A Further Note on Group Dying of Sitka Spruce and Rhizina Inflata

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THE authors first drew attention to the association of the fungus *Rhizina inflata* with group dying of Sitka spruce in a previous note to this Journal in 1953[1]. Since then, observations on this phenomenon have been continued, and as group dying in conifer plantations is of more frequent occurrence than has hitherto been believed, it seems desirable to furnish readers with more details of this trouble so that they may become conversant with its various features. It is also desirable that any occurrence of such group dying might be brought to the notice of the Forestry Division.

Group dying, as its name implies, is the death of the trees in groups. The number of dead and dying trees in a group may be only a few or several dozen, and affected trees may occur anywhere in the plantation. This trouble has usually be reported from established plantations of Sitka spruce 20 to 30 years old, although Murray[2] records its occurrence in a few younger and older plantations. Whilst Sitka spruce (*Picea sitchensis* Carr.) is the species generally affected by group dying, Norway spruce (*Picea abies* Karst.) has also been reported as liable to the disease in Great Britain, Murray.[2] In Ireland, up to the present time, besides Sitka spruce, group dying has only been seen in *Pinus contorta.* Death of this species has been observed by Mr. M. Swan and it occurred in a pine plantation 17 years old at Kilworth, Co. Cork. Here again, the association of the fungus *Rhizina inflata* with the disease was quite evident.

The sequence of aerial symptoms of group dying in Sitka spruce are as follows: The earliest symptom is the prolific formation of cones. This, perhaps, is most noticeable on trees on the edge of a diseased area, where only one or two trees are already dead and the trouble is in the process of spreading. This cone production generally occurs from 1 to 3 years before the death of the individual. Following an abundant, premature crop of cones, the crown of the tree becomes thinner and thinner in succeeding years. Many of the needles drop whilst still green, and finally, a complete shedding of the needles may occur suddenly in the middle of the growing season. Accompanying the sparseness of foliage, current season's growth is retarded, and there is a tendency for the ends of the top branches to develop several side shoots, leading to a slight witches' broom appearance. This effect is still obvious after the trees are dead, Fig. 1. The lenticels are very much enlarged on the trunk of the tree, Fig. 2, and resin exudes. This exudation most frequently occurs towards the base of the stem, but it may also occur as blobs of resin on the trunk up to a height of ten or

Fig. 1
Typical death of Sitka Spruce in early development of group dying.

twelve feet, and occasionally there may be a copious flow of resin down the trunk as in Fig. 2.

The aerial symptoms just described and the ultimate death of the tree are the result of a diseased root system. It is well known that cankers on fruit and forest trees or artificial girdling of their stems

tend to induce heavy fruiting. So also in group dying of Sitka spruce, the death of the cortex of the roots interrupts the downward flow of manufactured food material and this is diverted to cone production. However, the death of the roots is progressive, and the supply of water

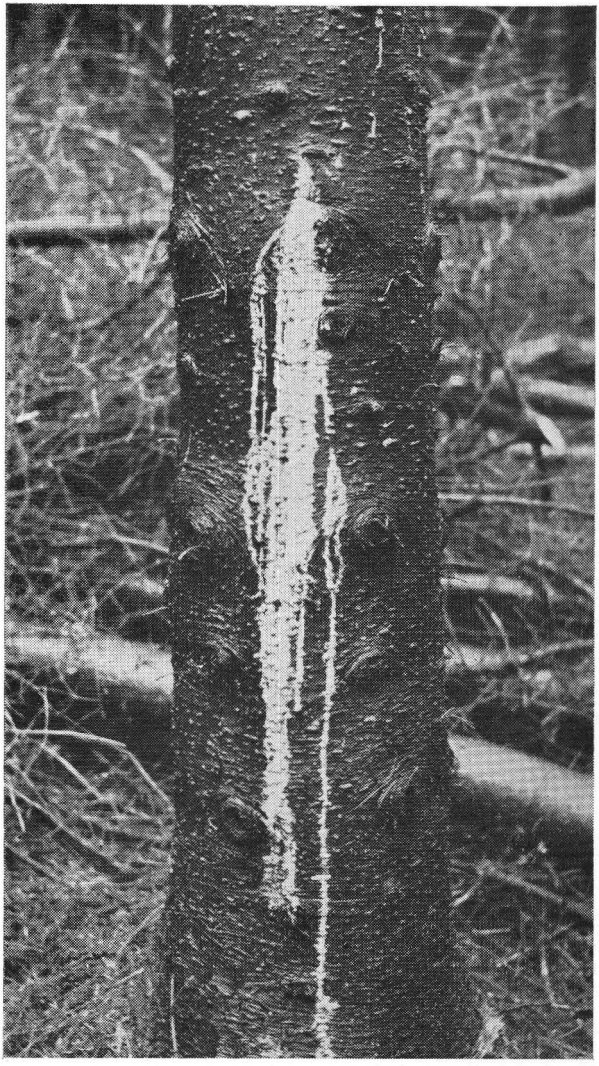

Fig. 2
Stem of dying Sitka Spruce showing enlarged lenticles and copious resin flow.

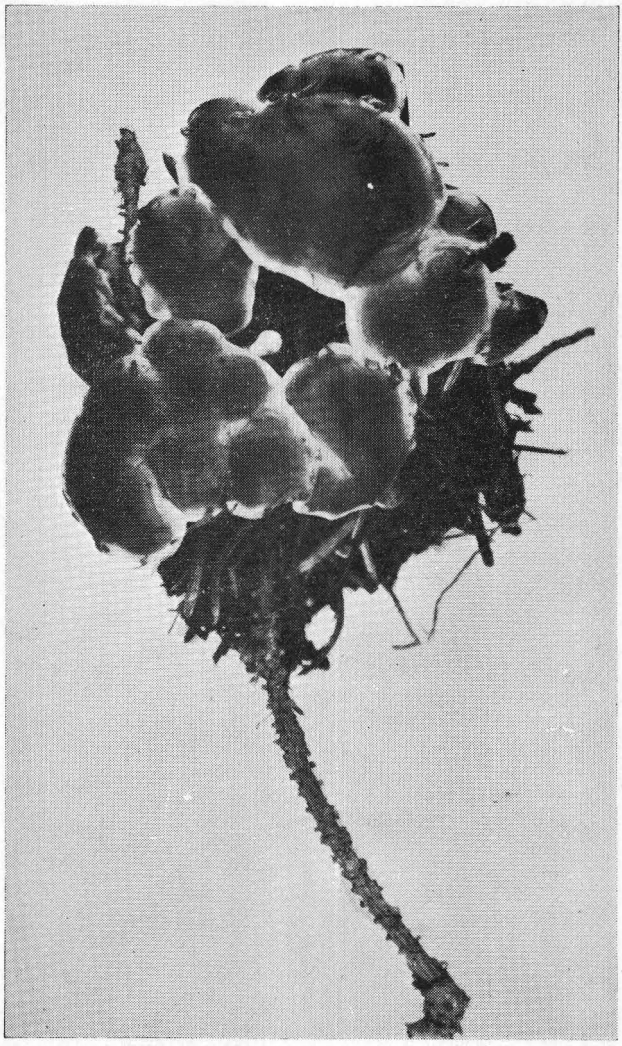

Fig 3
Typical colony of fructifications of *Rhizina Inflata* on needle debris over dead root in group dying area. (Natural size).

and nutrients to the top gradually diminishes and finally ceases altogether. The crown has no recourse but to fall back upon the remaining water in the stem, and when this is exhausted the needles drop and death of the tree ensues, Fig. 1.

The close association of the fungus *Rhizina inflata* with group dying of Sitka spruce has been noted in Great Britain[2] as well as in Ireland. The fungal fructifications are most abundant in the month

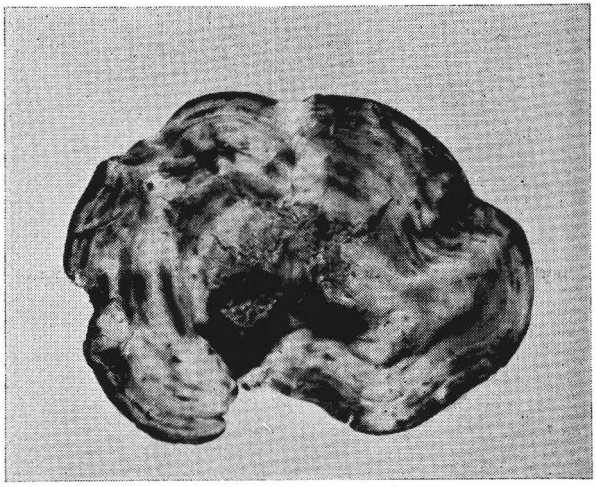

Fig. 4
Under side of single fructification of *Rhizina Inflata.*
(Natural Size).

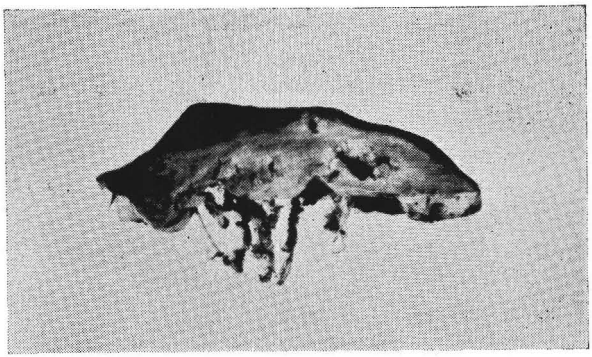

Fig. 5
Side view of fructification of *Rhizina Inflata* showing mycelial strands which are often in contact with dead corticel cells of the root.

of September, but apparently their development is largely dependent upon climatic conditions. As mentioned in our previous note[1] they were abundant in 1953; but in the wet cold year of 1954 a careful

search of the same areas in the woods at Glendalough revealed only a single poorly developed fructification. In 1955, after the very warm months of July and August, the fructifications were again very numerous in diseased areas in September. As well as occurring around the collar of dead trees, frequently the fructifications were found growing up in colonies along the length of diseased roots for a length of two feet or more. A description of these sporulating bodies has already appeared in this Journal[1] and it need not be repeated here. However, a typical colony of fructifications of *Rhizina inflata* is illustrated in Fig. 3, and the under side of a single unit is shown in Fig. 4; while Fig. 5 shows a side view of a fructification with the hyphal strands hanging down which are often found in contact with dead areas on the cortex of diseased roots.

References :

1. McKay, R., and T. Clear—Association of *Rhizina inflata* with Group Dying of Sitka Spruce. Irish Forestry, Vol. X, pp. 58-59, 1953.

2. Murray, J. S.—Two Diseases of Spruce under Investigation in Great Britain. Forestry, Vol. XXVII, pp. 54-62, 1954.