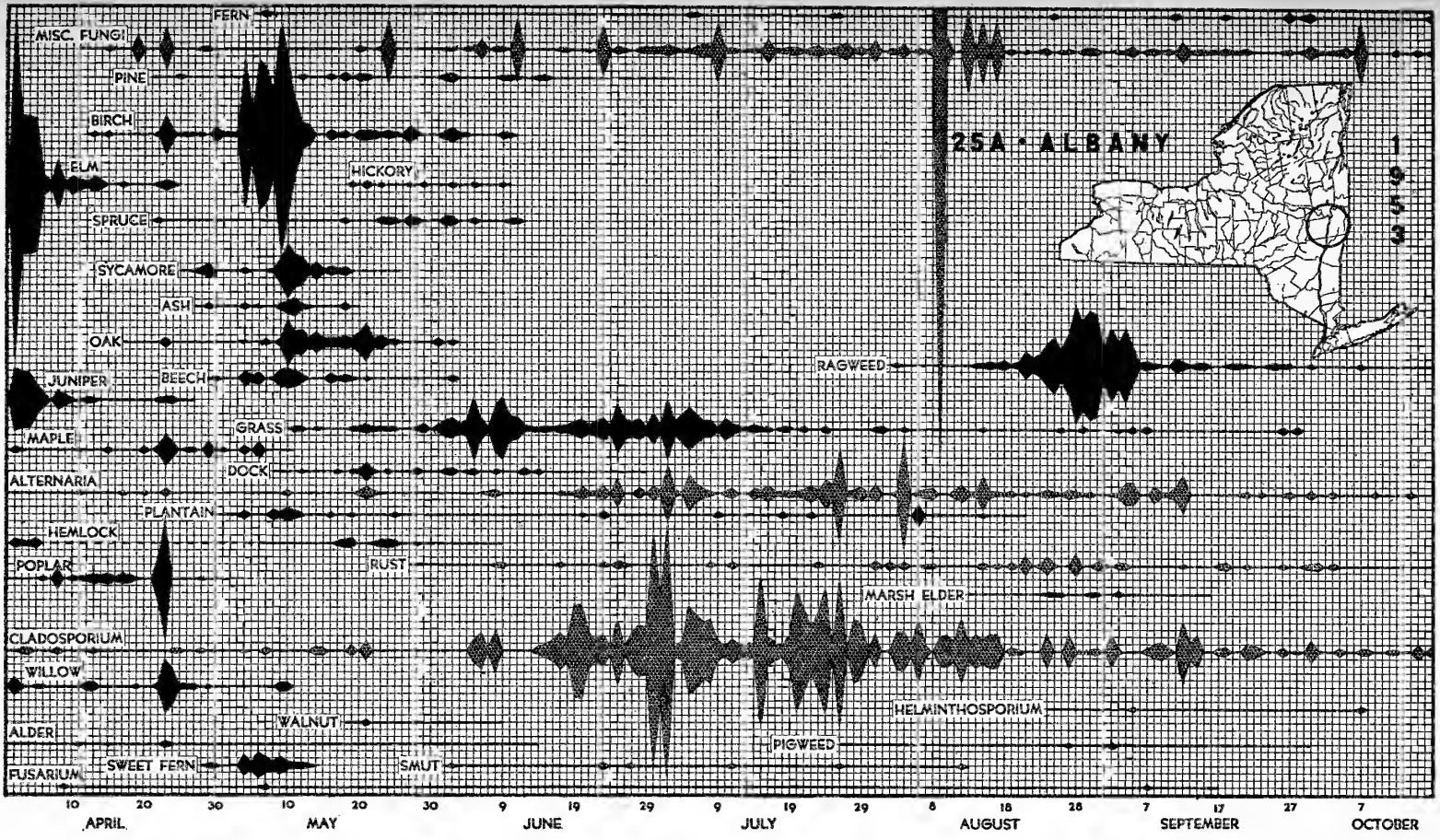
MARSH ELDER
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


25A · ALBANY
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SYCAMORE
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BEECH
JUNIPER
RAGWEED
GRASS
MAPLE
DOCK
ALTERNARIA
PLANTAIN
HEMLOCK
RUST
POPLAR
MARSH ELDER
CLADOSPORIUM
WILLOW
HELMINTHOSPORIUM
WALNUT
ALDER
PIGWEED
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SMUT
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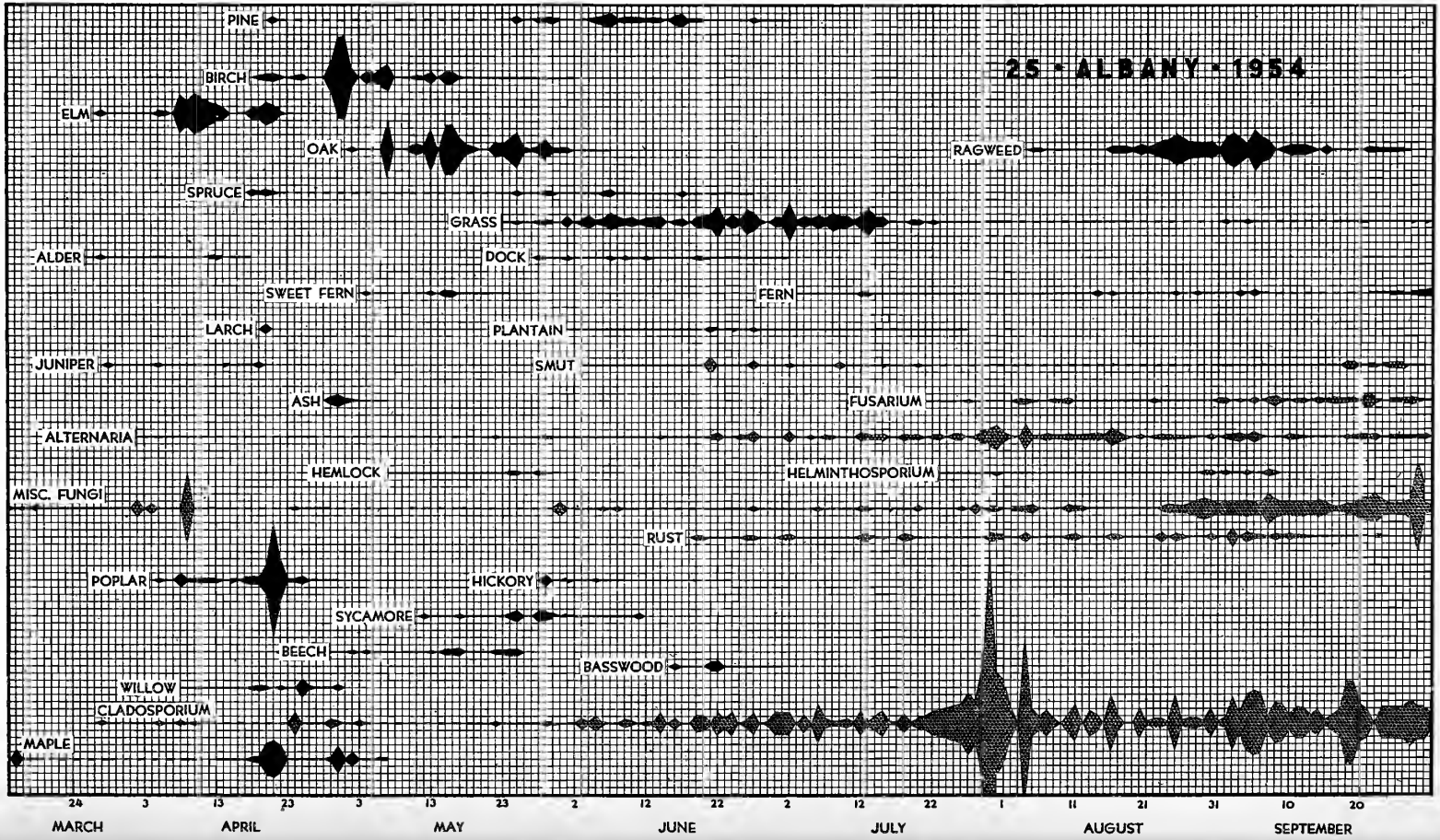
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


25 · ALBANY · 1954
PINE
BIRCH
ELM
OAK
SPRUCE
GRASS
ALDER
DOCK
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FERN
LARCH
PLANTAIN
JUNIPER
SMUT
ASH
FUSARIUM
ALTERNARIA
HEMLOCK
HELMINTHOSPORIUM
MISC. FUNGI
RUST
POPLAR
HICKORY
SYCAMORE
BEECH
BASSWOOD
WILLOW
CLADOSPORIUM
MAPLE
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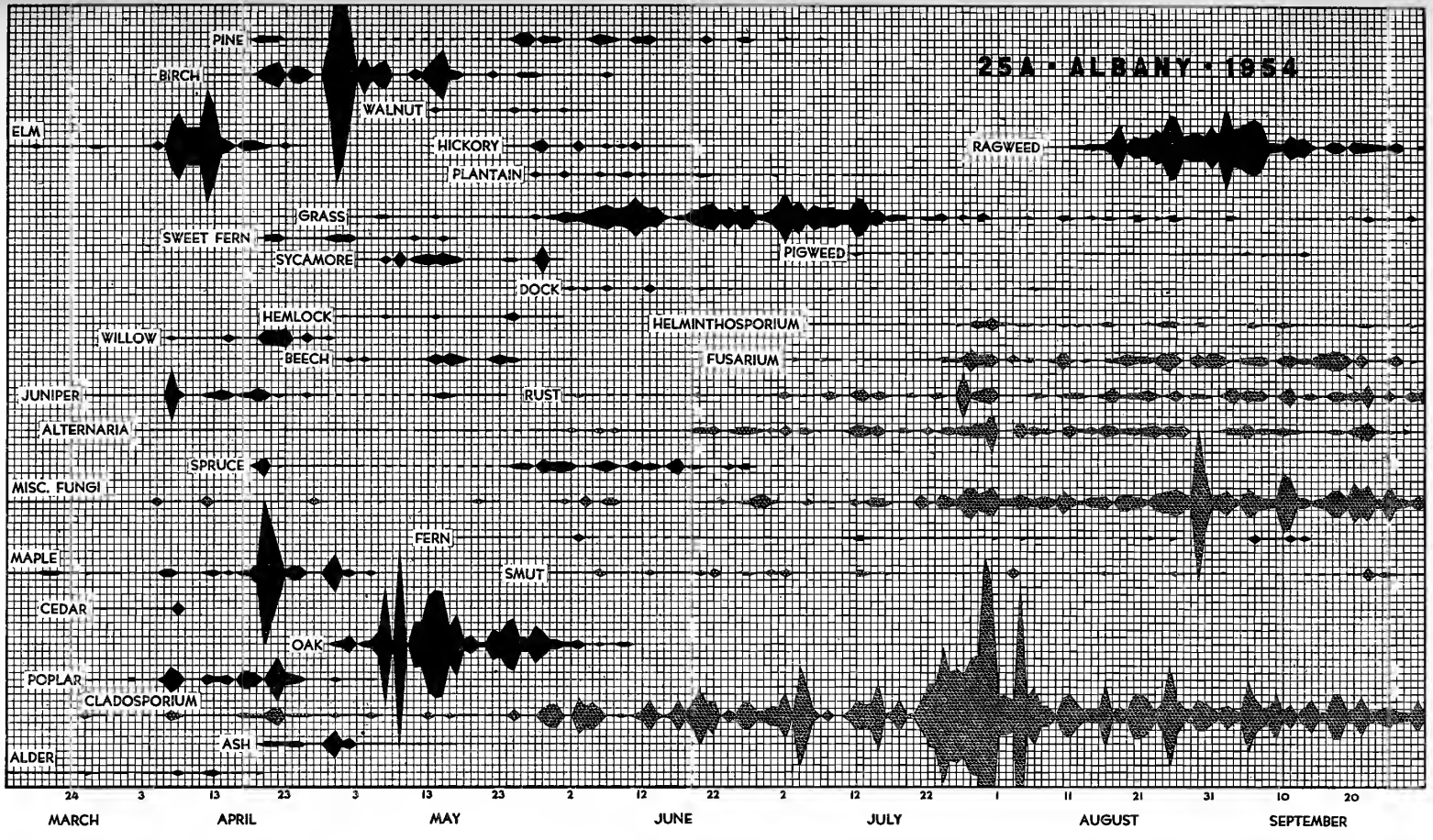
MAY
JUNE
JULY
AUGUST
SEPTEMBER


25A • ALBANY • 1954
PINE
BIRCH
WALNUT
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PLANTAIN
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GRASS
SWEET FERN
SYCAMORE
PIGWEED
DOCK
HEMLOCK
HELMINTHOSPORIUM
WILLOW
BEECH
FUSARIUM
JUNIPER
RUST
ALTERNARIA
SPRUCE
MISC. FUNGI
FERN
MAPLE
SMUT
CEDAR
OAK
POPLAR
CLADOSPORIUM
ASH
ALDER
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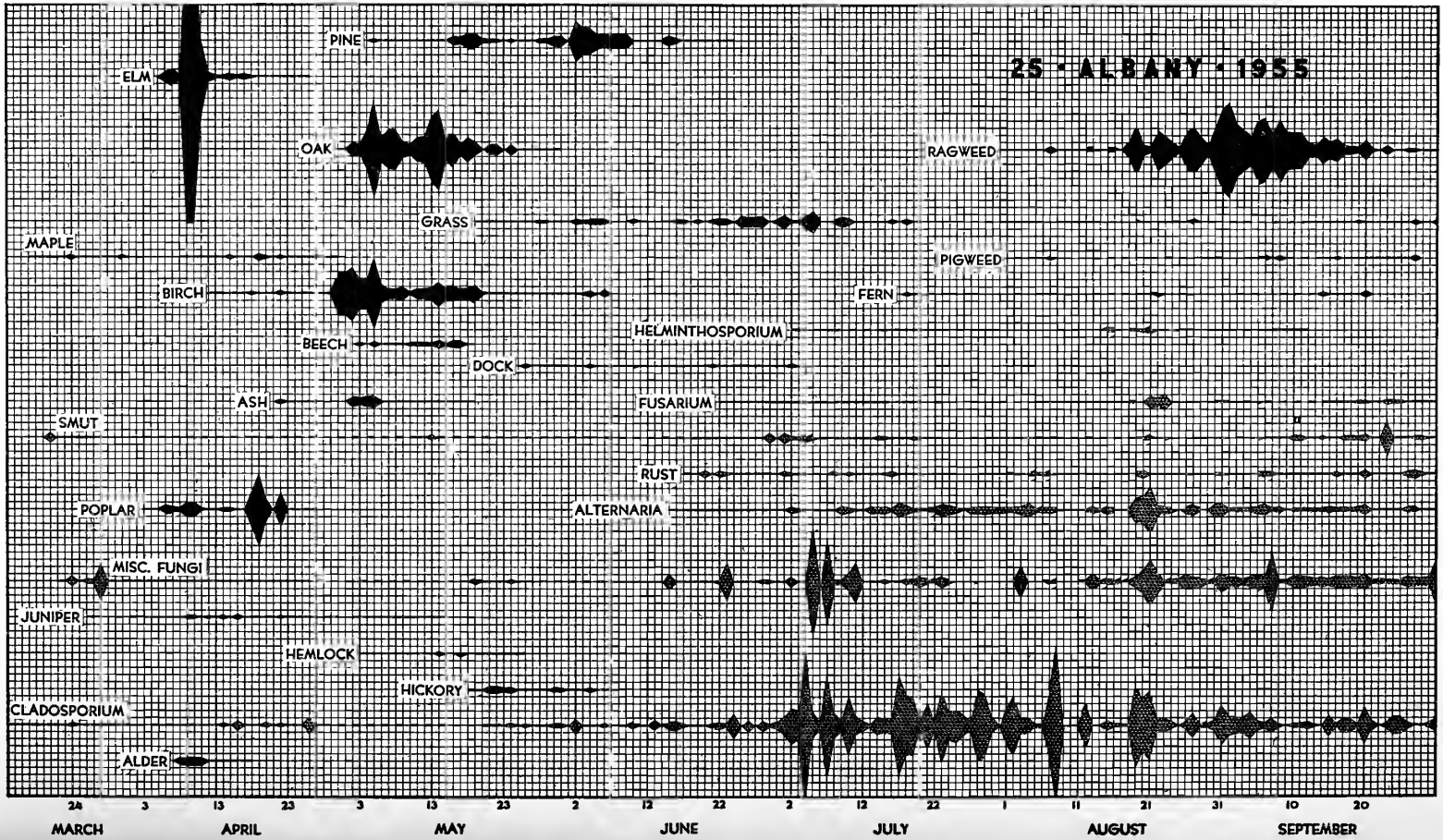
MAY
JUNE
JULY
AUGUST
SEPTEMBER


25 · ALBANY · 1955
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POPLAR
MISC. FUNGI
JUNIPER
HEMLOCK
HICKORY
CLADOSPORIUM
ALDER
RAGWEED
PIGWEED
FERN
HELMINTHOSPORIUM
FUSARIUM
RUST
ALTERNARIA
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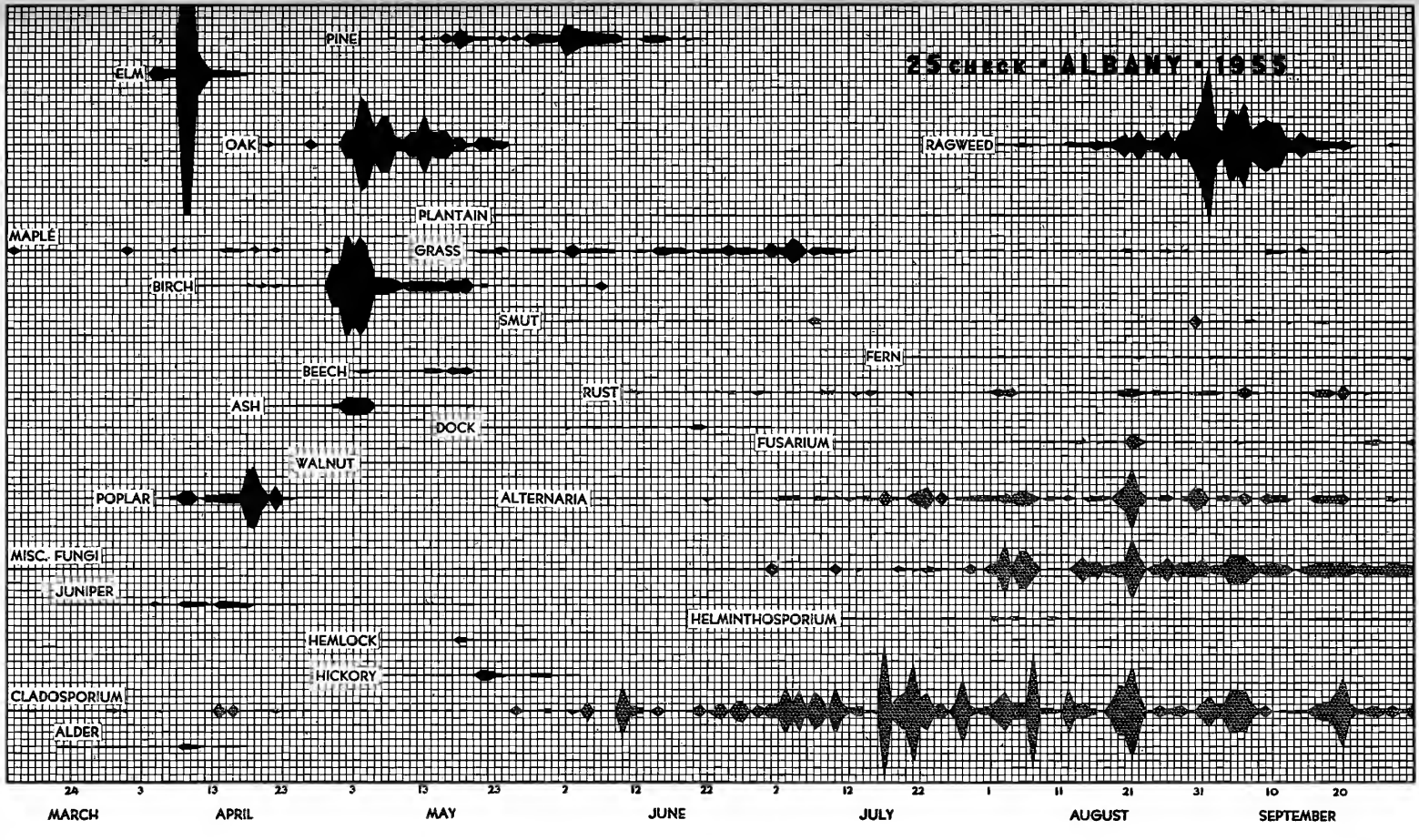
MAY
JUNE
JULY
AUGUST
SEPTEMBER


25 CHECK • ALBANY • 1955
PINE
ELM
OAK
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GRASS
BIRCH
SMUT
FERN
BEECH
RUST
ASH
DOCK
FUSARIUM
WALNUT
POPLAR
ALTERNARIA
MISC. FUNGI
JUNIPER
HELMINTHOSPORIUM
HEMLOCK
HICKORY
CLADOSPORIUM
ALDER
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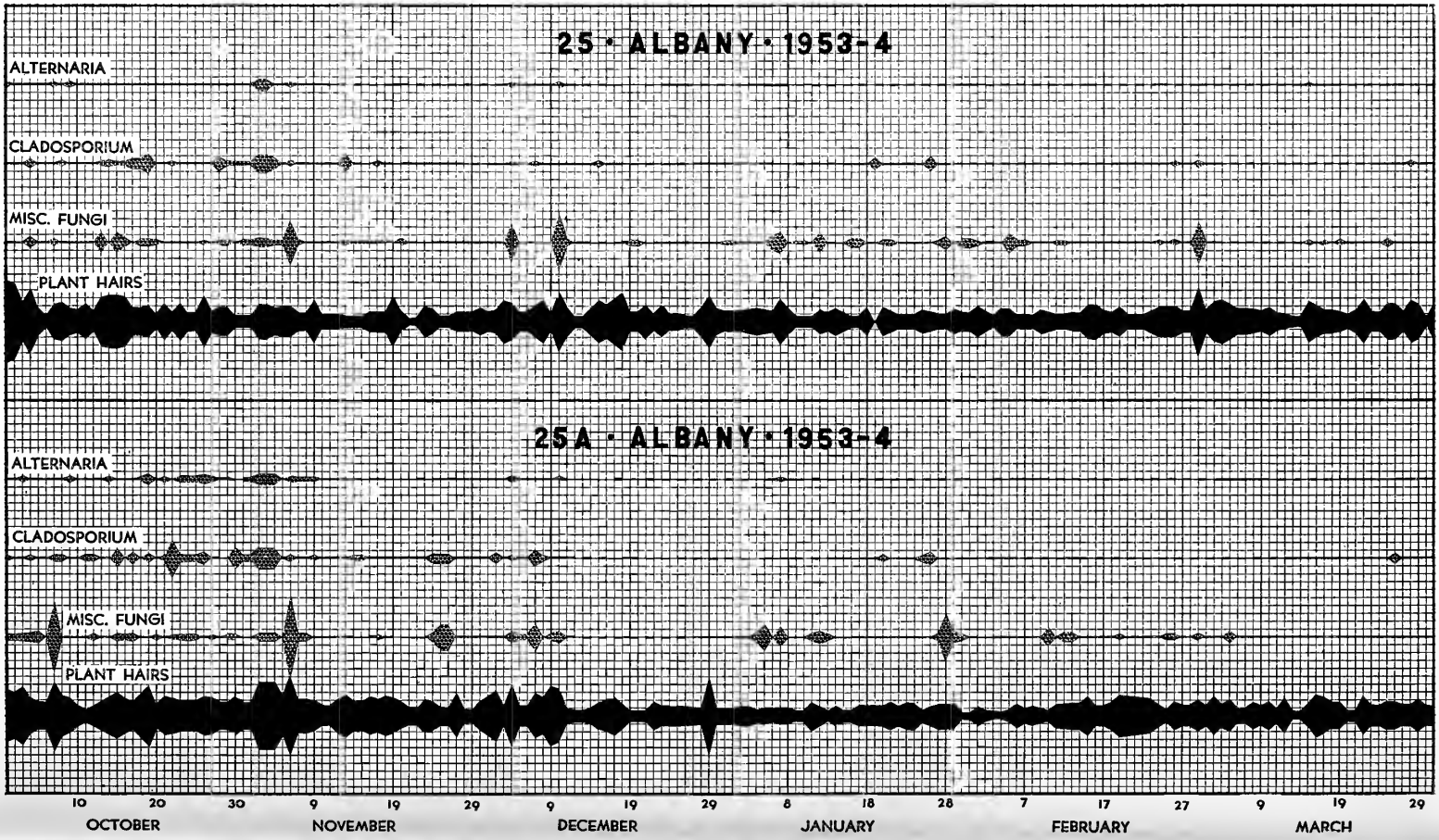
JUNE
JULY
AUGUST
SEPTEMBER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ALTERNARIA
CLADOSPORIUM
MISC. FUNGI
PLANT HAIRS
25A · ALBANY · 1953-4
ALTERNARIA
CLADOSPORIUM
MISC. FUNGI
PLANT HAIRS
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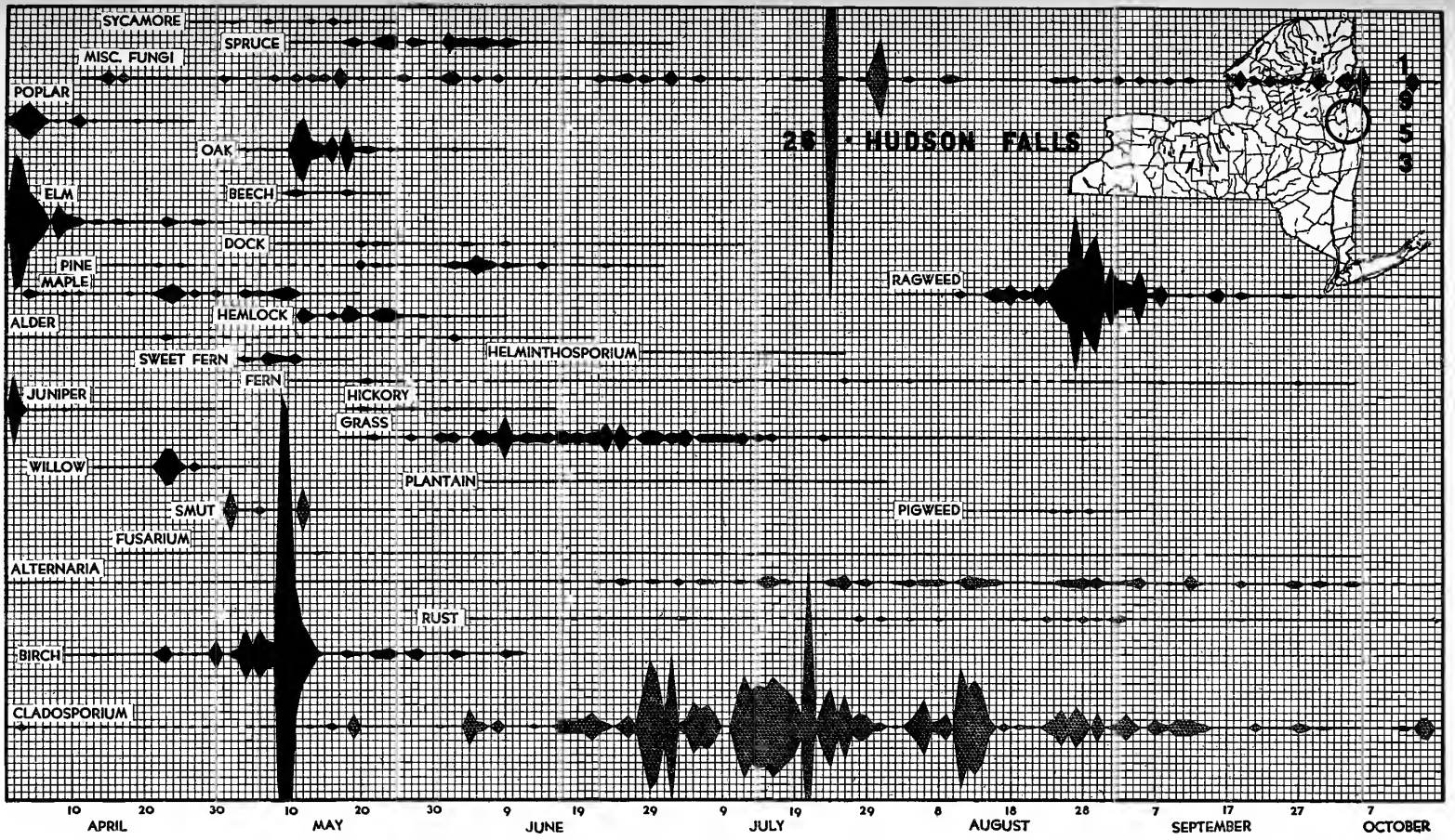
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH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SPRUCE
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BEECH
DOCK
PINE
MAPLE
HEMLOCK
ALDER
SWEET FERN
FERN
HELMINTHOSPORIUM
JUNIPER
HICKORY
GRASS
WILLOW
PLANTAIN
SMUT
FUSARIUM
PIGWEED
ALTERNARIA
RUST
BIRCH
CLADOSPORIUM
RAGWEED
28 · HUDSON FALLS
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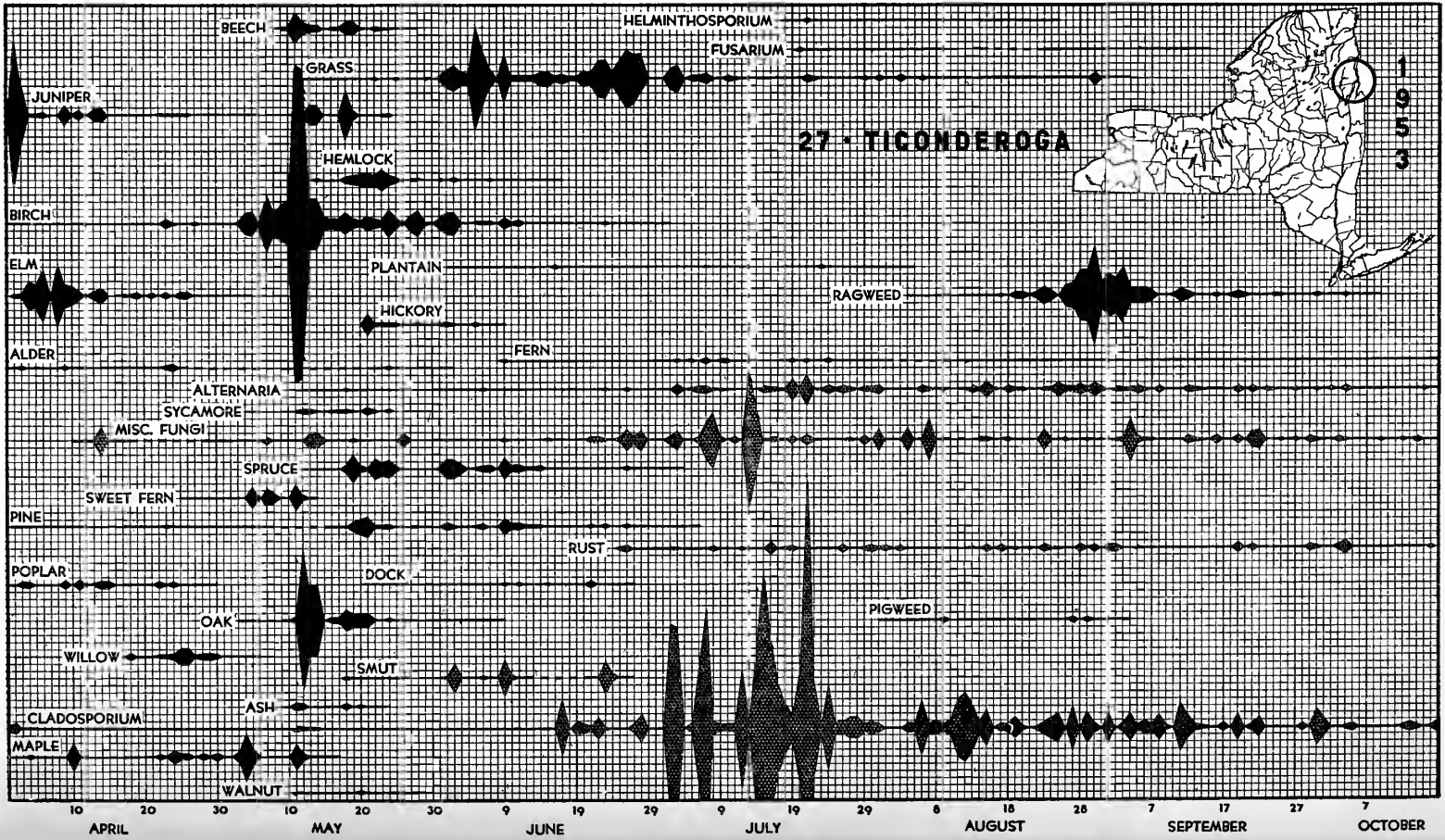
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER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ELM
PLANTAIN
HICKORY
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ALTERNARIA
SYCAMORE
MISC. FUNGI
SPRUCE
SWEET FERN
PINE
POPLAR
OAK
WILLOW
SMUT
ASH
CLADOSPORIUM
MAPLE
WALNUT
HELMINTHOSPORIUM
FUSARIUM
27 · TICONDEROGA
1953
RAGWEED
FERN
RUST
DOCK
PIGWEED
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APRIL
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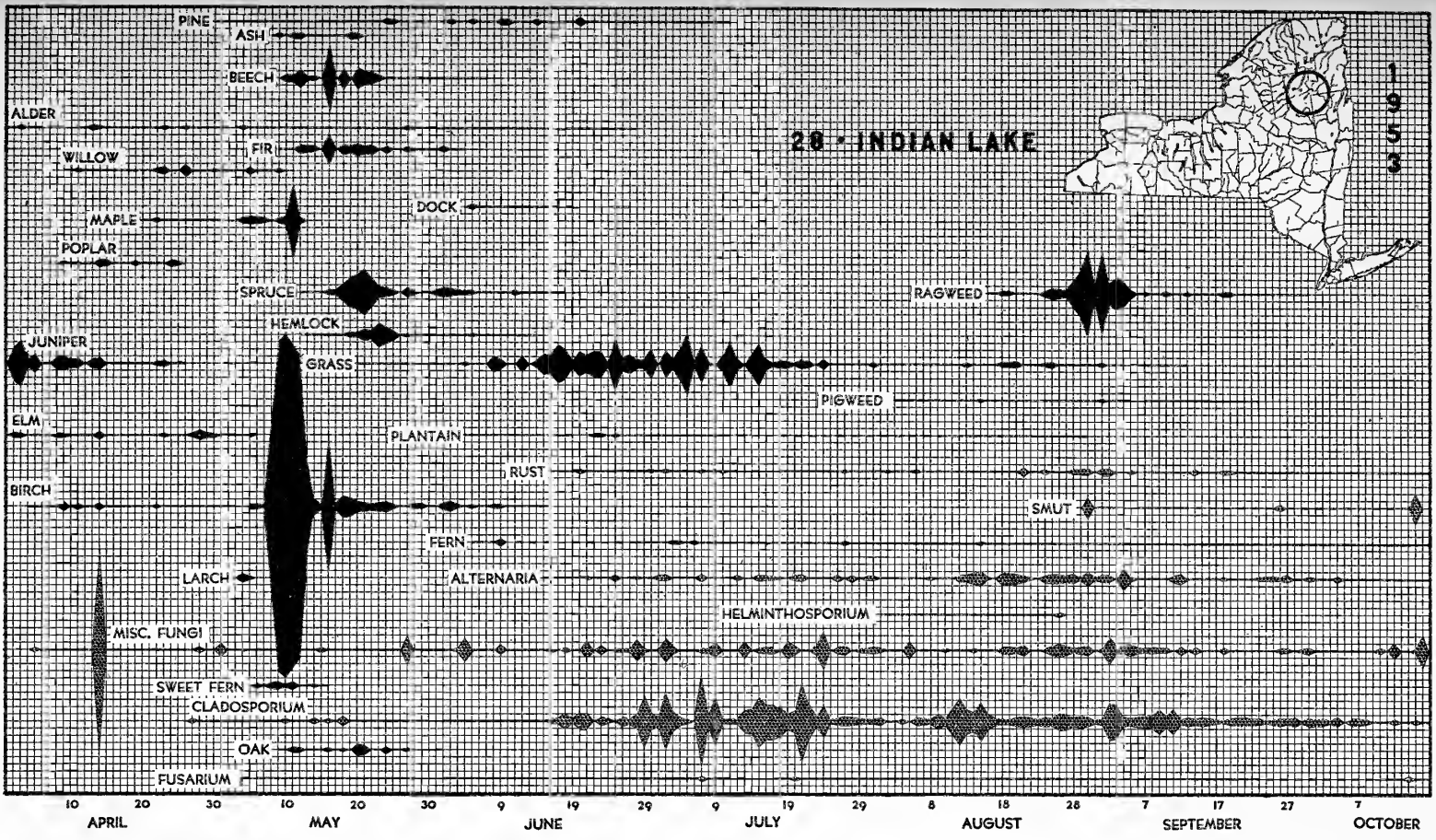
JULY
AUGUST
SEPTEMBER
OCTOBER


28 · INDIAN LAKE
1953
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ASH
BEECH
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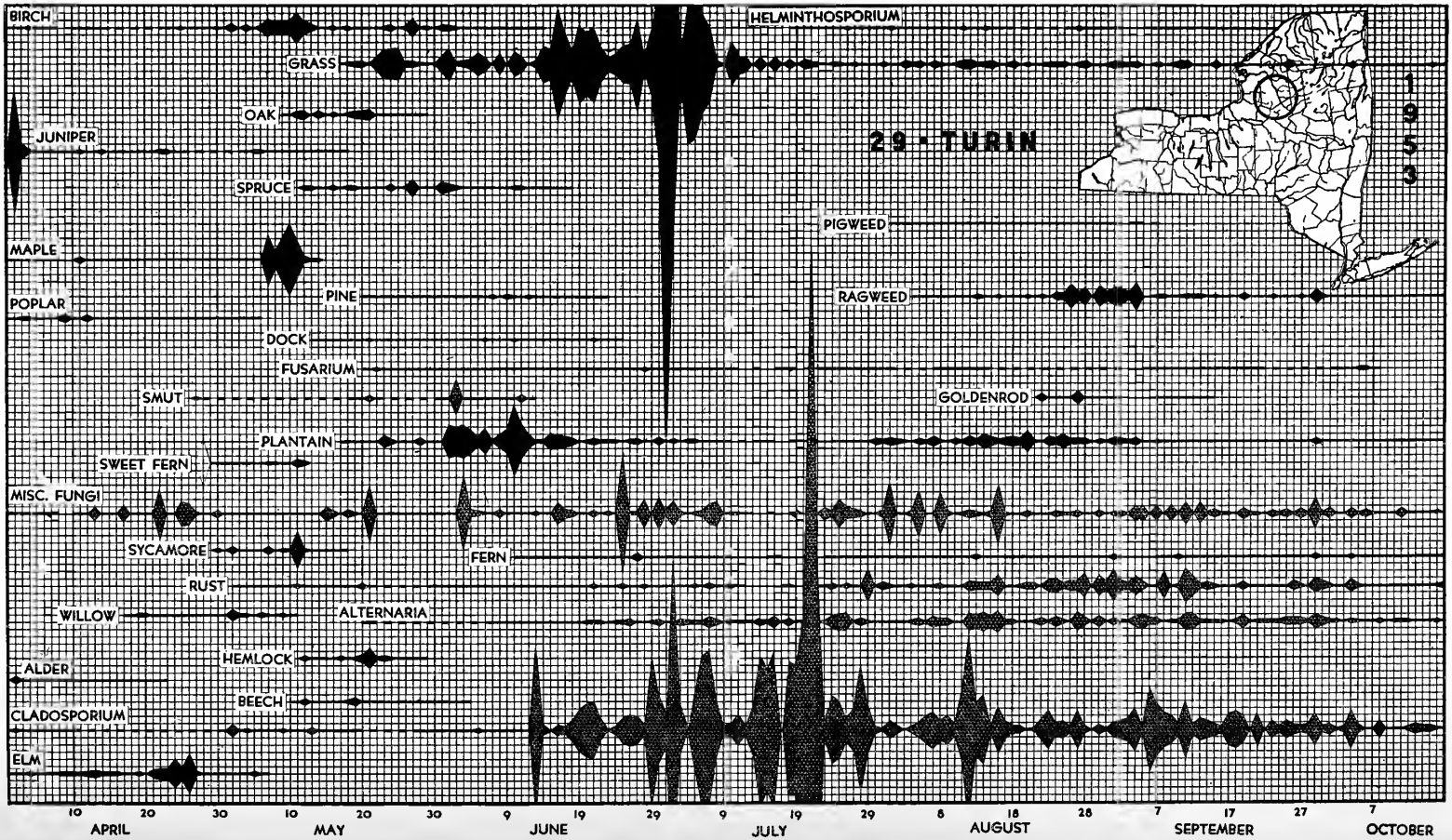
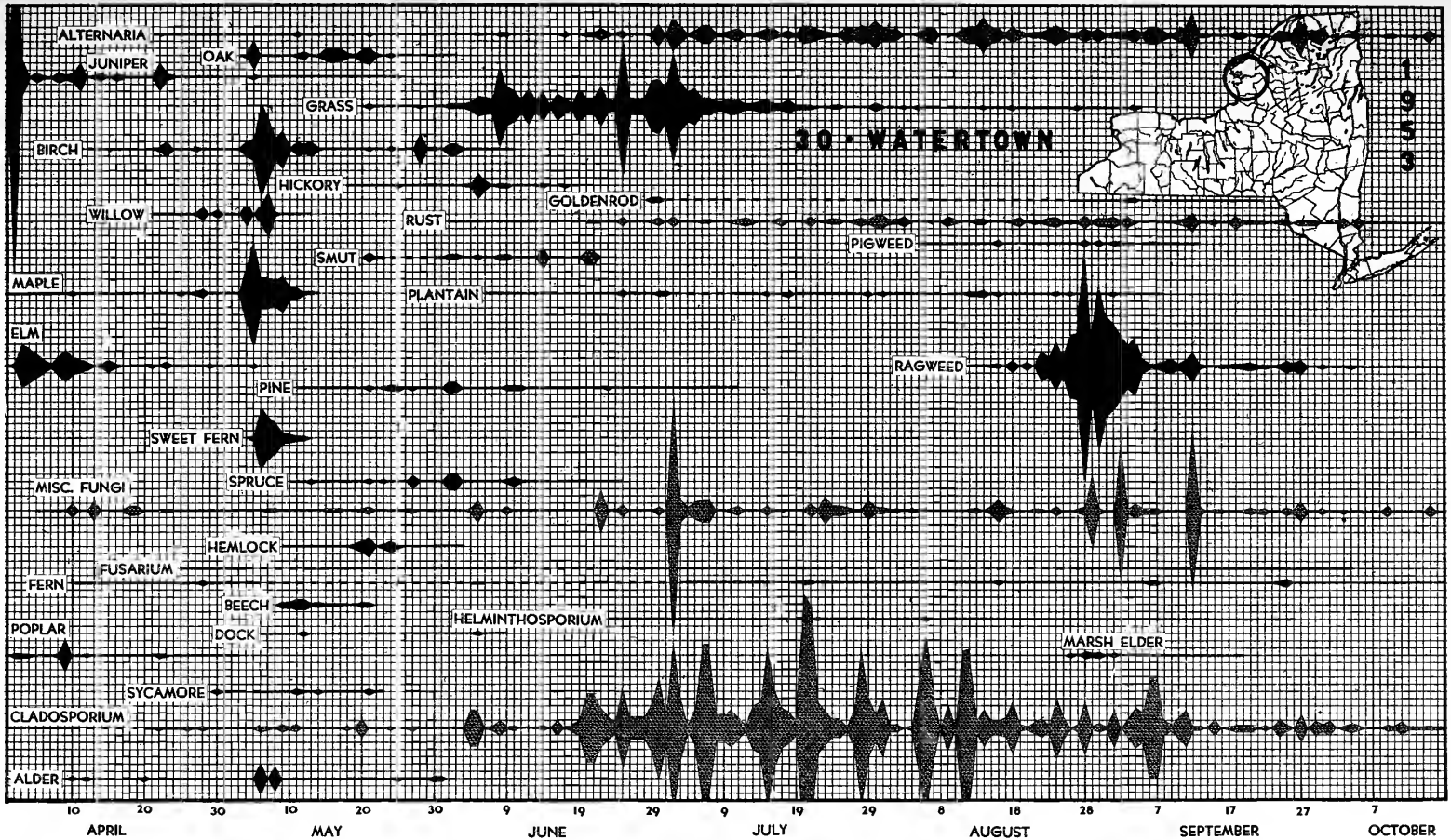
WILLOW
FIR
MAPLE
DOCK
POPLAR
SPRUCE
RAGWEED
HEMLOCK
JUNIPER
GRASS
PIGWEED
ELM
PLANTAIN
RUST
BIRCH
SMUT
FERN
LARCH
ALTERNARIA
HELMINTHOSPORIUM
MISC. FUNGI
SWEET FERN
CLADOSPORIUM
OAK
FUSARIUM
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


BIRCH
GRASS
OAK
JUNIPER
SPRUCE
MAPLE
POPLAR
PINE
DOCK
FUSARIUM
SMUT
PLANTAIN
SWEET FERN
MISC. FUNGI
SYCAMORE
RUST
WILLOW
ALTERNARIA
HEMLOCK
ALDER
BEECH
CLADOSPORIUM
ELM
HELMINTHOSPORIUM
29 · TURIN
1953
PIGWEED
RAGWEED
GOLDENROD
FERN
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


ALTERNARIA
JUNIPER
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GRASS
BIRCH
HICKORY
WILLOW
RUST
GOLDENROD
SMUT
PIGWEED
MAPLE
PLANTAIN
ELM
RAGWEED
PINE
SWEET FERN
SPRUCE
MISC. FUNGI
HEMLOCK
FUSARIUM
FERN
BEECH
DOCK
POPLAR
HELMINTHOSPORIUM
MARSH ELDER
SYCAMORE
CLADOSPORIUM
ALDER
30 • WATERTOWN
1953
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APRIL
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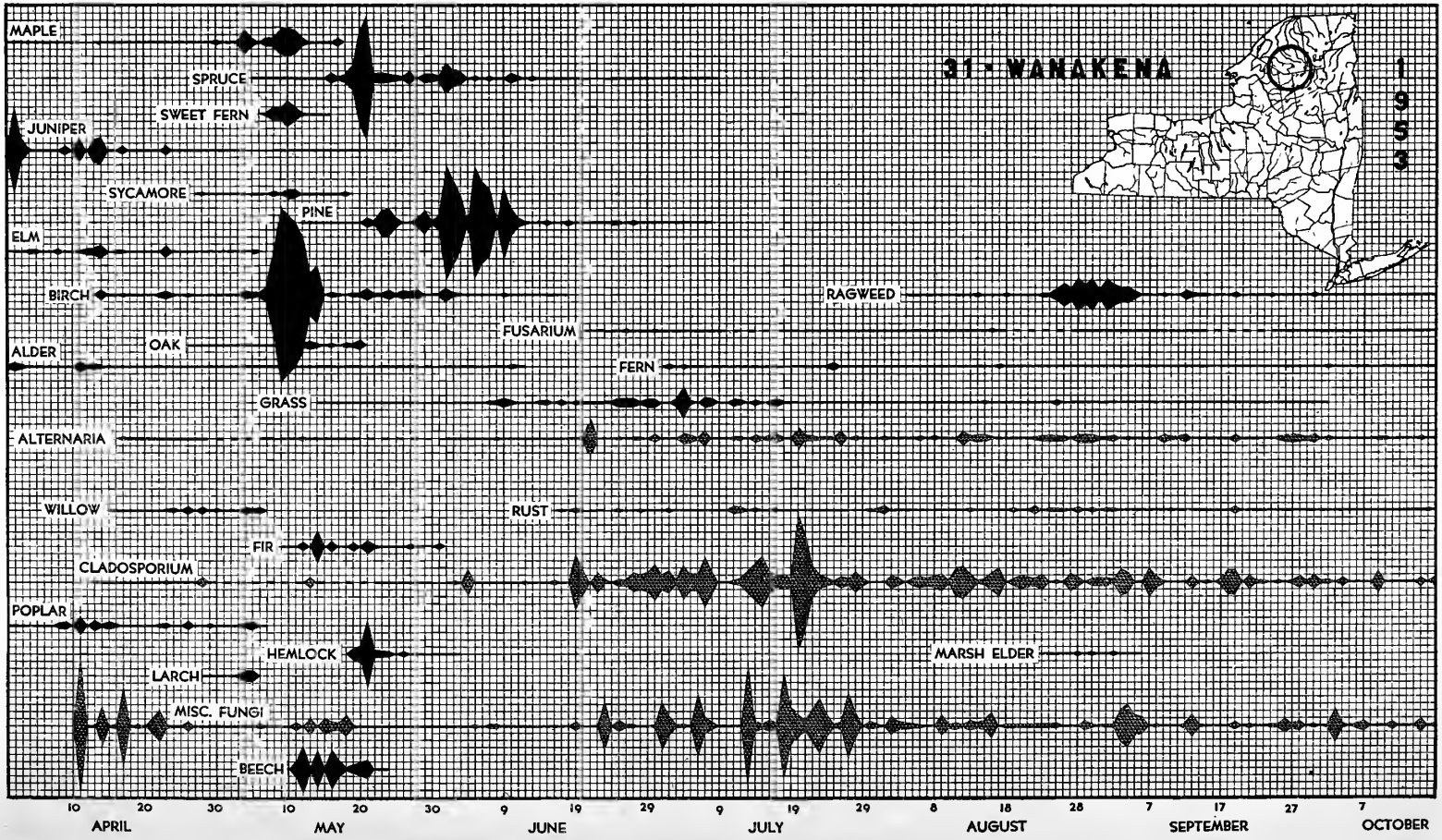
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


31 - WAUKENA
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SWEET FERN
JUNIPER
SYCAMORE
PINE
ELM
BIRCH
OAK
ALDER
RAGWEED
FUSARIUM
FERN
GRASS
ALTERNARIA
WILLOW
RUST
FIR
CLADOSPORIUM
POPLAR
HEMLOCK
MARSH ELDER
LARCH
MISC. FUNGI
BEECH
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
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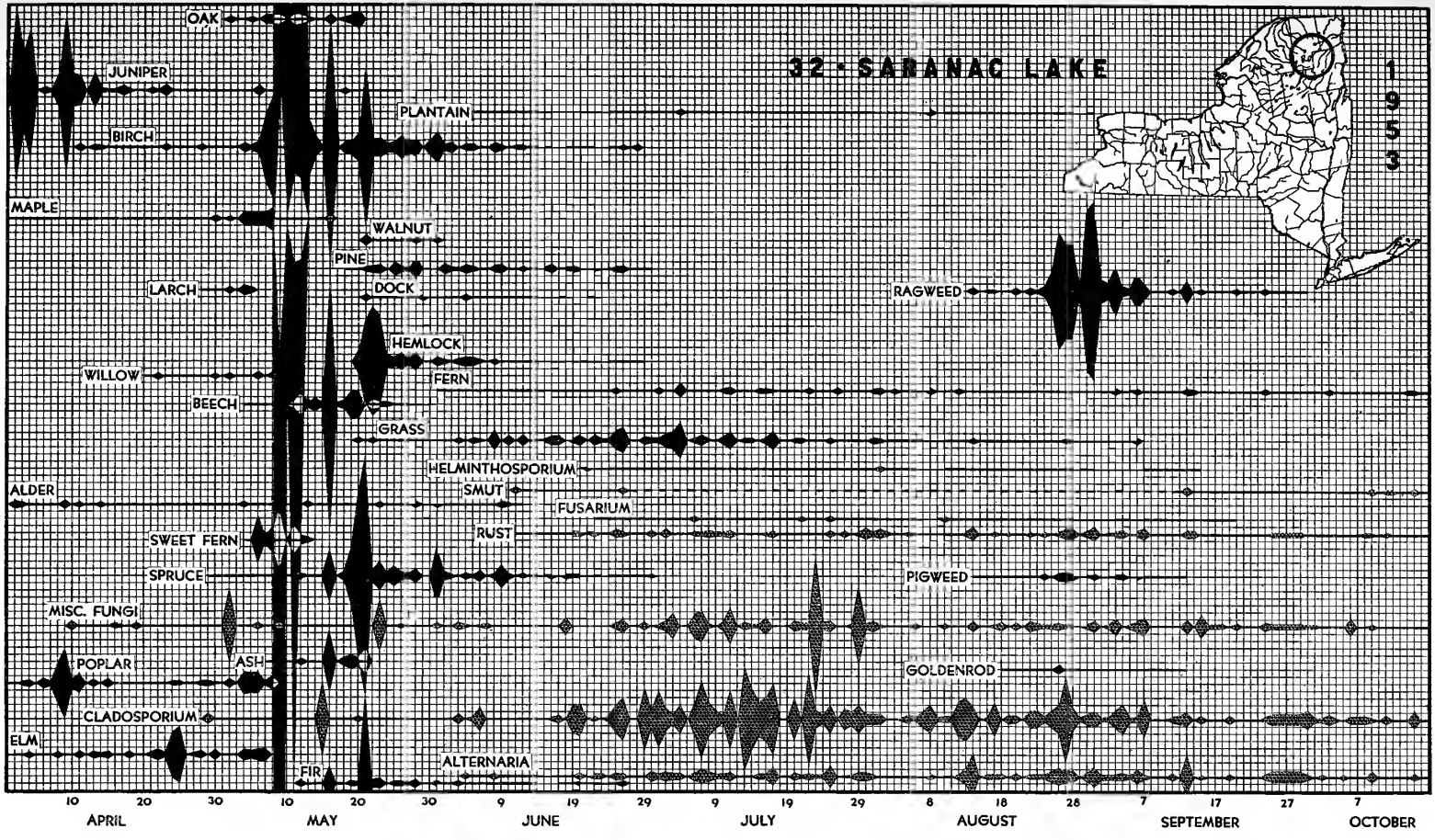
AUGUST
SEPTEMBER
OCTOBER


32 - SARANAC LAKE
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BIRCH
MAPLE
PLANTAIN
WALNUT
PINE
LARCH
DOCK
HEMLOCK
WILLOW
FERN
BEECH
GRASS
HELMINTHOSPORIUM
ALDER
SMUT
FUSARIUM
SWEET FERN
RUST
SPRUCE
MISC. FUNGI
POPLAR
ASH
CLADOSPORIUM
ELM
FIR
ALTERNARIA
RAGWEED
PIGWEED
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10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
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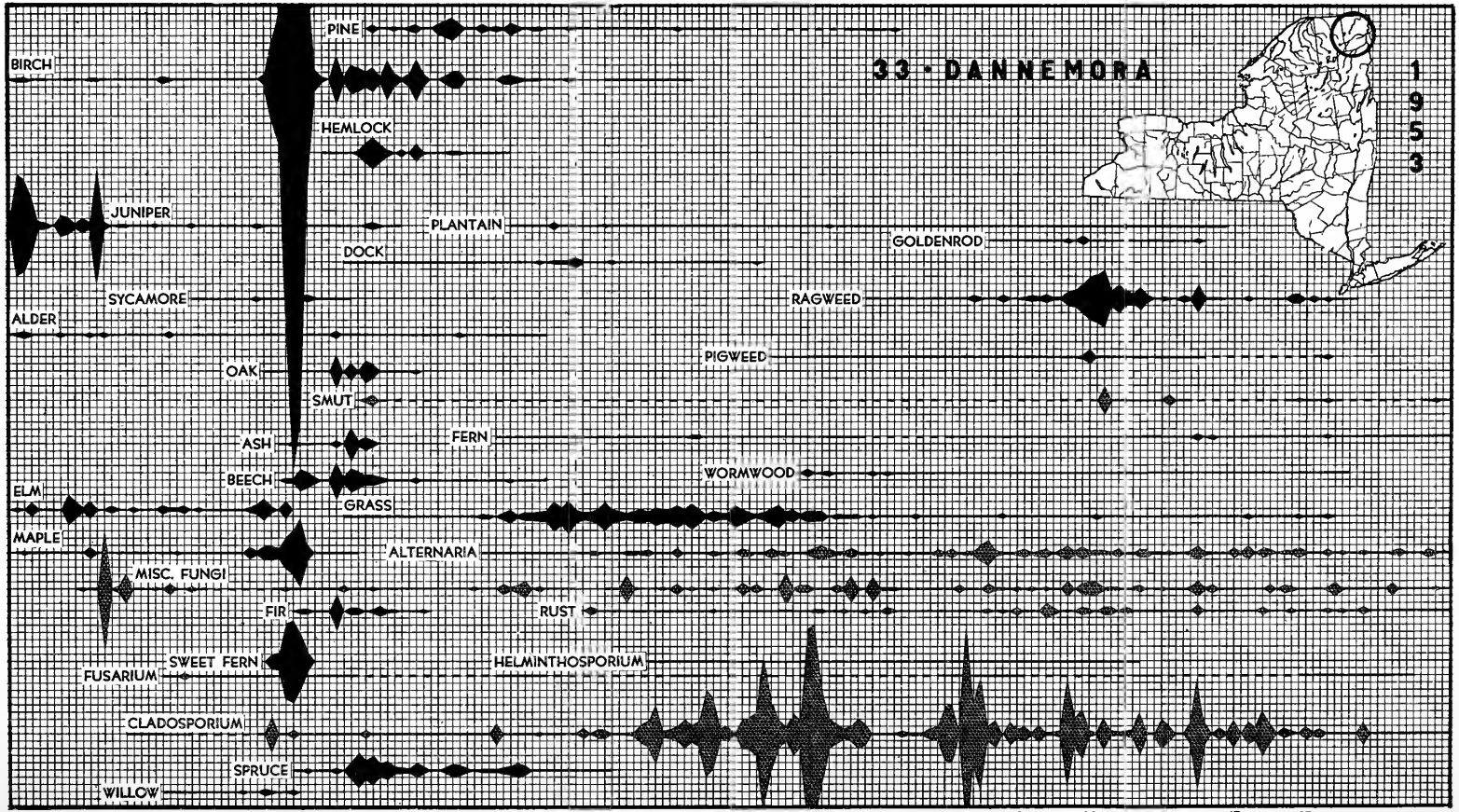
AUGUST
SEPTEMBER
OCTOBER


33 · DANNEMORA
1953
PINE
BIRCH
HEMLOCK
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PLANTAIN
DOCK
GOLDENROD
SYCAMORE
RAGWEED
ALDER
PIGWEED
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SMUT
ASH
FERN
BEECH
WORMWOOD
ELM
GRASS
MAPLE
ALTERNARIA
MISC. FUNGI
FIR
RUST
SWEET FERN
HELMINTHOSPORIUM
FUSARIUM
CLADOSPORIUM
SPRUCE
WILLOW
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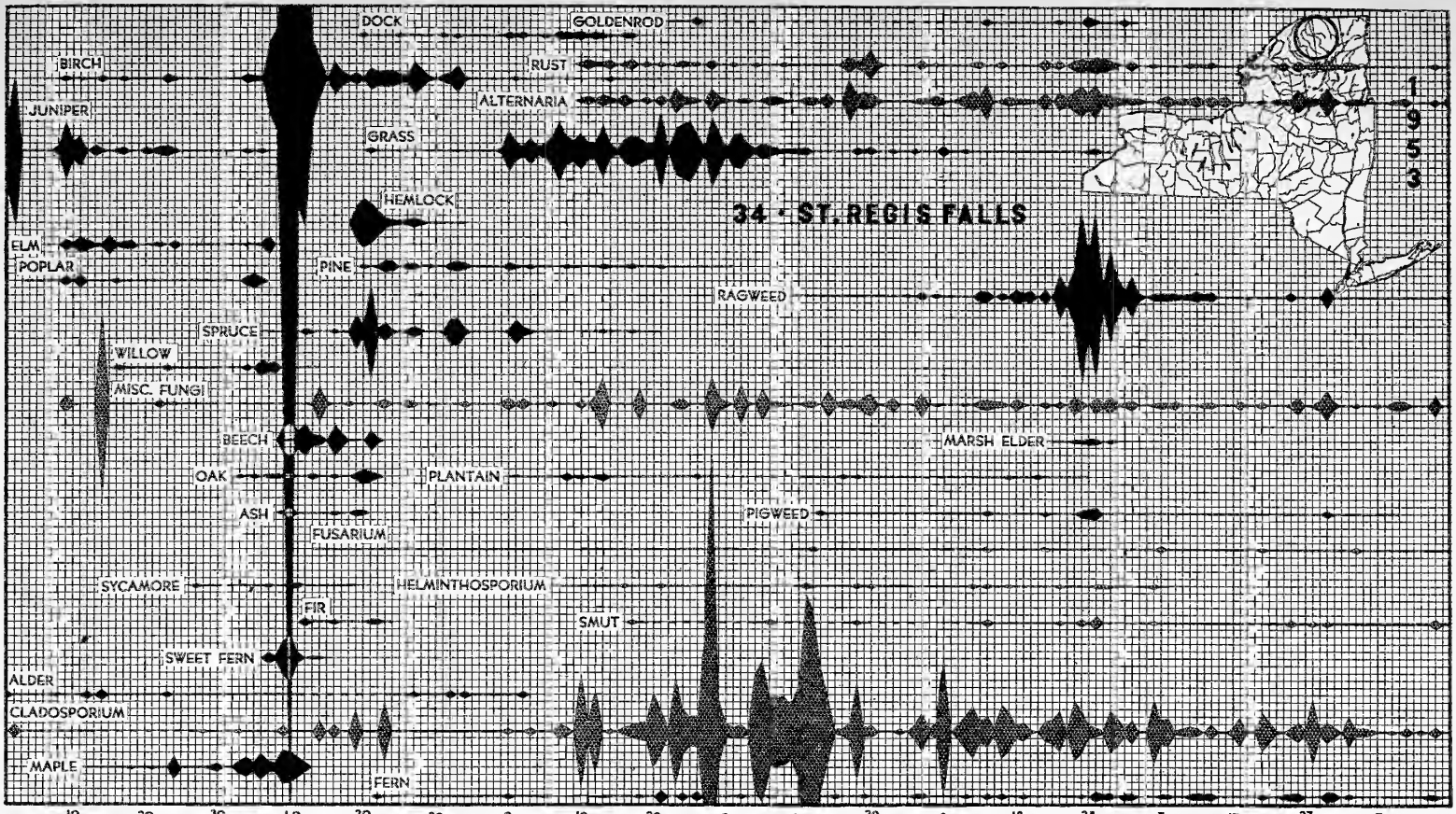
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER


DOCK
GOLDENROD
BIRCH
RUST
JUNIPER
ALTERNARIA
GRASS
HEMLOCK
34 - ST. REGIS FALLS
1953
ELM
POPLAR
PINE
RAGWEED
SPRUCE
WILLOW
MISC. FUNGI
BEECH
MARSH ELDER
OAK
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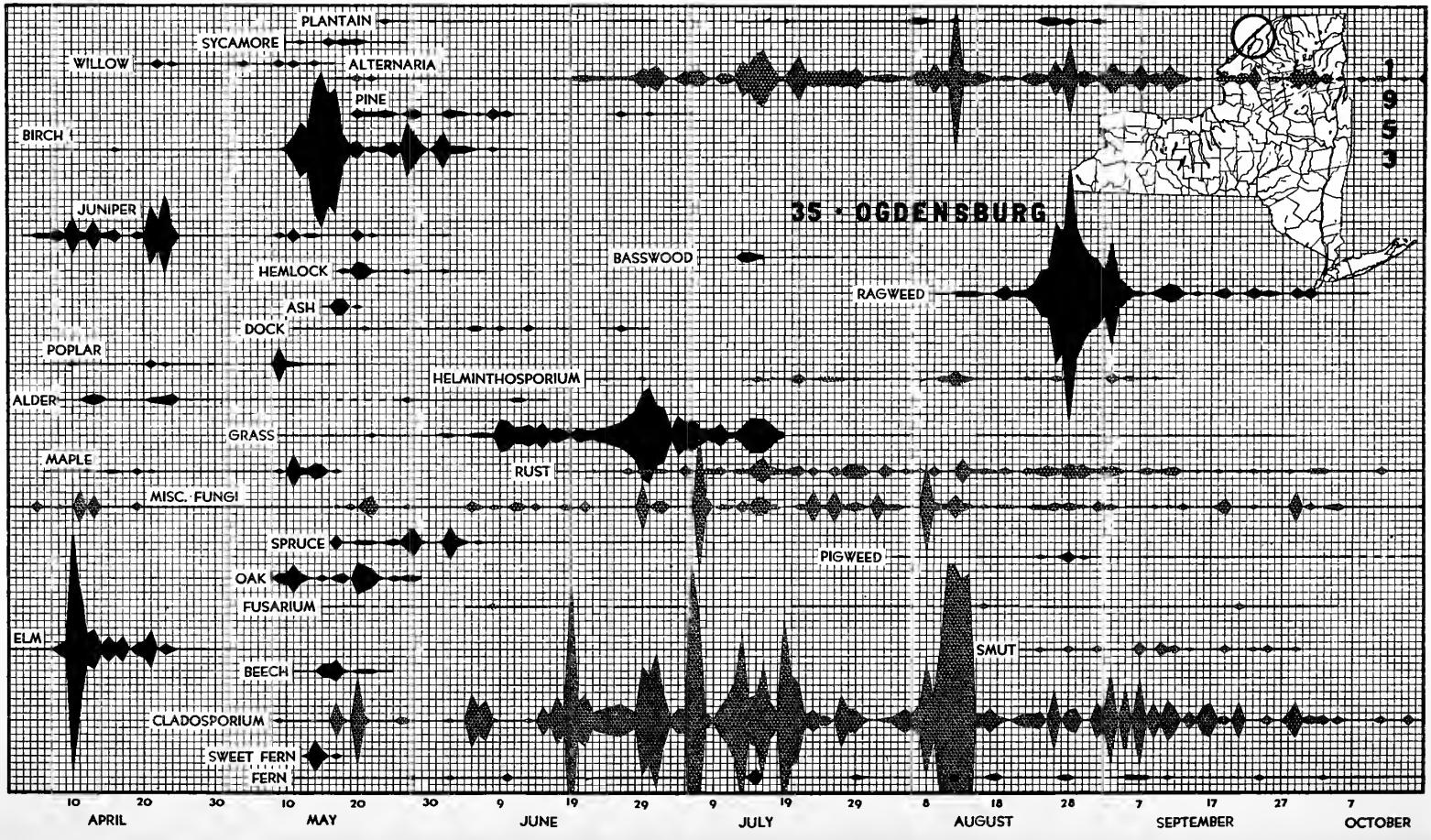
ASH
PIGWEED
FUSARIUM
SYCAMORE
HELMINTHOSPORIUM
FIR
SMUT
SWEET FERN
ALDER
CLADOSPORIUM
MAPLE
FERN
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


PLANTAIN
SYCAMORE
WILLOW
ALTERNARIA
PINE
BIRCH
JUNIPER
HEMLOCK
ASH
DOCK
POPLAR
ALDER
GRASS
MAPLE
MISC. FUNGI
SPRUCE
OAK
FUSARIUM
ELM
BEECH
CLADOSPORIUM
SWEET FERN
FERN
BASSWOOD
RAGWEED
HELMINTHOSPORIUM
RUST
PIGWEED
SMUT
35 · OGDENSBURG
1953
10 20 30 10 20 30 9 19 29 9 19 29 8 18 28 7 17 27 7
APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER