WET UNDERFOOT

By

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LAST month methods of draining land by pipes or channels to lead excessive water away were dealt with. These are direct ways of removing excess water and lowering the water table, but often conditions in the sub and top soil above the level of the actual drains impede water penetration and lead to wet surface conditions. Treatments to correct such faults are now discussed, but little or no benefit will be derived from any of them if inadequate means of sub-soil drainage exist.

Sub-Soil Cultivation

This operation is *not* the same as mole draining. At a glance the same machine is used, i.e. a mole plough, but there is a vital difference in the attachment on the vertical share In the case of sub-soil cultivation a sub-soil shoe is fitted and this has a lifting and shattering effect on the sub-soil. In view of this, sub-soil cultivation is an essential operation on land where level adjustment using heavy equipment has resulted in the breakdown of the land's natural drainage crevices and excessive compaction in the sub-soil region or where a "pan" exists for any reason at all. These conditions seriously hinder water penetration to any sub-soil drains and frequently lead to waterlogging of the top soil.

Sub-soil cultivation to be most effective should be done when the sub-soil is as dry as possible. However, as it is usually required during constructional work its timing is governed by the amount of subsequent work in relation to the proposed period of establishment, e.g. seeding. The work can be done even on relatively small areas, e.g. golf greens, and it is carried out following the return of top soil to the graded area and before any tile drains are introduced. Heavy equipment should not be used after its completion. Where a complete drainage layer of aggregate tapped by underlying drains is to be introduced into a golf green sub-soil cultivation is unnecessary.

To gain maximum benefit from sub-soil cultivation the operation must be carried out at quite close centres and a spacing of 2 ft. should be regarded as the maximum, the sub-soil shoe being set to work at a minimum depth of 18 in. The operation should be done in the direction of the maximum fall on the land, though where really excessive compaction exists two passes would be worth while. In this case the first pass should be done at right angles to the maximum fall.

Sub-soil cultivation can be carried out on established turf where drainage is impeded by excessive sub-soil compaction, but before it is decided upon expert guidance should be obtained. The operation can sometimes be carried out in such a way as to cause little damage to existing turf but there is a risk of severe damage necessitating reseeding.

Spiking

Turf surfaces which are slow to drain because of such causes as excessive surface compaction, or the presence of fibre, benefit from spiking. The formation of numerous slits in the ground assists surface moisture penetration but the work must be done frequently and the underlying soil must be open and its drainage adequate if benefit is to be derived. Further to this on excessively fibrous or mossy areas other treatments, e.g. corrective liming or fertilizer treatment, might be necessary to help correct the conditions favouring the fibre or moss build up.

Usually spiking on large areas is done by tractor operated machines. As depth of penetration is important, the use of long tines is to be preferred. The

lighter machines with tines penetrating to 4 in. are very useful as they can be frequently used with the minimum surface disturbance but in many situations the use of heavy models should be seriously considered. These machines have tines capable of penetrating to 9 in. but under some conditions their action is quite severe and disturbance of the surface might restrict their use.

On smaller and finer turf areas quite good machines are available for use but often hand work is necessary to obtain maximum penetration. Purpose-made hand forks can be used or flat tined garden forks and these should be inserted to their full depth at intervals of some 4 in. Before withdrawing the forks the ground can be eased up a little with advantage but great care is necessary if this is done so as to avoid leaving a corrugated surface.

Sanding

During constructional work the incorporation into the top soil of suitable sand or other gritty material is recommended to open up heavy land and make it more permeable.

On existing turf a different approach is required for greens, tees and fairways.

On a green the application of a pure dressing of sand is seldom a good thing in that it tends to form a definite layer which ultimately forms a root break. It is better to build up a layer of approximately ideal soil by regular top dressing with sandy compost. Only in particularly wet conditions is a light dressing of pure sand really justified.

On the tees the position is much the same but conditions where sand alone can be used with advantage arise more frequently. On heavy land with open turf and a muddy surface, dressings of sand improve playing conditions substantially and the sand gets worked into the top soil by treading or during renovation work.

On fairways good, gritty sand or coarse coke breeze can be used with

advantage much more often than they are. Sand at 10 tons per acre is soon absorbed on a muddy fairway but it is best to allow this amount to be "lost" before applying a further dressing. As an alternative to applying sand in winter to improve already muddy conditions it is worth organising applications of sand and similar materials after thorough spiking and following spring chain harrowing. At this time less damage is likely from the transport and spreading of the material.

Sulphur Treatment

The use of sulphur on golf courses will be strange to many people but the material can have very beneficial results on golf fairways if applied under the right conditions. Heavy and moisture retentive clay soils provide wet, sticky conditions for winter play. Where this is a problem, and providing the soil is of good fertility thus promoting rapid grass growth with a tendency towards lushness, a light application of finely ground sulphur will help matters. The effect of the sulphur is to produce much improved surface drainage and firmer winter conditions. In addition there is usually an increase in the fineness of the turf plus reduced weed and worm activity. This all sounds very fine but it should not encourage clubs to experiment with the treatment without soil tests and expert guidance. Whilst much good work can be done by the discriminate use of sulphur it is very easy to make a mistake which could be costly to correct. A given set of conditions are required before sulphur can be used and casual observation will not show whether these exist or not.

Think Things Out

If maximum use is to be made of golf courses and the best possible conditions for play are to be provided satisfactory drainage is essential. Where drainage problems exist careful thought must be given to their cause since wet and sticky surface conditions do not *necessarily* indicate the need for tile drains. Any club contemplating improving drainage would be well advised to obtain expert guidance so that the money they spend results in maximum benefit. It is true that the inherent characteristics of some land will always result in wetter conditions than would be desirable but it is often surprising just what can be done with relatively little financial outlay in relation to the results obtained.