

here also point to the need for knowledge of the overwintering habits of *Trypodendron*, for while they make very occasional attacks on logs during August, the great bulk of the population overwinters outside of the logs, and not necessarily in the vicinity of their origin. It is not inconceivable that these beetles may migrate to higher altitudes during summer, to redistribute themselves in unexpected areas the next spring.—K. Graham.

#### Dwarf Mistletoe on Ponderosa Pine in British Columbia.

—In the United States, three species of *Arceuthobium* have been found to attack ponderosa pine (*Pinus ponderosa* Laws.). The first, *Arceuthobium vaginatum* forma *cryptopodum* (Engelmann) Gill, is a southern form, and is restricted to the Rocky Mountain form of ponderosa pine. The second, *A. campylopodum* forma *typicum* (Engelmann) Gill, is relatively common throughout most of the range of its host in the United States, and has been found up to approximately 30 miles from the Canadian border. The third, *A. americanum* Nutt. is found according to Gill "in rare instances only" on ponderosa pine. Apparently, dwarf mistletoe has not been collected on this host to date in Canada.

In May of this year, a conspicuous broom formation was noted on ponderosa pine approximately 8 miles north of Kimberley, B.C. The brooms were fairly dense and of varying proportions, in one instance the entire tree being affected. On closer examination, dwarf mistletoe was found to be present in abundance on the brooms. This dwarf mistletoe is believed to be *A. americanum* Nutt., for the following reasons:

1. The flowering time of this dwarf mistletoe coincided with that of *Arceuthobium americanum*. Flowering times of *A. vaginatum* and *A. campylopodum* are May-June and August-September respectively, while that of *A. americanum* in this region is April-May.

2. Accessory branches apparently had been produced from collateral buds, and pistillate flowers often occurred in whorls. Both of these features are considered typical of *A. americanum*.

3. The infected ponderosa pine was mixed with lodgepole pine (*Pinus contorta* Dougl. var. *latifolia* Engelmann) which was infected with *A. americanum*. This identification was later confirmed by Dr. L. S. Gill.

This collection is interesting because it represents, to the writer's knowledge, the first record of dwarf mistletoe on *Pinus ponderosa* in Canada.—J. Kuijt.

**Studies of Forest Tree Rusts.**—The rusts represent one of the few taxonomic groups of fungi in which all members are obligate parasites in all stages of their life cycle. A knowledge of their physiology and ecology, geographical distribution, host relationships, and life histories is therefore considered of fundamental and economic importance.

Investigations were begun in British Columbia in 1949 to obtain information on rusts affecting forest trees. An extensive survey contributing over 2,000 collections has revealed 59 species of tree rusts, 14 of which are reported for

the first time in British Columbia. In addition, 78 alternate host records new to this region and 23 records apparently new to science have been determined. The survey has shown the distribution of economically important rusts, such as the broom and cone rusts of spruce and the blister rusts of pines, and has led to the discovery of important rusts hitherto not known to occur in British Columbia, such as *Chrysomyxa woronini* Tranz. on spruce and cone rusts on fir (*Abies* sp.) and Sitka spruce.

Since tree rusts, with very few exceptions, cannot survive in the absence of an alternate host and can therefore be controlled by eradication of the alternate hosts, studies were also extended to other host plants. Alternate hosts of 6 tree rusts have been discovered and the rusts' complete life cycles have been determined by observation of the infected hosts in the field and in the greenhouse. Over 100 inoculations were performed to confirm or refute host relationships of a number of incompletely known tree rusts.

The preliminary survey and biological studies have indicated, therefore, the nature and extent of further investigations required to clarify or increase existing information on this important group of forest fungi. More intensive studies are in progress to provide information of the latter nature.—W. G. Ziller.

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