plant to another, for not only must it carry the spores of the fungus on its body, but it must also be able to introduce them into the xylem of living trees—a fact which has not yet been demonstrated experimentally. However, since adults must penetrate through the bark and cambium of trees to reach the wood, where they construct their galleries, it is highly probable that the insect is capable of transmitting the disease to trees weakened by other agents, thus creating an inoculum potential for transmission by known vectors.

—R. J. Finnegan and C. Gagnon.

ONTARIO

Survival of Fusarium, Pythium, and Rhizoctonia in Very Dry Soil.—There are scattered records in the literature of the amazing survival ability of sclerotia of *Rhizoctonia* spp. and of oospores of *Pythium* spp. in soil. Understanding the epidemiology of many important soil-borne diseases would be easier if more knowledge was available of the saprophytic action and survival of these pathogens in soil. The following observations on survival of fungi in soil may therefore be of some use until more systematic studies are available.

Sandy soil was taken from the nursery at Midhurst, Ontario, in the spring of 1962 and stored in wooden bins in the headerhouse of the Laboratory. Because of the dryness of the atmosphere and darkness in the bins, there could not be any growth of weeds to provide for pathogenic activity of fungi in the soil. In March 1964, after almost 2 years' storage, the soil contained only 0.2% of water by weight. Microbiological analysis of this soil was made using conventional dilution and soil plate techniques, the former with malt agar and the latter with cornmeal agar with and without selective antibiotics. Bacteria were suppressed with 50 p.p.m. of streptomycin and certain fungi with 200 p.p.m. of mycostatin.

The most interesting result was the finding of species of *Pythium and Rhizoctonia*. Both were found only a few times when using large amounts of soil (over ½ gm.) per plate. Under these conditions other organisms could not be fully excluded and they probably prevented some *Pythium* and *Rhizoctonia* from being observed. The numbers of bacteria and actinomycetes were very low, 12,000 and 400 per cc. of soil. There were 1,180 fungi per cc. of soil (dilution plates), mostly species of *Aspergillus* (540) and *Penicillium* (580). Soil platings revealed the presence of *Fusarium solani* (Mart.) App. et Wr., *Mortierella* spp., *Mucor* spp., and *Trichoderma viride* Pers. ex Fr. The colonies of the later four and of *Pythium* and *Rhizoctonia* usually originated from large soil aggregates probably always containing humus or plant residues. Other fungi were very rare.

The survival of *Pythium* and *Rhizoctonia* in very dry soil suggests that these important damping-off pathogens can spread with dust particles blown by wind from unsterilized soil to adjacent sterilized seedbeds.—O. Vaartaja.

BRITISH COLUMBIA

Nematode Infestation, and Sex Difference in Response to Log Odors, in the Cerambycid Beetle, Leptura obliterata (Haldeman).—For field studies of scolytid attraction, at Lake Cowichan, B.C., in 1963, plastic-coverd frame cages were filled with May-felled Douglas-fir logs or bark. These cages served as sources of odors, which were released through a top opening in each cage, above which small glass-barrier traps were mounted. The cages were placed in a second-growth stand of Douglas-fir, and insects collected from the traps at intervals during the season.

The cerambycid, *Leptura obliterata* (Haldeman), started appearing in the traps in late July and was the most common insect in late August and early September catches. Individuals were attracted by whole logs, bare logs, and by bark alone.

Specimens from some of the early catches were dissected, to determine sex with certainty. There were two interesting results: 1) no males were found, and 2) several females were heavily infested with internal nematodes. The sex, and the incidence of nematode infestation, were then determined in all other specimens collected from 18 cage-trap units that season, the results being given below.

Sex and nematode infestation of *L. obliterata* taken at log odor sources.

	July 21	July 29	Aug. 2	Aug. 12	Aug. 21 (part)	Aug. 21 (part)	Sept. 4	Sept. 18	Total
male	0	0	0	1	0	0	0	0	1
female	10	10	16	161	42	78	237	42	596
per cent females infested	—	—	—(1)	31	18(1)	29	30	59	27

(1) Individuals of the first three dates were combined with the first part of the August 21 collection for this determination.

In all infested individuals the abdominal cavity was packed with nematodes. Uninfested beetles had large ovaries, with well developed eggs, but ovaries of infested beetles were poorly developed, the ovarioles being small and often obscured by nematodes. Judging by appearance, it seems unlikely that infested individuals could have produced offspring. I thank Dr. K. C. Sanwal, Entomology Research Institute, Ottawa, for a provisional identification of the nematodes (from water-soaked material) as rhabditid dauerlarvae, possibly of the genus *Parasitorhabditis* (Fuchs, 1937) Chitwood, 1950. These parasites may be a significant factor in the biology of *L. obliterata* and their presence raises questions concerning their life history and mode of transmission.

L. obliterata is reported as breeding in a variety of dead conifers (Craighead, F. C., 1923. Dept. Agr. [Dom. of Canada] Bull. No. 27, New Series, Tech.). I cannot find any reference to normal sex ratio in *Leptura* species, in the literature. The above data clearly suggest, however, that only females of *L. obliterata* are attracted by log odors (the single male is considered an accidental catch). *Leptura* species are well known to frequent flowers, where mating occurs, and are considered pollen feeders. (Linsley, E. G., 1961. Univ. Calif. Pub. Ent. Vol. 18). Although males visit flowers, they apparently are not attracted to logs. This demonstration of sex difference in response to log odors raises various questions. For example, in how many other flower-frequenting cerambycid species does attraction to brood material involve females only? Is it feeding or mating that causes females to change their behavior when they leave flowers and begin to search for logs on which to oviposit?—J. A. Chapman.

Uptake of Water by the Ambrosia Beetle Trypodendron Following Desiccation.—Physiological studies of insects often utilize tracer materials, including radioisotopes, which are fed or otherwise introduced into the body. Ambrosia beetles cannot be fed these materials readily because their food consists only of the symbiotic fungus with which they are associated. A simple method has been found to make *Trypodendron* take up water; desiccate the beetles and then allow them to drink. This makes it possible to introduce dyes and other tracers via the alimentary tract. A short description of our experience with this method is given here.

Adult *Trypodendron lineatum* (Oliv.) collected from overwintering sites in bark in January and March were used for tests. After removing them from the bark they were stored in moist bark flakes in a refrigerator until used. During desiccation beetles were kept separately in small gelatin capsules perforated at both ends. Beetles were individually weighed and kept over anhydrous calcium sulphate in a darkened container at room temperature.

Five series consisting of five male and five female beetles each were used. They were re-weighed at intervals to determine rate of moisture loss. At several different levels of moisture loss, beetles were transferred to stoppered shell vials, each containing a roll of wet glass paper. They were removed and weighed again within a day. Desiccated beetles could be seen to push their heads into wet paper and appeared to drink as they did this.

The rate of weight loss with time was fairly constant, so that it was possible to estimate with reasonable accuracy the time required to reach a certain level of desiccation. Results from the experiment are summarized in the accompanying table.

Percentage weight loss in adult *Trypodendron* subjected to desiccation[1] for various periods

Hours of desiccation	MALE			FEMALE		
	Av. loss	Loss per hour[2]	Range	Av. loss	Loss per hour[2]	Range
7	3.3	.477	.313—.569	4.8	.688	.421—.863
17	7.8	.457	.387—.532	—	—	—
24	12.6	.525	.378—.720	14.4	.600	.569—.923
48	25.3	.528	.481—.666	32.0	.666	.579—.721

Average weight of beetles before test: male—3.23 mg. (2.42—3.78); female—3.62 mg. (3.05—4.29).

[1] All percentages of weight loss are based on original weights of beetles.

[2] Value during interval since previous weighing.

There was considerable individual variability in rate of weight loss and gain during desiccation and subsequent exposure to water, but it can be stated that, under the conditions of our tests, adults survived a weight loss of 10—25%, while drying over a period of 17—30 hrs. If given access to water, desiccated individuals regained their original weight and often exceeded it for 1 or 2 days. In these instances subsequent weighings showed that most of them soon returned to their