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GROUP DYING OF SPRUCE IN EIRE

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IN July, 1953, I was privileged to visit Eire to see 'group dying' in Sitka spruce. In an earlier conversation, Mr. T. Clear of the National University, had described deaths of Sitka spruce in several Irish forests and as the symptoms appeared similar to those of a disease of spruce being investigated in Britain, I was very glad to have the opportunity to see the disease in Eire.

Group dying in Sitka was first reported in Britain in Dumfriesshire in 1936. Since then, between twenty to thirty reports have come in from places between Argyll and Somerset. It has also been reported on Norway spruce. It is characterised by death of the root system accompanied by thinning of the crown, reduction in height increments and usually heavy coning before death. The final needle fall occurs when the needles are green, in contrast to most other diseases which cause needle shedding when the needles are to some extent discoloured. Typically, on the affected roots there can be seen longitudinal cracks in the bark and dead areas in the cortex. These latter, though not apparent at first sight, are usually easily observed when the outer dead bark scales are scraped away. The trees die in groups and there is some evidence that these groups become static after enlarging for some years. The largest groups in Britain at present, do not exceed one quarter of an acre.

No fungus or insect has yet been shown to be responsible for the disease. The only explanation put forward, so far, is that of Day who ascribes the dying to unfavourable soil conditions which do not permit adequate rooting depth for the trees as they develop.

The first area where I was shown diseased Sitka was in Glendalough Compt.26, P.23, in County Wicklow about twenty five miles south of Dublin. The glen, running NW/SE, is formed partly of granite, partly mica schist. About 900 acres of conifers are planted here, 54% of them Sitka spruce, which is confined to the peat areas. The local forester had said that about eight groups of dying Sitka spruce existed in the forest, but we found only three. The first was on a medium to steep slope, on a black amorphous peat, about 9 inches thick, over sandy, slightly podsolized mica schist. Rainfall 60″ per annum, altitude about 1500 ft., aspect north-east. About forty dead trees were standing in the centre of the group without any survivors among them. Surrounding trees had

dead roots and typical root lesions were found on living roots. These symptoms are characteristic of ' group dying ' in Britain. The roots were largely confined to the peat and had made little attempt to penetrate the mineral soil. Drainage was free both in the peat and in the mineral soil, but the area was water receiving as it formed part of a large concavity on the hill. The rooting here was certainly shallow, but I could see no obvious reason why the trees should have died so suddenly from this cause. There was, as usual, the sight of long, once vigorous leaders on some of the dead trees. The depth of peat and rooting characteristics of healthy Sitka a little way off along the same contour did not appear to differ appreciably from those of the dying group.

The second group lay almost immediately below and was slightly larger. The site details were much the same as for the first, but the site was much wetter, being flatter. The third group lay farther down still, in the valley bottom. The ground here was waterlogged, with water lying on the surface. Heavy rain had fallen in the past week, but surplus water on this area must be the normal condition over a greater part of the year.

All three sites had the shallow rooting habit of the Sitka in common, but the dying groups were so well defined and local in extent that it is difficult to imagine this feature alone being responsible for the deaths. Also there were large areas of healthy spruce nearby with soil conditions and moisture relationships similar to those where trees were dying.

A visit was paid to Glenmalure, which adjoins Glendalough to the south west. Dying Sitka spruce had been noticed here in Compt. 8, P.29, of the Clohernagh property about 1949. This again was typical ' group dying ', and dead roots on the outer fringe of live trees showed that it was still active. The soil was about nine inches of raw peat over granite and, at the time we saw it, was water-sodden. I should think the site quality was inferior to those seen at Glendalough. The slope was steep, aspect north, altitude about 750 ft., rainfall about 60". The second group at Glenmalure occurred in the Ballyboy property, P.23. This was on an alluvial flat at about 500 ft. with a soil considerably deeper than the other examples seen. It was, however, watersodden at the time I saw it but to what degree this was its normal state or merely the result of the heavy recent rain, was rather uncertain. The growth of the Sitka was good. Mr. Clear, who knows the local conditions well, said that he considered this site of high quality for Sitka.

A visit was also paid to Dundrum Forest, Compt. 36, P.18, Co. Tipperary, where dying of Sitka spruce had also been reported. As the forest was approached a long strip of Sitka spruce about half a mile in length with a large percentage of dead individuals among them could be seen on the flat land bordering the forest which then sloped upwards. The extensive area over which trees were dying was rather alarming since one of the few reassuring things about ' group-dying ' so far observed, is its tendency to remain local in its effect. Inspection of the trees, however, failed to disclose the usual ' group dying ' symptoms. No extensive death of roots occurred, even on trees whose crowns were so thin that

in true ' group dying ' there would have been associated death of roots up to the stems. No dead patches could be found on living roots. The site was extremely ill drained. The soil, derived from the Upper Coal Measures, was a structureless clay with a gleyed horizon, providing very poor rooting material. It had at one time been drained but drainage had been neglected. The vegetation was typical of ill drained situations containing, *Ranunculus lingua, Aira caespitosa* and *Juncus*. The crop had been grossly underthinned as was evidenced by the slenderness of the stems compared to height growth and the number of trees on the ground. I was unable to examine the crowns but their general appearance was typical of *Neomyzaphis* attack. On this site also, some of the dead trees had long leaders and apparently undiminished growth up to the end, whilst others showed a reduction in height increment over the last few years.

This area of dying Sitka corresponds better to Day's explanation of restricted root depth than any other I have seen. It is the first I have seen without the typical root death and lesions, but I am not sure whether it is quite different from what I have described previously as ' group dying ' or just another phase of the same thing. In this area, also, wind-blown trees were found, the deeper going roots of which had obviously died before the blowing of the trees, but whose surface roots were quite healthy. This is exactly the condition Day has always described in his work and the details of the site are very similar to the conditions under which he says ' group-dying ' occurs. The inconsistencies of the observations on these six Irish areas are typical of observations on our British ones.

Since my return from Eire, Mr. Clear has written to me describing the occurrence of *Rhizina inflata* (Schäss) fructifications on spruce roots in a group dying area in Glenmalure. This accords with observations made this summer on several areas of group dying in Britain which are in the early stages of the disease. The fruit bodies were so numerous and conspicuous, and occurring in such close association with dead and dying roots, that it is highly probable that they have some influence on the disease. Perhaps the weather conditions of this year favoured the production of fructifications because they have never been noticed in such quantity before. The exact role played by the fungus will now have to be investigated by inoculation experiments as it is very important to know whether it is primary or secondary.

I should like to express my gratitude to the Eire Forest Service for making my visit possible and for the kindness shown to me by various members of the staff. I am also deeply indebted to Mr. Clear, who personally conducted me on all the visits to the forests and who spared no effort to make my tour as worthwhile and informative as possible.

Acknowledgement

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