retarded larvæ they develop rapidly to reach the same length as the others which showed a 'normal' development. It is noteworthy, however, that even at 56 days members of the high-dose populations had not reached the size of the worms in the low-dose populations, and had not, in fact, achieved the normal size quoted for *Ostertagia circumcincta*, the predominant member of the genus in the population. Despite their small size these worms appeared morphologically to be sexually mature and eggs were visible within the uteri of the females. Only relatively low and erratic egg counts (rarely more than 1,000 eggs per gram) were observed in these sheep, despite their heavy worm burden.

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## Boron Deficiency in *Grevillea robusta*

*Grevillea robusta* A. Cunn. is used as a shade tree in many tea plantations in Kenya. It is easily established, and is little subject to pests or diseases. In December 1959 it was reported that *Grevillea* were dying on the whole of one field in a tea plantation in the Nandi Hills district of Kenya. The trees were 2–3 years of age and were dying back from the tip. Of many, only the main branches near the apex of the tree were affected, while one or two lateral branches lower down the tree carried healthy leaves. The more seriously affected trees were almost completely defoliated; but leaves could in many cases be seen sprouting from the main trunk at heights of 4 ft. down to ground-level. In almost all trees showing advanced symptoms there was cracking of the bark and exudation of gum. The symptoms are similar to those described by Vail *et al.*[1] for boron deficiency in wattle. The fact that, prior to the planting of tea and trees of *Grevillea* in the area in question, an attempt to establish wattle had failed, led to an investigation into the boron status of the soil and of the *Grevillea* trees.

Leaf samples were taken from two dead trees, some apparently healthy trees in the same field, and some healthy trees about two miles away from the affected field. Boron analyses on these samples showed one healthy leaf to have the highest boron content (17 p.p.m.) and one from a diseased tree to have the least (13 p.p.m.); the results of further leaf analyses were somewhat inconsistent. The figures for water-soluble boron in the soil, however, supported the idea that boron deficiency was in fact responsible for the effects. Table 1 summarizes the relevant results.

Soil samples taken at a depth of 18–24 in. from a healthy area in the Kericho district some sixty miles to the south of Nandi Hills had a water-soluble boron content of 0·13 p.p.m.

Table 1. Water-Soluble Boron (p.p.m. of Dry Soil)

| | 0–9 in. | 9–18 in. | 18–27 in. | 27–36 in. |
|---|---|---|---|---|
| Soil from affected area | 0·13 | 0·07 | 0·03 | 0·03 |
| Soil from healthy area | 0·20 | 0·17 | 0·14 | 0·06 |

Treatment by applications of borax to the affected area is being tried and an investigation into the boron contents of soil in other parts of East Africa is proceeding. A fuller report will be published elsewhere.

It may be noted that tea bushes showed no symptoms, which may be due to their lower boron requirement[2], or more probably to the effectual 'scavenging' operations of the extensive tea root system.

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## Effects of *Gibberella fujikuroi* on Fungal Root-infections of *Pinus*

In connexion with several communications in *Nature*[1–4] concerned with the effects of gibberellins on the nodulation of legumes, it would seem opportune to put on record the following experimental observations relating to the influence of *Gibberella fujikuroi* on certain other root associations.

The test plants were seedlings of *Pinus sylvestris* growing in pot-cultures with three different soils, namely, two podsols (*p*H 5) contrasting as regards their mycological contents, and a soil of the agricultural type (*p*H 6·8). *Gibberella* was inoculated into the soils at sowing, and re-inoculated twice at monthly intervals. Three months from sowing, the inoculated cultures started to exhibit a slight depression in development. The figures in Table 1 give the average heights of seedlings five months old.

Table 1

| | Podsol *A* (cm.) | Podsol *B* (cm.) | Agricultural soil (cm.) |
|---|---|---|---|
| Plants from control cultures | 6·0 | 5·2 | 4·9 |
| Plants from inoculated cultures | 5·7 | 4·4 | 4·4 |

The decrease in vigour and height of the treated seedlings was accompanied by a noticeable shift in the proportion of the various root-associations affecting the plants. In podsol *A* which, in the control cultures, showed about an equal amount of normal and subnormal mycorrhizas, the presence of *Gibberella* stimulated the formation of the subnormal type of association at the cost of normal mycorrhizas. Decrease in the incidence of true mycorrhizal infection and simultaneous spread of a parasitic association (formed by *Rhizoctonia sylvestris*) was observed for the seedlings in podsol *B* inoculated with *Gibberella*. The 'treated' cultures in the agricultural soil exhibited a marked increase in numbers of a harmful (haustorial) infection and considerable suppression of mycorrhizas.

In older seedlings, about 8 months old, the slight growth differences between controls and inoculated