

THE CONTROL OF FUNGAL DISEASES ON TURF

John Tomalin, BSc., Farm Protection

Agricultural and horticultural chemicals which find a use on sports and fine turf are few and far between, notable exceptions are the hormone weed killers and the fungicides based on organic mercury compounds.

The introduction of Benlate*, benomyl fungicide, for the control of fungal diseases on turf, represents a major advance in this small but highly specialised area.

Since 1970 J. R. Escritt and A. R. Woolhouse, at the Sports Turf Research Institute, have been evaluating Benlate on turf diseases. The results have been impressive and recommendations were made in 1973 for the use of Benlate against Fusarium Patch, Red Thread and Dollar Spot, the main diseases affect-

However, the use of fungicides is not the complete answer to disease control problems, whether from an economical or managerial view point, on any crop let alone sports turf.

Diseases require certain conditions for infection and successful development on plants. When these conditions are optimal the growth and spread of disease is rapid. Such conditions are best illustrated by taking the three major diseases of sports turf in the UK as examples.

Fusarium Patch, caused by the fungus *Fusarium Nivale*, is favoured by moist cool conditions in the spring and autumn, although it can develop under such conditions at almost any

time. It is further encouraged when the growth of grass is soft and lush, often associated with high rates or frequent use of nitrogen fertiliser.

Red Thread, caused by species of *Corticium*, develops best under dry conditions of mid summer particularly in areas of low soil fertility where the grass tends to be starved.

Dollar Spot, caused by *Sclerotinia Homocarpa*, is particularly common on turf of sea marsh origin, and red fescue grasses.

There are other factors which can affect the potential establishment of disease, which to some extent can be controlled by good management. These can be grouped as management factors, and include all the various operations normally carried out by groundsmen in the care and preparation of playing surfaces. Also, knowing the conditions under which disease best develops, good cultural practices can provide conditions much less suitable for disease development. It follows that any disease which may develop will be less of a problem as it will not be growing in optimum conditions and second, the use of another management aid, a fungicide, will be more effective since it will be acting against a less actively growing organism.

Other factors remain outside the control of man—these are the environmental factors. Climatic conditions are unpredictable and sudden fluctuations or persistent conditions will

have a considerable bearing on the incidence and development of disease, even under ideal management conditions. For example, Fusarium Patch can spread rapidly if ideal climate conditions persist, and at this stage a fungicide is at a disadvantage as it is not acting in optimum conditions. However, it is usually the only management factor that can be effectively employed, and only then as a curative treatment.

Until the recent introduction of systemic fungicides, the majority were essentially preventive in action, that is to be effective they should be applied before the disease becomes apparent.

When applied in situations which demand curative activity the disease is generally only checked, and certainly only rarely controlled outright. Curative treatments cannot prevent damage, or the killing of grass in the case of Fusarium Patch.

The major advantage of the systemic fungicides such as Benlate is that they possess curative activity since they are capable of penetrating plant tissues and attacking the disease from inside the foliage as well as by contact action on the leaf surface. Therefore when applied under conditions where disease is present and climatic conditions favour the spread of disease, control is obtained. The damage caused to turf grasses by disease under these conditions can therefore be minimised.

The Sports Turf Research Institute results in its trials with Benlate as a preventive and curative treatment have been impressive. Against

Fusarium Patch a rate of 6 oz of Benlate per 1000 sq. ft. (approximately 18 lb/acre) is necessary for control, while for Red Thread and Dollar Spot a lower rate of 4 oz Benlate per 1000 sq. ft. (12 lb/acre) is adequate. The Benlate should be applied in two gallons of water over 1000 sq. ft. (7 gal/acre). This moderately high volume is necessary to ensure adequate coverage and penetration of the spray solution into the sward. Only in this way can Benlate come into intimate contact with the disease in order to ensure good control. Skimping with the volume of water can lead to poor or partial control.

There is a tendency when applying sprays as curative treatments to make spot applications over the infected area. This is a dangerous practice since the very fact the disease is present shows that conditions have favoured infection and it could break out at any time on an adjacent area of the same sward. Fusarium Patch is a good example in this case. It is therefore important when treating diseased turf that the entire area is sprayed, rather than spot applications.

One area of misjudgement, and most important, is the correct timing of applications. As indicated previously, the incidence of disease is difficult to predict under UK conditions, and therefore most applications will tend to be curative in nature. It is therefore essential to apply any fungicide as soon as disease appears; the longer application is delayed the more difficult disease becomes to control. A close watch should be kept during

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periods when conditions are such that disease is likely to occur. Normally one well timed application of Benlate will give control, but, if conditions which favour disease persist then repeat applications at 3-4 week intervals may be necessary.

There are some areas of turf which have a history of disease where it reappears each year. This is true of Fusarium Patch, for example, golf greens which are situated in hollows or overhung by trees, are particularly susceptible, and also bowling green turf of sea marsh origin which tends to be attacked by Dollar Spot. In this type of situation it is well worth applying Benlate as a preventive treatment during high risk periods.

As far as application equipment is concerned, any sprayer will suffice, although conventional boom sprayers are preferred as they give a more even coverage. Hand operated knapsack sprayers are liable to leave areas unsprayed and over or under dosed if used carelessly.

Apart from the high activity of Benlate on turf diseases, there are other factors which make it an attractive material. It is a very safe fungicide in all aspects and is widely used. Since 1970 it has been extensively used in agriculture and horticulture on a wide range of crops, achieving new standards of disease control on many crops, including, we believe, turf. In an age when there is growing concern about our environment and a trend towards conservation, Benlate has proved extremely safe to both the operator and wild life. It is also exceptionally safe on plant life and there is no problem of a check to growth or discolouration of the grass.

To conclude, it can be seen that Benlate offers improved disease control on turf but such a material can only be considered in terms of one more weapon in the armoury of management skills. It is critical, whether preventive or curative control

measures are proposed, that accurate identification of the disease, or the potential for disease outbreak, is made. This should be used in conjunction with the correct rate and timing of chemical application, co-ordinated with correct management to ensure normal plant growth.

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