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PATHOGENS ASSOCIATED WITH PEAT MOSS USED FOR PROPAGATION[1]

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The use of peat moss as a constituent of media for growing and propagating plants is an old and well accepted practice. Although its properties may vary slightly, depending on its origin, peat moss generally has a high moisture-holding capacity, a low pH and contains a small amount of nitrogen (3). Its primary function as an additive to propagation media is to increase moisture-holding capacity.

Introduction of plant pathogens in peat moss has received little attention among plant propagators. Kim, *et al.* (4) isolated several pathogenic fungi from foreign and domestic sources of peat moss and stated that peat may serve as a vehicle for the entry of plant pathogens from foreign countries. Their observations also suggest that plant propagators might introduce pathogenic organisms into cutting beds, seed flats, etc. through the use of contaminated peat moss.

An example of such contamination occurred several years ago in Oregon when *Penicillium spp.* infected the basal portion of rhododendron cuttings and caused serious losses. Infected cuttings developed dark brown discoloration of the wood at the base of the cutting (Figure 1). Sporulation of the fungus on the decayed wood produced a powdery, bluish-green deposit.

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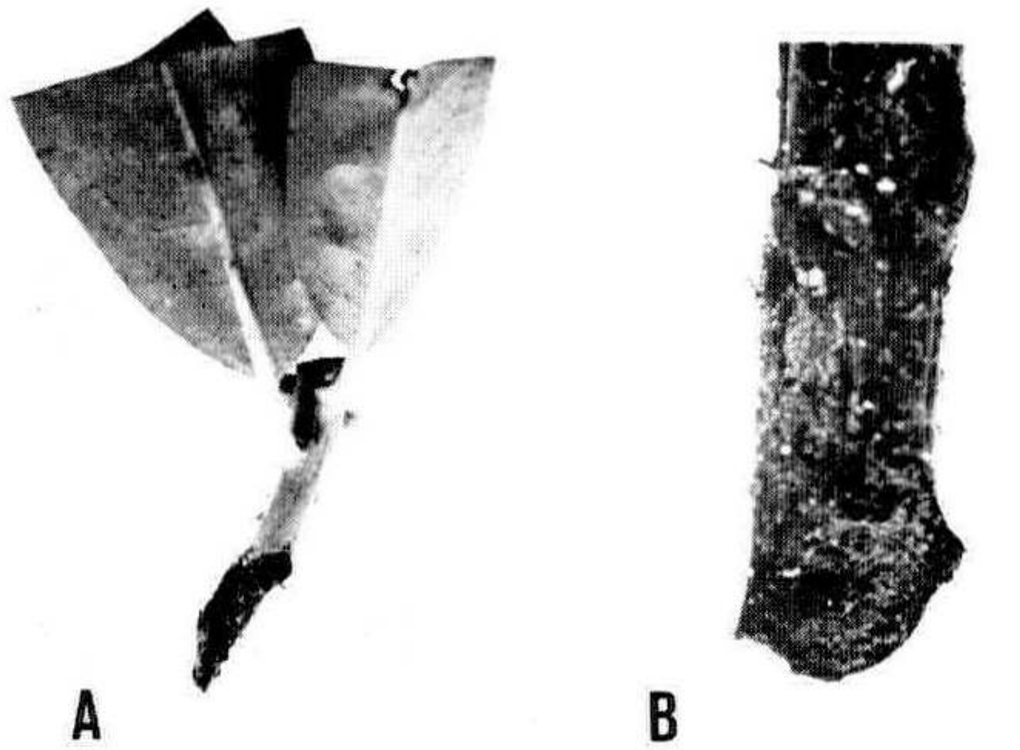

Figure 1. Basal decay of rhododendron cutting caused by *Penicillium sp.*
A = Entire cutting showing decay of basal portion.
B = Enlargement of decayed section.

In order to determine the source of infection, peat moss and perlite samples used in preparation of the propagation beds were collected and assayed for the presence of *Penicillium sp.* Contamination from the cuttings by epiphytic *Penicillium* spores appeared unlikely because the cuttings were immersed in a solution of 5% Clorox (5.25% sodium hypochlorite) for surface de-contamination before planting.

No *Penicillium sp.* or other fungus propagules were recovered from perlite samples. However, peat moss samples contained propagules of *Penicillium sp.*, many other fungi (both pathogens and non-pathogens) and bacteria (Table 1). The amount of contamination varied widely among the samples assayed., but *Penicillium sp.* were detected in every sample.

Table 1. Fungal and bacterial propagules isolated from several sources of peat moss[a)]

Sample No.	Colony Counts[b)]		
	Penicillium sp. (Thousands)	Other Fungi (Thousands)	Bacteria[c)] (Thousands)
1	100	19,900	5
2	3	3,197	83
3	10	9,990	100
4	41	3,959	1
5	12	15.998	Trace

a) Assayed by planting on potato dextrose agar.
b) Counts are the average of three replicates and represent numbers of colonies per gram of peat moss.
c) Counts include bacteria and yeast-like colonies.

Strict sanitation procedures are followed by most successful plant propagators; however, the most stringent sanitation procedures will not provide satisfactory results if contaminated peat is not treated to destroy plant pathogens. Heat or chemical treatment of peat mixtures is recommended in California when

such mixtures are to be used for plant propagation (6). Other sources suggest that steam sterilization of peat mixtures used for seeding bedding plants is not beneficial and may even cause undesirable results (2,5); however, no data were provided, nor were details of the sterilization process given. Total sterilization is not necessary for the control of most plant pathogenic fungi and bacteria (1). Pasteurization of the propagating medium with aerated steam at 60°C (140°F) provides satisfactory results and eliminates all but the most resistant fungi and bacteria.

Chemical fumigation is frequently employed to eliminate pathogens from propagation media, particularly in locations where steam is not available. Satisfactory results are often achieved when label directions are carefully followed. Special attention must be given to completely eliminate all chemical residue following treatment to prevent injury of sensitive crops.

While many plant propagators have overlooked the potential of peat moss as a carrier of disease organisms in the past, more attention should be given to this possibility. Peat moss is a valuable additive for mixtures used to propagate and grow a wide variety of plants and should not be discarded. Rather, elimination of the pathogens should become a routine part of the sanitation program.

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BIOLOGICAL CONTROL OF *PHYTOPHTHORA CINNAMOMI*

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Abstract. *Phytophthora cinnamomi* root rot of avocado is biologically controlled in Queensland, Australia by intensive cover cropping and applica-