Seaweed for soil and turf

by W. A. Stephenson*

ALTHOUGH grass has always been a feature of our countryside, it is only since 1930 that any real experimental work has been done, either in this country or in others on sports turf. So much research on close cut grass indicates a world-wide desire for information, yet nobody has arrived at a perfect formula. This can hardly be expected when one considers the varying factors of soil and climate. To a very great extent good grass depends on a good groundsman. Modern aids in the way of machinery, fertilisers, etc., are very important, but are not in themselves, sufficient. The groundsman must maintain a good soil structure if he hopes to produce hard wearing turf.

Headache

The making of a good pitch, cricket table or green requires much thought and work, each particular surface needing a technique specifically for its use and the local conditions. Having produced a good playing turf there follows, as always, the task of maintaining it, and this can provide the biggest headache. A sports pitch, whether for football, hockey, cricket or bowling, gets a severe pounding during the season and the heavy machinery, such as rollers, combine to compact the surface. Compaction is such that all too often we find that an almost impenetrable surface has been formed on the top layer of soil. This surface resists top water, especially heavy rain and indicates that the crumb structure of the surface soil is not right. A well-known turf consultant has said that most important of all is a layer of top soil with a good crumb structure—even if it is only ½ in. deep.

As early as 1947, J. H. Quastel and D. M. Webley showed that alginic acid, which forms 25 per cent. of seaweed, was an excellent soil conditioner. It not only improved the crumb structure, but also increased the water holding power of the soils, and that these provided better aeration of waterlogged soils. The alginates in the seaweed act as stabilising colloids, that is, water holding agents. Sodium alginate is more soluble in water and gives the fastest action, calcium alginate has a similar effect but needs longer to break down. When sodium alginate is added to soil that contains the slightest trace of lime, it immediately changes into either calcium or magnesium salts, and forms a dispersed colloidal solution. The alginates gradually disperse through the soil, and if the alginate decomposing micro-organisms are present, are rapidly broken down to simpler units, which are then used by the organisms in the soil.

Alginates can be detected for many months if these organisms are not present, but they will eventually appear, and the breaking-down process will begin. It is for this reason that seaweed fertilisers sometimes have little or no effect soon after their addition to the soil, but after a few months they quite suddenly show a marked effect. Whole seaweed meal not only supplies the mixed salts of alginic acid, but also other organic matter, which stimulates the soil micro-flora with the long term formation of humus.

Bacteria

Scientists seem to agree that soil organisms must have organic materials; "if one feeds the soil micro-organisms, they will feed the plant". Not only does seaweed, both dried and liquid, increase the rate of the nitrogen fixing bacteria, but a research student at Edinburgh also found that out of 217 bacteria found in rotting seaweed, 161 produced nitrogen salts.

Seaweed is also rich in non-toxic trace elements. Trace elements, particularly the metals, have now been found to be essential to the enzyme system of both plants and animals. Moreover, much lime in the soil can be responsible for locking the minerals already present—particularly iron, zinc and manganese.

On the other hand, seaweed is probably the richest source of these minerals, in non-toxic quantities. Not only does seaweed provide these minerals for the plant, but it also unlocks those already present, and holds them in solution for use by the plant. It has been shown that the amount of manganese in the leaves of tomato plants that have been treated with seaweed is far greater than the amount of manganese in the seaweed applied. This is possible as the seaweed is an excellent cultural material for the soil bacteria and fungi, and triggers off a reaction to lower the pH of the soil and causes the soil to release its own trace elements. Simple sugars are present in seaweed—such as mannitol which is known to chelate metals and this possibly contributes to the overall effect.

Hot and Cold

Liquid seaweed is probably the most convenient way of applying seaweed to grass. There are many ways of making an extract—hot and cold water methods are easy and cheap, but these only extract part of the nutrients. An almost complete extract can be made by hydrolisis under pressure. This method makes use of all the nutrients and growth promoting hormones. Maxicrop is an example of this method and is compatible with any other solution so that it can be applied at the same time as a weed killer.

Dr. Bentley of Aberdeen has shown that when seaweeds are treated by this method of hydrolisis they yield growth promoting hormones that are effective at 1 : 100,000. One of these compounds, not yet identified chemically, stimulates and maintains the growth both of root and stem. This hormone is of great importance both in producing and maintaining a good hard-wearing turf—for only if there is a strong and vigorous root system can the grass make a quick recovery after heavy use.

It is well known that when there is plenty of humus in the soil the bacteria and fungi produce natural antibiotics, these enter the plant and make it disease resistant.

Cold Cure

Experimental workers in New Jersey found that seaweed also produces antibiotic substances when they tried to grow influenza and mump virus on agar jelly made from seaweed. Their experiments failed because the antibiotics in the jelly inhibited the growth of the virus. Growth promoting hormones themselves have also been found to give increased resistance to disease. All these factors in seaweed combine in producing sturdy, healthy plant growth, well able to resist both disease and pests.

Experiments at the Sports Turf Research Institute suggest that the use of seaweed might increase the drought resistance of golf greens, and it is now being used at Muirfield Golf Course, Edinburgh.

Many other famous swards have been dressed with seaweed—from the Tottenham Hotspurs ground to the British Embassy lawns in Washington, D.C.

* Maxicrop Ltd.

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