An Inhibitory Growth Correlation in the Apothecial Stipe of *Sclerotinia sclerotiorum*

Although growth correlations have been widely studied in the higher plants, there have been few observations of this phenomenon in the lower plants, and none at all in the fungi. The occurrence of such a correlation in the apothecial stipe of the fungus *Sclerotinia sclerotiorum* (Lib.) D.By., 1886, is described here.

The *S. sclerotiorum* used was isolated from a diseased bean pod of *Phaseolus vulgaris* from Spearwood, Western Australia, during September 1958.

Under certain conditions of moisture and temperature, one to several stipes, 0·5–0·8 mm. in diameter, may develop on the surface of sclerotia. No external supply of nutrients is necessary for this to occur. If the sclerotia and attached stipes are held in darkness, the stipes continue to grow in length without branching and may attain lengths up to 50 mm. under laboratory conditions. If their apices are exposed to light each develops a single apothecium.

As extensive studies were being made on factors affecting the formation of apothecial stipes by sclerotia, germinating sclerotia were readily available. The sclerotia formed by each culture had been air-dried at 25° C. for 3 weeks, sterilized in 1 : 1,000 mercuric chloride, washed in distilled water and placed in a Petri dish containing 1 per cent water agar. The dishes were then placed in a dark incubator at 15° C. to induce the formation of apothecial stipes. This usually occurred within six weeks.

Twenty of the dishes were selected at random. In each dish one sclerotium with an apothecial stipe more than 10 mm. in length was located. The apical regions of 1–2 mm. were removed with a razor from ten such stipes. The remaining ten stipes were left intact as controls. The dishes were then partially sealed with 'Sellotape' to prevent desiccation and replaced in the incubator. Observations were made weekly. The experiment was repeated using 20 apothecial stipes longer than 20 mm., from half of which the apical 10 mm. was removed.

Decapitated stipes ceased to grow in length. Lateral branches, morphologically similar to the parent stipe, developed in 1–2 weeks at lower levels on all except two such stipes (Table 1). The withering of the two stipes on which no branches formed probably resulted from damage to the point of attachment of the stipe to the sclerotium during decapitation. Sometimes only one branch developed, but frequently several branches formed. Occasionally, several formed at one point on the stipe. In one or two instances, the apices of the lateral branches rested in water on the surface of the agar. Such apices withered and branches formed on them at lower levels. No branches developed on the intact stipes. Under suitable light conditions all lateral branches, except the few which had withered, formed apparently normal apothecia at their apices (Fig. 1).

Table 1. Formation of Lateral Branches on Decapitated and Intact Apothecial Stipes

Treatment of stipes		No. of branches formed per stipe									
		1	2	3	4	5	6	7	8	9	10
Experiment 1 (stipes > 10 mm. long)	Decapitated (2 mm. removed)	1	3	1	2	4	3	2	2	4	2
	Intact	–	–	–	–	–	–	–	–	–	–
Experiment 2 (stipes > 20 mm. long)	Decapitated (10 mm. removed)	3	3	–	6	1	2	4	5	–	2
	Intact	–	–	–	–	–	–	–	–	–	–

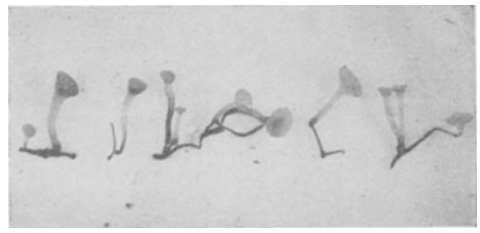

Fig. 1. Mature apothecia at the apices of lateral branches on decapitated apothecial stipes. The sclerotia have been removed. Natural size

The origin of the lateral branches of the apothecial stipes of *S. sclerotiorum* is uncertain. They may originate from microscopic areas of meristematic tissue normally prevented from developing by the presence of the stipe apex. However, no such areas were observed in the few longitudinal sections examined. It is doubtful, therefore, if the phenomenon can be likened to that of apical dominance which occurs in higher plants. It is more likely that they arose as a result of induced meristematic activity in mature cells following the removal of the stipe apex. In this event the phenomenon would be one of regeneration comparable, for example, with the development of adventitious shoots below the cut end of decapitated hypocotyls in certain higher plants[2,7]. Robertson[5] suggested that branching of the hyphal apex of *Fusarium oxysporum* following the arresting of the growth of the hyphal apex for more than 60 sec. might be explained similarly.

Auxins are thought to be involved in correlation phenomena in higher plants[1,6,7]. However, though auxins are known to be produced by many fungi, they have not been assigned a growth-regulating role in these organisms[3]. This may be because most experimental work has been concerned with the effect of auxins on growth of fungal mycelia rather than of fruit bodies. The inhibition of the development of lateral branches by the intact apex of the apothecial stipe of *S. sclerotiorum* may be determined to some extent by growth substances originating in the apex. Certainly the apothecial stipe of *S. sclerotiorum* appears to merit investigation as a source of growth-regulating substances in fungi.

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Germination of Resting Bodies in *Verticillium* Species

Although detailed investigations have been carried out on the morphology, physiology and pathology of *Verticillium* species, there are very few references to the function and germination of the