

Fertilisers

There are divided opinions about fertiliser usage on the golf course: those who see fertiliser as 'death' to the traditional golf course grasses and those who believe that a little 'sugar' promotes a stronger more active plant. The fertiliser manufacturers report that golf courses are using more of their products – and this also applies to 'turf conditioners' or 'growth stimulants'. Both of these latter can be defined loosely as those products which provide a range of nutrients and other essential elements and compounds, but not necessarily with a sufficient or specific level of the major nutrients of 'N P & K' (nitrogen, phosphate and potassium). Both have greenkeepers who swear by them, together with research and/or trials which shows how effective they are, but as yet they tend to remain in the realms of 'muck and mystery'. That stated, Greenkeeper International is informed that research is being undertaken to analyse the constituents of seaweed which promote root growth and tillering.

Neither fertiliser nor turf conditioner should be seen as cure-alls and it is vital to cure underlying problems such as compaction and drainage, if for no other reason than the plant cannot utilise your expensive fertiliser efficiently unless it is growing healthily. A strong healthy plant also provides maximum resistance to disease and weed infestation.

Proof of expanding demand in the market is also provided by the growing number of products being produced specifically for golf greens and similar fine turf. Agriculture has

HUGH TILLEY weighs up what some greenkeepers believe is death to golf course grasses, while others reckon it's a little sugar... on Page 38, we present the range of spring and summer fertilisers available and how best to use them

seen fertiliser develop to inorganics of greater concentration, purity and consistency, and to a certain extent away from this as farmers seek cheaper materials, but the needs of amenity turf are significantly different and the goal is not maximum growth but 'wearability', health and (perhaps) grass appearance. In this market; price is not all important, (at least not to all) nor are concentration or purity. 'Organic' has become a preferred word, preferred by humans but not necessarily by a plant. However there are sound agronomic reasons for using some elements as organic compounds such as buffering and stabilising them from premature absorption or degradation.

Fertiliser is available in several forms, liquid or solid, and in many formulations from fully soluble, for foliar feeds, through suspensions (solids in water, which are seldom used on the golf course) to granulars. Foliar feeds can be applied

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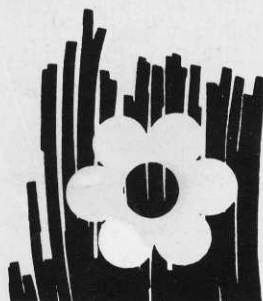
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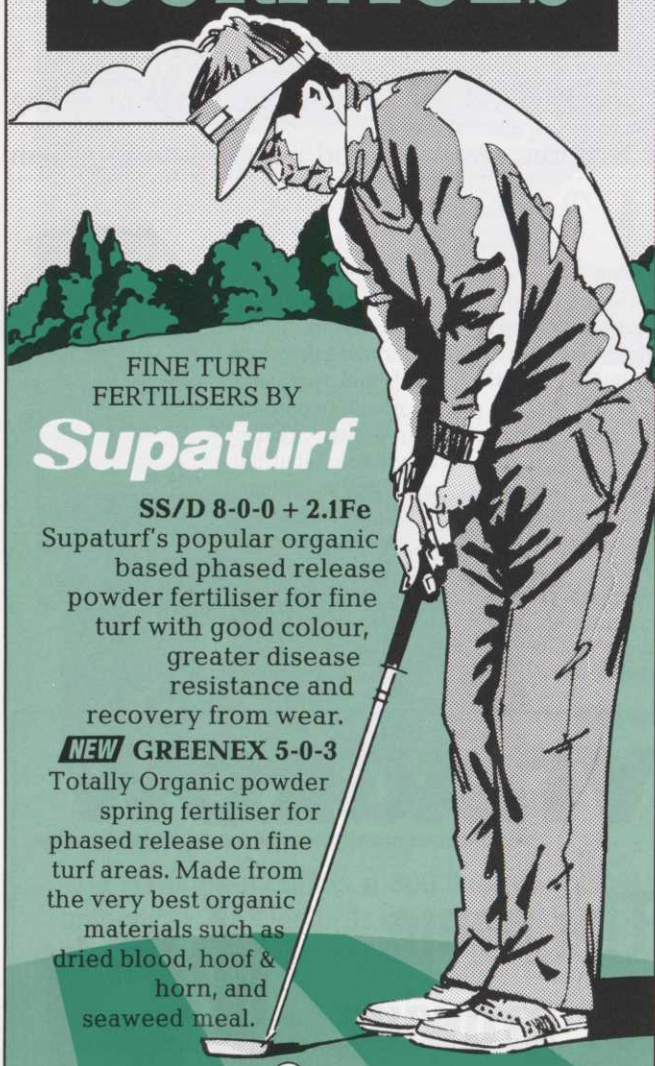
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→ (at suitable dilution) by watering can, sprayer or even irrigation. Solid fertiliser is mostly formulated as mini-granules for better spreading and quicker easier assimilation into the soil – and away from the mower, but some are in powder form.

While it is easy and convenient to refer to specific elements by name or chemical symbol as if they were 'pure' or single atoms, in fact they only exist (in stability) as compounds chemically bonded to other elements. How they are bonded and with which other elements obviously has a great bearing on how available they are to the plant. The differences are often used as a sales pitch; this being particularly true over nitrogen, and is very easy to become confused by conflicting claims. The average greenkeeper needs to develop some skepticism over competing claims and seek the reasoning behind the formulations.

For the greenkeeper a most important feature in fertilisers is safe application, and this means safeguarding against 'scorching' the leaf and also avoiding mower contamination. Nitrogen is the main culprit in scorch, particularly when it exists in purer or stronger nitrate or ammonia compounds. Most high nitrogen products include several different forms of nitrogen, and this also extends the period of their release to the grass. However, nitrogen is the most effective element in 'greening up' the grass; and it is the major nutrient depleted when clipping are removed from the green. In excess the result is a more lax, lush, easily bruised plant of lower resistance to wear and disease.

Nitrate nitrogen is ideal for quick assimilation, while ammonia nitrogen reaches peak availability later in spring as nitrification bacteria in the soil become more active. Release of nitrogen can be modified and retarded by incorporating the nitrogen with or in various compounds; such as 'Didin,' the proprietary name for dicyandiamide, IBDU (Isobutylidene Diurea) and others, or 'Osmocote', a semi permeable organic resin coating. Didin is found in medium and high N fertilisers from ICI, Farmura and others, working by inhibiting the nitrification bacteria. IBDU is used by Fisons, Mascot,

Schweizer and others, while Osmacote is available from Sierra in a range specifically for turf. The release life of the differing methods varies depending upon the mechanism of release, whither soil temperature, moisture or bacterial, thus 'life' is not predictable at spreading.

The advantages of phasing release allows fewer and earlier applications to be made, and it levels out the availability of the nutrient. Sierra suggest that a single annual application is possible, whereas Didin and IBDU, only claim up to about three months, thus increasing the number of applications. It is also easy enough to 'top-up' with foliar feeds as and when weather and grass growth dictate. The other major nutrients of phosphate and potassium are significantly different as they are longer lasting and more stable in most soils, nor do they have the same dramatic visual effect, nonetheless they are essential. Potassium ('K' or potash,) is essential to disease resistance and plant hardness, and is removed with mowing. Thus annual (autumn) application is usually needed, though some may be provided by certain sands used in topdressing. Unfortu-

'For the greenkeeper a most important feature in fertilisers is safe application, and this means safeguarding against 'scorching' the leaf and also avoiding mower contamination. Nitrogen is the main culprit in scorch'

nately an excess of potash free in the soil can inhibit other trace elements and nutrients.

Phosphate is most significant for root development. It too can be applied annually, though many soils – particularly clays – contain sufficient. The trend towards forming greens on sand has had a very significant effect on nutrition as most sands are poor at retaining potassium and magnesium. There is an indication from STRI and one manufacturer that there is significant advantage (on acidic sands) in providing calcium and boron too. Agriland have recently added a NPK foliar feed which includes enhanced levels of these elements.

Of other metallic elements; magnesium is vital to photosynthesis, with the obvious symptoms of deficiency being loss of leaf colour and lack of response to nitrogen. Iron is another 'visual' element which is essential for chlorophyll with application promoting a desirable dark green 'green' colour. In contrast to magnesium, iron deficiency is more likely to occur in high alkalinity soils such as chalk downlands. Iron has the other beneficial effect of suppressing moss, though how effectively will depend upon the level of inclusion. This element and other metals, particularly copper, also work as fungicides; for instance against fusarium. There are many ways in which important elements and nutrients can become 'locked-up' in the soil: excesses of one element is one common cause, cold and wet conditions are another. Wet anaerobic (oxygen-less) conditions will inhibit iron absorption (and many other plant processes).

Manganese, zinc, copper and iodine are all important at



trace levels, and these and many other compounds, vitamins and amino acids are found in seaweed. Thus the inclusion of seaweed meal or extraction in fertilisers and foliar feeds is a useful addition – and although this may be a shotgun approach it is effective, failing having a complete and detailed analysis of the soil. The word 'chelate' – pronounced key-late – is often used in conjunction with trace elements and is simply an organic compound form of the element which is readily absorbed by the plant and not locked into the soil.

➔ 40



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Supplier	Product	Type	%N	%P	%K	Other elements	Comments
Agriland Ltd. Blue Roof Farm, Throop Road, Throop, Bournemouth, Dorset, BH8 0DW. Tel: 0202 532291 Fax: 0202 535224	Classic 20-0-0	LF	20	0	0		Fast acting ureic N
	Classic 15-0-10	LF	15	0	0		Ideal for intensive use areas
	Classic 10-2.5-7.5	LF	10	2.5	7.5	4.2% Ca O, 0.1%B	Ideal for sand constructions
	Agrimaster	LF	1.2	4.4	6	0.6 Mg, Ca, Na, Fe+	Seaweed base growth stimulant
	Agricrop	LF	5	.36	.47	as above	as above plus added N & sulphur.
BASF plc Lady Lane, Hadleigh, Ipswich, Suffolk IP7 5BQ Tel: 0473 822581 Fax: 0473 827460	Floranid N	G	31	0	0		Based on Isodur slow release N
	Floranid NK	G	14	0	19	2%Mg	The highest NK on market
	Floranid NPK	G	15	9	15	2%Mg	Ideal for sand or high pH
	Floranid Turf	G	20	5	8	2%Mg	Standard spring/summer use
Fairfield Turf Ltd., Fairfield Court, Brookland, Romney Marsh, Kent TN29 9RX. Tel: 06794 731	Scotts Lawnbuilder	mG	22	3	3		Vermiculite based
	Scotts	mG	17	23	6	1.6Fe	Supplied for unit area application
	Scotts	mG	16	0	0	5Fe	Metalyene Urea + iron, moss suppress
Farmura Environmental Products Snow Hill, Egerton, Ashford, Kent TN27 9DU Tel: 0233 76241 Fax: 0233 76419	Flo-Gro Blue	LF	12	0	4		Incorporates Didin
	Flo-Gro Brown	LF	12	0	4	0.5Fe & Mg	Incorporates Didin
	Flo-Glo Green	LF	9	3	9		Organic base
	Flo-Glo Yellow	LF	18	0	0		
	Flo-Glo Purple	LF	10	0	10		Wetters & iron also available
	Liquid foliar feed range based on "bovine extract" with added nutrient.						
Fisons Horticulture, Paper Mill Lane, Bramford, Ipswich, Suffolk IP8 4BZ Tel: 0473 830492 Fax: 0473 830386	Turf Tonic	MG	7	0	0	2%Fe, 1%Mg	
	Zero Phosphate	MG	14	0	7		
	Mosskiller	MG	14	0	0	8.9%Fe	
	Super N	MG	24	0	0	2%Fe	Incorporates IBDU
	Spring & Summer	MG	14	2	4		
	Extra	MG	14	2	4		with MCPA & Mecoprop herbicid
	Organic 2	MG	11	0	0		
	Also range of Organic and traditional fertilisers in mini pelleted form for outfields and fairways.						
ICI Agrochemicals, Professional Products, Fernihurst, Haslemere, Surrey, GU27 3LE Tel: 0428 645454 Fax: 0428 657222	Longlife						
	Spring & Summer	mG	14	3	7	2%Mg+s/weed extract included	Didin, fully compounded
	Finegreen	mG	15	0	5	2%Mg as above	
	Nitrogen with Iron	mG	8	0	0	2.5%Fe	N as sulphate of ammonia & urea
	Also range for "sportsfield" formulations for fairways including 11.6.9, 25.0.0, 14,3,7 analyses.						
Maxicrop International Ltd., Weldon Road, Corby, Northants NN17 1US Tel: 0536 402182 Fax: 0536 204254	Maxicrop						
	No. 1 Triple S'weed	LF	3	0.6	2.4	Fe,Cu,Mn,Zn,B,Mo+	In seaweed extract base
	No. 4 Super Grass	LF	12.5	6.9	4.1	Comprehensive	In seaweed extract base
	No. 5 plus Nitrogen	LF	17	0	0.7	range of traces	In seaweed extract base
	No. 6 Seagreen	LF	2	0	0	6%Fe +above	In seaweed extract base
	No. 2 Mosskiller	LF	2	0	0	16.4%FeSO ₄	
Rigby Taylor Ltd., Rigby Taylor House, Garside Street, Bolton BL1 4AE Tel: 0204 394888 Fax: 0204 385276 (Scottish agents: Souters of Stirling)	Mascot						
	Microfine 18-0-0	mG	18	0	0	6%Fe	80%N as IBDU
	Microfine 14-4-7	mG	14	4	7	2%Mg	50%IBDU
	Microfine 12-0-6	mG	12	0	6	2%Fe, 2%Mg	50%IBDU
	Microfine 8-0-0	mG	8	0	0	4%Fe, 2%Mg	
	Organic S/S2	mG	14	2	7	1%Mg	
	Special Organic N	P	8	0.5	0.5		Organic slow release nitrogen
	Mini-Gran	mG	11	5	5		Less expensive than mascot range
	Supreme S/S	P	10	5	5	1.5%Fe	Blend of organic/inorganics
	Taylor's Fairway		12	6	6		
	Taylor's High N	G	27.5	0	0		
Taylor Lawn Sand	P	5.4	0	0	1.5%Fe	Sulphate of ammonia	
Sierra UK Ltd., Loughborough Road, West Bridgford, Nottingham Tel: 0602 455100 Fax: 0602 455311	Sierrablen Turfmix	mG	28	5	7	Fe	6-7 month release life
	Sierrablen Mimi	mG	25	2	10		6-7 month controlled release
	Osmocote N	G	39	0	0		6-7 month controlled release
Sta-brite Supplies Ltd., Unit 7 Bessemer Park, Bessemer Road, Basingstoke, Hants RG21 3NB Tel: 0256 811811 Fax: 0256 811078	Sta-Green 110	P	10	5.5	2.5	1.5%Fe	Course Powder, 34% organic
	Sta-Green 195	MG	10	5	5		56% organic
	Sta-Green 270	MG	12	0	9	1%Mg, 1%Fe	also contains seaweed
	Sta-Green 260	P	5.25	0	6.25	4%Fe	
	Sta-Green 130	G	9	7	7		Fairway granular
	Sta-Green 140	G	7	7	7		
	Sta-Green 185	Pellet	11	5.5	5.5		organic based
	Schweizer Golf	mG	20	5	8	1.6%Mg	part IBDU and UF
	Sport-Green Golf	mG	18	6	12	1.6%Mg	
	Certoplant Golf	mG	9.5	7	10	3.2MgO & traces	including slow release
	Also fine granular "fairway" products as previous three analyses.						
Vitax Ltd., Owen Street, Coalville, Leicester LE6 2DE Tel: (0530) 510060 Fax: (0530) 510299	Fine "N" extra	P	8	0	0	2.5%Fe	Plus trace elements.
	Key "N"	P	20	0	0	1.6%Mg	60%IBDU
	Fine "X"	P	8	0	6	0.5%Mg, 1.0%Fe	
	Lawn Sand	P	4.6	0	0	1.8%Fe	
	Weed 'N' Feed	P	8	4	4.2	0.3%Mg, 3%Fe.	
	Micro gran 1	mG	12	4	6		
	Micro gran 3	mG	12	0	9	0.5%Mg, 1.0%Fe	
	Micro gran 4	mG	12	3	9	0.5%Mg, 1.0%Fe	
Also 12-6-6 and 12-0-9 "outfield" compounds.							

Key: G = Granular; m = micro; M = min; P = Powder; LF = Liquid Foliar.

Fertilisers

'It is often easy (even desirable) to carry out your own mini-trials'

37 ➔ Soil analysis can be a useful guide to soil nutrient status but there are some reservations about just how useful. It must be realised that the analysis only refers to that particular sample, ie – if you take several cores and mix them you get averaged results – this may not tell you maximum and minimum levels at any one spot, which may be more useful. On the other hand taking a multitude of cores across the whole course is usually expensive and impractical except for quick and cheap tests (such as for pH), thus a more useful practice may be to take one or two cores from areas of satisfactory growth and the same from 'problem' or less satisfactory areas, which will allow for better comparison.

The time and method of sampling can also cause distortion of results: a hand auger can take a disproportionate volume of soil from one level without providing a true profile of the soil and may not include *all* the soil available to the root system. In addition, recent fertiliser applications can cause distortion. Most analyses of P & K use the MAFF ADAS 0-5 scale where 0 equals no trace and 2 is 'ideal', and this provides a simple and effective guide for applications of these nutrients. Most suppliers give a guide to application rates based on these; however it must be remembered that such figures are only a guide. Some DIY soil test kits are available but these are limited in scope. How useful any one course manager will find them will depend on his attitude, and perhaps on his knowledge of basic soil chemistry.

Minor nutrient and trace element analysis and recommen-

dations are less well defined, with interpretation often dependent on the advisor. Fortunately most plant deficiencies produce classic symptoms and these can usually be used as a guide, either for more detailed analysis or for a trial application of a specific remedy. However it must be remembered that deficiencies – and thus symptoms – are often transitory, caused by weather or other temporary conditions such as drought, water-logging or cold, or even a spell of rapid growth.

There is an abundance of advice freely available on most matters effecting golf turf, (not always welcome or 'useful'), which often leaves the greenkeeper with the problem of selecting which to 'hear' and which to ignore. Fortunately most traditional greenkeepers are imbued with a healthy scepticism.

It is often easy (even desirable) to carry out your own mini-trials, and while results may not be scientifically valid they often give valuable indications of the effect of specific nutrition and management programmes: on *your* course, with *your* management and under *your* conditions. What works for one greenkeeper may not work for another, but with range of fertiliser and growth promotion products now available it is easy to select materials which meet your requirements for turf nutrition with greater precision than ever before.

• *Hugh Tilley is a regular contributor to Greenkeeper International. His special interests include machinery, management, safety and agrochemicals.*

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