Ait. were germinated in dishes with 100 ppm of these chemicals). Similarly, GS-388 appears promising in controlling fungal diseases. HRS-1590 showed very specific activity against only *Pythium* spp. Such specific activity might be useful in certain soils as it does not prevent the natural control exerted by soil flora through antagonism to *Pythium* spp.

Unusual tolerance is an important characteristic when chemicals are used as a research tool, e.g., in assessing incidences of certain groups of organisms in soil. Together with many other polyenes, endomycine was tolerated particularly by *Pythium* sp., bacteria, and certain species of *Mortierella*. As a check, another polyene studied earlier, pimaricin, was tested again against all the fungi of Table 1. The results were generally very similar to those with endomycin. Accordingly, pimaricin was successfully used in surveys of soil *Pythium*. *Fusarium solani* was unusually tolerant of GS-388. Isolation of this fungus was greatly facilitated in soil platings where this antibiotic was incorporated at 25 ppm in cornmeal agar together with 10 ppm each of neomycin and aureomycin against bacteria and 150 ppm of pentacloronitrobenzene against *Trichoderma*. Perhaps the partial tolerance of *Cylindrocarpon radicicola* to trichlorodinitrobenzene could be similarly used in studies of this fungus in soil. The tolerance of *Suillus granulatus* to endomycin suggests that this antibiotic (in combination with others) may be useful in isolations of some basidiomycetes. The important element of soil flora belonging to *Mortierella* spp. might be isolated with the following medium: HRS-1590 at 50 ppm to suppress *Pythium*, endomycin at 50 ppm to suppress most other fungi, and antibacterials to suppress bacteria.—O. Vaartaja.

PRAIRIE PROVINCES

Inoculation Tests with Diplodia tumefaciens (Shear) Zalasky.—Two sets of inoculations were made with *Diplodia tumefaciens* on suckers of poplar maintained in a greenhouse. In one set, eight hybrids were tested for susceptibility to *D. tumefaciens* and, in the other set, black poplar (*Populus balsamifera* L.) and aspen (*P. tremuloides* Michx.) were inoculated to discover whether *D. tumefaciens* from black poplar is equally pathogenic on aspen and vice versa. The host material consisted of 1-year-old aspen and black poplar and 3-month-old hybrid poplars raised in a greenhouse from rooted cuttings. Rooted hybrid cuttings were obtained from the Prairie Farm Rehabilitation Act Tree Nursery at Indian Head, Saskatchewan. Two inoculum sources from aspen (Nos. 51 and 53 from Pineland Nursery, Manitoba) and one from black poplar (No. 69 from Beaver Creek, Saskatchewan) were used. Inoculum was obtained from trees in mixed stands of aspen-black poplar, but only inoculum No. 51 was from a stand in which both species were infected. The funnel method of inoculation was used (Zalasky, H. Can. J. Botany 42, 385-391, 1964).

The occurrence of *D. tumefaciens* on two poplar hybrids, Brooks and Lomardy, naturally infected from diseased aspen and black poplar (Zalasky, H. Plant Disease Reporter 49:50, 1965), suggested that other poplar hybrids may be susceptible. In the first set of inoculations, the eight hybrids (*Populus brooks, P. cardeniensis, P. northwest, P. petrowskyana, P. sargentii, P. tristis, P. vernirubens*, and *P. volunteer*) were mostly cultivars from *Populus deltoides, P. laurifolia*, and *P. balsamifera* (Cram, W. H. Forestry Chron. 36: 204-209, 1960; Poplars in Forestry and Land Use, FAO, 511 pages, 1958). In January 1965, one lot of rooted cuttings that had been transplanted three to a flat in November 1964, were inoculated with inoculum No. 69. Two to seven inoculations were made per hybrid, the total number of inoculations for all hybrids being 30. The funnels in the control plants of the other lot contained sterile distilled water.

On March 22, 1965, examination of inoculated material showed that all inoculations in *P. cardeniensis?, P. petrowskyana*, and *P. tristis* were positive, whereas 9 out of 13 inoculations in *P. brooks* and *P. northwest* were failures. Infected stems had excrescences up to 0.5 cm in diameter. On August 9, 1965, woody galls and swellings up to 2.5 cm in diameter were most conspicuous on *P. cardeniensis?* and *P. petrowskyana*. In a few instances where a new branch forked from the stem, basal galls caused that portion of the branch to become dwarfed and finally to die. The bark of some of the galls was pitted and green except for traces of cork up to 1 mm thick containing the mycelium of *D. tumefaciens*. Fruiting bodies of the fungus occurred in all infected material, except *P. cardeniensis?* and *P. petrowskyana* where the cork apparently sloughed off rapidly enough to prevent the fungus from fruiting. These results suggest that the host has a pronounced influence on the morphological development of the fungus. *P. sargentii, P. vernirubens*, and *P. volunteer* appear to be resistant to *D. tumefaciens*.

In the second set of inoculations four aspen and four black poplar were inoculated with inoculum from each source. Distilled water was used on the controls. Eight inoculations were carried out. Eleven months after inoculation small swellings and *D. tumefaciens* fruiting bodies occurred in all aspen test plants. The swellings were several times smaller than those on black poplar. Inoculum No. 69 infected two black poplar; the other inoculum sources did not infect this species. This indicates that *D. tumefaciens* from aspen is not equally pathogenic to black poplar.—Harry Zalasky and O. K. Fenn.

BRITISH COLUMBIA

Further Observations on Pole Blight of White Pine.—Pole blight of western white pine (*Pinus monticola* Dougl.) is thought to have been initiated by a series of dry, hot summers which may have begun as early as 1917 and continued until the mid-1940's. In Idaho, pole blight distribution has been correlated with the occurrence of soils having limited soil moisture storage capacity or recharge potential (Leaphart, C. D. and O. L. Copeland. Soil Sci. Soc. Amer. Proc. 21: 551-554, 1957.) Preliminary analysis of results from a survey of white pine stands in the southern interior of British Columbia indicates that distribution can be correlated additionally with soil fertility and growth rate of trees. The survey also corroborates recovery trends noted previously.

Most of the affected trees examined in British Columbia were on noticeably podzolized soils, characteristic of the Interior Western Hemlock Zone. Pine stands in areas with relatively dry climates near the margin of the Hemlock Zone were rarely affected. The relatively favourable soil fertility of the weakly podzolized soils of these areas may have been more effective in promoting resistance to pole blight than drought was in causing the disease. Pole blight was also rare among pine growing toward the upper altitudinal limit of the species in the transition between the Hemlock Zone and the Engelmann Spruce—Subalpine Fir Zone. Lack of pole blight at high elevations, however, is unlikely to be related to favourable soil fertility because subalpine soils are usually strongly podzolized. Here, amelioration of drought by more frequent showers and longer duration of snow packs than at lower elevations in the Hemlock Zone may have been a factor.

Internodual growth measurements showed that most of the pole-blight-affected white pine examined had made rapid growth during the early pole stage (age 20 to 50 years). Pole blight was uncommon, even on apparently equivalent sites, when stands were densely stocked and the pine had grown slowly during this period. Consequently, a significant characteristic of the sites on which pole blight occurred seems to be their ability, when appropriately stocked, to support rapid growth of pine during the early pole stage in normal and moist years. Such trees might then be especially vulnerable to water shortage during drought years, particularly in soils with limited soil moisture storage capacity. Slow-growing pine in densely stocked stands are probably less prejudiced. The frequency of pole blight among dominant and co-dominant trees being greater than among intermediate and suppressed trees, and the lack of pole blight among slow-growing pine toward the subalpine zone, may be analogous.

The occurrence of callused margins on lesions in all the 40 affected stands examined indicates that recovery from pole blight is widespread. This trend was first noted in the four disease progress and control plots which had been established earlier (Molnar, A. C. and R. G. McMinn. Bi-mon. Progr. Rept. 14(3): 3-4, 1958). Recovery from pole blight is consistent with the hypothesis that adverse weather induced the disease because improvement could be expected when water shortage moderated following resumption of moister climatic conditions in accord with long-term averages. Even in stands in which most of the pine are now dead, callusing of lesions showed that recovery had begun before death occurred. Death in most cases could be attributed to mountain pine beetle infestations. Successful beetle attacks evidently could continue even after recovery had begun. Beyond the range of pole blight, beetle infestations were rare in immature (less than 120 years old) white pine stands.—R. G. McMinn.

Some Results of Artificial Inoculation with Western Hemlock Dwarf Mistletoe Seed.—Seeds of *Arceuthobium campylopodum* Engelm. f. *tsugensis* (Rosend.) Gill with emergent radicles were collected from western hemlock, *Tsuga heterophylla* (Raf.) Sarg., branches during the early spring of 1964 near Cowichan Lake, Vancouver Island. The seeds, disseminated during the fall of 1963, were planted with the aid of lanolin paste on several 5 to 6 year-old potted conifers