

Maturing with Age



2005 Toro Student of the Year Winner, Alan Pierce, has learnt from his youthful experiences to become a successful Deputy, as Gareth Jones found out.

What image flickers into your mind when the word student is mentioned? A soap dodger, a tax avoider, a cider drinker, an apple polisher or a hard grafter studying in the library until the wee hours? Whatever the description that has been conjured up in the old grey matter, good or bad, no doubt the character created takes the form of a teenager, a spotty, hormone driven young gun.

The 2005 Toro Student of the Year Final went some way to dispel that young ideology as Alan Pierce won the competition by a nose, with David Newton, 47, and James Lindsay, 27, claiming the runners up prizes. While at 25 years of age Alan is not exactly preparing to draw out his pension and sizing himself up for a nice pair of comfy slippers, he, along with David and James, have gone a long way to prove that education and professional development is not just for the youth of today.

Alan, who currently plies his trade at Ham Manor Golf Club as Deputy Course Manager, has been in greenkeeping since 1995, starting at the tender age of 15, but the education side of greenkeeping has only been part of his life since 2000, when he took on his NVQ Level 2 in Amenity Horticulture. He has since gone on to tackle Level 3 Sportsturf Management and also complete factory training with Kubota and John Shaw. He is quick to point out that age should be no barrier to studying.

"I don't think age matters at all. It is easy to think that the eight finalists are all young and all from the top clubs. The fact is that they were from all over, from big private clubs to municipals, from Deputy Course Managers to Assistants. It doesn't matter what age you are, what club you work at or what position you hold, you always have the chance to learn, further your career and possibly win Awards like this," said a smiling Alan, who was shocked just to be nominated by his tutor, Dave Blackmur at Plumpton College, to enter the competition, let alone to lift the famous Toro Shield.

Alan has learnt the hard way that a youthful thirst for knowledge and keen attitude is not always a recipe for success. He took on the Deputy

Course Manager position at Wellshurst Golf Club, returning to his first ever club, at 19 and soon realised that he had not developed the key skills needed for such a role of responsibility. Working with colleagues older and more experienced than himself proved difficult, while dealing with members' problems and criticism was something Alan had not faced before.

"I was just too young. I knew the greenkeeping side of the job inside out, but I didn't have the people skills or the man management ability. I didn't understand the importance of the way you treat people, the way you talk to them and the way you portray yourself and how much of a big difference it made to your job. You are an ambassador for your club and must act accordingly. "It is as important as the actual greenkeeping. You can be the greatest greenkeeper in the world, but if you are rude to your staff or members it is never going to work. I used to listen to members' complaints and just walk away, ignoring their reasoning. Now, with more experience under my belt, I know that is the wrong way to go about it. I'd rather admit that I'm not good at something and let someone else have a go at it, rather than stick at it and make a total mess," confessed Toro's Student of the Year.

This case of 'too much too young' is an experience that could have lost Alan to the industry forever. Winter had set in by the time he had made the decision to move on, he didn't want to move back down to an Assistant at the club and greenkeeping jobs were scarce. It resulted in a move into the oily world of a turf machinery technician.



The eight finalists



Using the mechanical skills gained from employment at Wellshurst Alan worked for John Shaw Machinery covering Kent and Sussex undertaking servicing, fault finding and repairs at golf clubs in his territory. However, it wasn't long until the pull of greenkeeping had the Greenock born man back where he belonged - on the course, this time at Royal Eastbourne as an Assistant.

"I needed to get back into greenkeeping and Eastbourne gave me that chance. It's nice to look at my CV and see things are getting better. Although I've moved sideways at points I haven't moved backwards. I was back as an Assistant at Eastbourne, but it was a much bigger club than anything I had worked at before. Plus Jim Simmons was an Assessor, so was keen on me getting qualifications, so I was still progressing, which was a bonus."

Moving forward is what Alan has done within the last six months, and it was one giant step as he went for the vacant Deputy job at Ham Manor Golf Club. Alan was ready to tackle the demons that haunted him from his previous Deputy post and, despite a competitive short list, Ham Manor grabbed their man.

"Again I'm working with people older than me. But 25 is a big difference from 19. I don't have anyone looking at me now and thinking I'm too young, I show more respect now and have the same returned to me. I have extra knowledge and skills to do the Deputy job successfully," stated the still smiling winner.

In his new position Alan is working under Jon Budd, who has been at Ham Manor for 14 years and was elevated to Course Manager after the departure of George Barr. Along with Jon and Alan is a team of five greenkeepers, three of whom have been at the club for over 10 years. The role is just what Alan needed to prove his development.

"Every day is a test. It's great for me to look back at my time at Wellshurst, at the things a Deputy had to do that I hated and the bits that scared me. Now I enjoy those elements and taking on the problems that come with responsibility. It helps that I have such great support too," said Alan, who admitted that none of his achievements would have been possible without the encouragement and loyal support of his wife, Becky, who moved both job and house when Alan signed the Ham Manor contract and will now prepare herself for eight weeks without her husband as he studies at the University of Massachusetts, USA, as part of the Toro prize.

"As a Deputy here I'm doing many jobs that would be done solely by a Course Manager at another club. They want the position to be something where the Deputy can actually play a major role in the course management day to day, rather than someone who just takes over the running when the Course Manager is away. I'm getting involved in budgets, purchasing and course design."

It's a far cry from when Alan started on the winding road of greenkeeping in 1995. Living in Scotland, the teenager needed to find a week's work placement during his final year of school. He took the opportunity to travel down and see his brother in the south east of England, who, in turn, found his visiting baby brother employment at Wellshurst GC. The week saw Alan fill up drain trenches by hand, but the Scot was hooked.

Alan had impressed and took up the club's offer of summer work. He left the position at the end of the season, before being offered a full time Assistant position four weeks later. While the club's facilities, budget and equipment could not match that of Ham Manor, it was an equally important time for the up and coming greenkeeper.

"I wouldn't be in greenkeeping if it wasn't for my original time there. Les Shrubbs, the Course Manager, was great to me. He showed so much trust, not many people would let a 16 year old out on an expensive greens mower. He encouraged me to learn as much as possible and that's why I have the mechanical side of things under my belt.

"Les gave me great advice when I needed it. When a position came up at Chartham Park he told me that if I wanted to progress I should go, that's what you have to do to develop. He made sacrifices for my growth. I still speak to him now, not as a professional but as a friend," commented Alan, with a hint of emotion in his tone.

If his time at Wellshurst had gone differently Alan would certainly not have been at BIGGA HOUSE competing for the Toro Award. It highlights how important those early days are.

"It's the only job I've ever wanted to do. But I think it is hard to get school leavers into the profession, because people don't like doing manual work anymore. It is also about keeping people in the industry. I feel Awards like this and holding training courses and social events are very important in making greenkeepers feel part of something special, which greenkeeping certainly is," concluded the 2005 Toro Student of the Year.



L-R: David Newton, Lely's Peter Mansfield, Alan Pierce and James Lindsey

A Fine Vintage

Gareth Jones witnessed another close, tense final at BIGGA HOUSE, which saw Alan Pierce become the 2005 Toro Student of the Year.

During the presentation of the 2005 Toro Student of the Year Award, judge Peter Mansfield, of Lely, commented that although the competition was now in its 16th year, due to its relatively young age it could not yet be classed as vintage. However, he recognised that the Award was continually growing and the standard improving year on year. If the competition is not a vintage in terms of age, it certainly is in terms of quality, as once again the eight finalists who congregated at BIGGA HOUSE set a superb standard, leaving the judging panel to do a lot of head scratching to decide the eventual victor.

Alan Pierce was eventually announced as the winner with David Newton and James Lindsay claiming the runners up prizes. Both David and James win a trip to Harrogate Week, January 22-27 2006, where they will attend workshops, Continue to Learn Seminars and the Banquet. With both the winner and runners up coming from the older end of the eight finalists, both David and James proved that age is no obstruction to furthering your career and knowledge.

At 47 years of age David was the oldest finalist and showed that it is never too late to make a career change into something for which you have a passion. The First Assistant at Arrowe Park Golf Club, Birkenhead, which is a municipal course, only took up greenkeeping at 36. Since then he has set about gaining his PA1 and PA6 and completing an NVQ Level 2 at Reaseheath College. He has just finished his NVQ Level 3 and plans to continue his rapid development and work on a Links course one day.

James is Deputy Head Greenkeeper at The Bedfordshire Golf Club, which boasts a 6,565 yards, par 70, Championship course. James cut his greenkeeping teeth at 14 at Ringdufferin GC, Northern Ireland. He has studied NVQ Level 3 in Sportsturf at Merrist Wood College and has previously earned a National Certificate in Amenity Horticulture and a National Diploma in Turf Science. After his achievement in the joint BIGGA and Toro competition the Deputy is keen to test his abilities at the highest level by eventually becoming a Course Manager and hosting a Major event.

The final highlighted the importance of support and encouragement and also the number of people submerged in the background who play such a vital part in the success of rising greenkeepers. All eight finalists thanked their club, college tutors and bosses for the help they had received in making their participation in the final possible. Alan Pierce summed this up best when he produced a long list of all the people who had aided him in his quest to become a successful Deputy Course Manager and 2005 Toro Student of the Year.

"I have to thank everyone from Ham Manor, particularly Jon Budd, the greenkeeping team and the Committee, Roy Brown, Secretary, Tom Lance, Club Chairman, David Cloughley, Club Captain, Wallace Grace, Vice Captain and Alan Calder, Greens Chairman, along with my tutor at Plumpton, Dave Blackmur, Jim Simmons, at Royal Eastbourne GC, and Les Shrubbs, my first boss. From the final itself I must thank all the judges, the seven other finalists, who were great, Alex Shore, the 2004 winner, and all at BIGGA and Toro for making this important competition such a success," finished Alan.

The five other finalists, Darren Leith, Tommy McFadden, Emmet Reilly, all from Elmwood College, Alastair Ogilvie, The College of West Anglia, and Daniel Spencer, Oaklands College, echoed the winners' comments.

"The support you get is crucial and you have to thank your golf club and the Course Manager, in my case Stefan Schon at Haga Golf Park in Norway, for sticking by you. You can't forget the colleges either, they do an excellent job, as Elmwood did with me, and I'm grateful for that," said Darren.



Judge Peter Mansfield, left, and 2005 Winner Alan Pierce



A well planned, modern maintenance department is a vital link between all members of staff. It helps foster good communication between those that use various items of equipment and, where applicable, those that maintain it

Servicing Your Facilities

James de Havilland looks at ways to save money by spending it when it comes to your workshop.

As anyone who visits golf courses up and down the UK will know, there is no such thing as a 'typical' course workshop. What is clear, however, is that an increasing number of clubs have professional workshop facilities while a significant minority still seem to muddle through. Although good service personnel will always seem to be able to deliver reliable equipment servicing despite their working environment, those with the best facilities have a head start.

It is easy to spend others money when writing an article, suggesting that the only way to service modern mowers and related course maintenance equipment is to carry the work out in a well lit and heated workshop. The reality is that some clubs still expect staff do some demanding repair and maintenance tasks when working out of a lean-to with a mud floor. In many cases, the kit being looked after may also be well past its first flush of youth. This is just the sort of kit that needs a great deal of TLC and a decent place to work on it.

What is often overlooked is that modern working practices will soon make it difficult to recruit good workshop qualified staff to a club offering poor facilities. A good workshop, well stocked with tools, spares and an office in which to handle the paperwork is taken for granted at some clubs. But those without such facilities may find it tough to retain any in-house maintenance ability when the current generation retire.

So, is the central argument of this article that courses with good facilities can rest on their laurels while those without should throw in the towel and have all major servicing done by third parties? Emphatically no. What we all need to be aware of is the need to keep up investment in servicing facilities. An ongoing programme to develop workshop facilities is an investment.

PLANNING FOR EXPANSION

It is tough and expensive to get planning permission these days, this hurdle often leading to problems when trying to modernise workshops. Clubs that have adapted old, and on occasion listed buildings, to house workshops and related equipment face an even bigger hurdle. However, the problems of getting improvements made are all too easy to use as a reason for not doing anything.

Again, it is easy to make suggestions. A new, single span building could well be used to re-house everything under one roof, modern industrial units providing relatively economical accommodation that has the flexibility to provide rest rooms, offices and workshops all under one roof.

This assumes there are the funds, space and, of equal importance, planning consent that would allow a new unit to be erected in a suitable position. This is simply not an option for everyone and can, in part, explain why some clubs appear to be muddling along. It is not for the want of trying.

In these cases, it takes a degree of lateral thinking to come up with a solution. Is it possible to relocate the workshops and greenkeepers buildings off site? Are any other existing buildings suitable for economic conversion? Can workshop, equipment storage, office and rest facilities be divided to fit in different locations? Can workshop facilities be shared with a third party to reduce costs? Does a local third party have workshop space that can be rented?

In some areas it may be possible to share a workshop with a local farmer or haulier. This is not as daft as it may at first appear, particularly if tools and other resources can be shared and there is good access to the course. Similarly, it could be possible to share resources by relocating a neighbouring workshop to a position on the course boundary. Farmers are currently being encouraged to diversify, so those with farming neighbours may find this option worth a look.



It may well take time to recoup the cost of a washing water recycling plant, but such a system demonstrates environmental awareness. This can help when it comes to negotiating irrigation water supplies, particularly in a dry year



Modern vehicle lifts come in a wide range of capacities. Selecting the right design calls for a degree of forward thinking, but it always pays to have a degree of over capacity. Some lifts are more versatile than others



In-house cylinder grinding facilities are not unusual these days, but investing in sets of spare cutting units that are all set and ready to go remains less common. Money spent on good machinery support is never wasted



Modern equipment does not come cheap, nor does its care and maintenance. Facilities that allow stored items to be parked up clean and dry will help control these costs, as well as make maintenance less time consuming

EXISTING FACILITIES

Assuming existing facilities are up to a good standard, it is important to keep them up to date. Modern buildings need to be maintained and kept clean if they are to look good, so it pays to put some money in the budget to allow for this. Similarly it is often the case that the buildings are finished but their surroundings are then overlooked.

Again, a budget to tidy the area around workshops and greenkeeper's 'sheds' can really improve how these facilities blend into their setting and with it the course as a whole. Good staff will always be attracted to a club that demonstrates as much care for its working environment as it does for its tees, greens and fairways.

WINTER SERVICING

So, what has all this got to do with winter servicing? As it happens, a great deal. We have been blessed, in recent years, with relatively mild winters, even in the north of Scotland. It will not be like this forever, and only those clubs with workshops that allow staff to service kit in a good workshop will see the job carried out to a reliable standard year in and year out.

Even in a typical mild southern British winter, where year round play is the norm, clean and dry workshops enable kit to be worked upon more easily. Modern mowers look after the comfort of the operator. Quite right too. It follows that those who look after those same machines should be able to do so in relative comfort as well. Regardless of the weather.

With thanks to Duncan Kelso, of Kings Hill Golf Club, West Malling, Kent for the pictures of the club's workshop facilities.

Sweet Revenge

Scott MacCallum witnesses a superb performance by BIGGA's Scratch Golf Team.

Perhaps it doesn't rank up there alongside Bangladesh's historic one day win over Australia in the summer or Northern Ireland's defeat of England in the World Cup Qualifier but the BIGGA Scratch Team's 6.5-3.5 win over the Combined Services Team at Burton Golf Club was an exceptional effort.



The gallant runners-up Combined Services team



The glorious and triumphant BIGGA team

It is all the more so when you recall that last year, when the inaugural match was played at The Berkshire, the score in the Combined Services favour was 10.5-1.5, so for five of the team who played last year it was a case of sweet revenge.

Playing Captain Gerald Bruce, Mike Hughes, Graeme MacDonald, Andy Unwin and Rob Welford admitted to have been a little shocked by the quality of their opponents last year but they, together with their new team mates steeled themselves for the return match and although man-for-man the Combined Services players were lower handicapped turned it around superbly.

It is not that the Combined Services performed poorly - in one fourball match in the morning BIGGA's pairing were six under par for the round but lost in the final green and the standard of all the play was exceptional.

It was fitting that in the afternoon foursomes it was Mike Hughes, who last year in partnership with Noel Crawford, had supplied BIGGA's only win, lagged a putt on the 17th green which sealed the victory. But the writing had been on the wall from early in the afternoon series with BIGGA up in four of the five matches from early in the respective rounds.

Both sides were equally complementary about the Burton course. All praised the general conditioning, especially as the match was played in mid-October, but the greens as prepared by Course Manager, Gavin Robson, and his team, came in for special plaudits.

Gerald Bruce led the team from the front with two wins, in harness with Mike Hughes in the morning and Andy Unwin in the afternoon with whom he enjoyed the biggest win of the day.

"Going into the afternoon tied gave us real belief. From then we knew we could win it. I was involved in

the match last year when we lost heavily, so I knew it was important that we kept it close in the morning matches. It's great to get such a fine victory this year," said Gerald.

The match had been organised by Northern and Midland Regional Administrator, Peter Larter, a former RAF man himself and he was equally delighted at the way the results fell.

"Five of this year's team were involved in the 2004 defeat, so they were really up for revenge this time around. The Combined Services are an excellent side, the majority are scratch, with a few +1's in there. Our team had players with handicaps up to 3, so it shows what a great effort it was to win," said Peter.

"We were up against it, but the lads came though in the afternoon matches with Gerald leading the team well on the course. It is a great feeling to turn it around after the hammering last year. We hope to face them again in 2006 and that will be another great match up."

BIGGA Chairman Kerran Daly and Chief Executive John Pemberton also attended on the day to provide encouragement when needed.



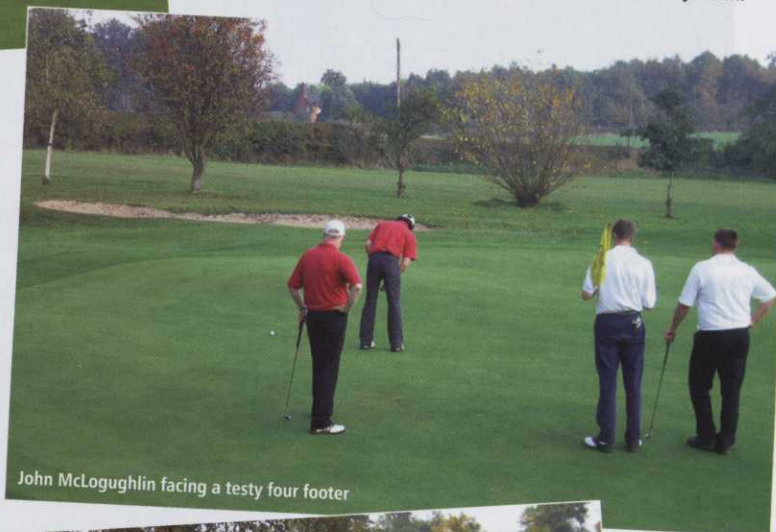
Graeme MacDonald plays to the long uphill par 3 10th in the afternoon foursomes



Job done! Mike Hughes' lagged putt on the 17th produced a concession and the match



Captain fantastic Gerald Bruce and his foursomes partner Andy Unwin



John McLogughlin facing a testy four footer

RESULTS

MORNING FOURBALLS

BIGGA	Combined Services	Result
John McLoughlin Gary Burgess	Ben Churchill Richard Baker	Lost 1 down
David Coupland Graeme MacDonald	Lee McCathie Darren Gould	Half
Mike Hughes Gerald Bruce (C)	Blue Loomie Dean Lewis	Won 2&1
Eddie Ainsworth Andy Unwin	Ned Kelly Mark Snape	Lost 4&2
Ian Mawer Rob Welford	Geoff Ascroft Richard Larratt	Won 2&1

Morning Score 2.5-2.5

AFTERNOON FOURSOMES

BIGGA	Combined Services	Result
John McLoughlin Graeme MacDonald	Ben Churchill Richard Baker	Lost 2&1
David Coupland Gary Burgess	Lee McCathie Darren Gould	Won 3&2
Mike Hughes Rob Welford	Blue Loomie Dean Lewis	Won 3&1
Gerald Bruce Andy Unwin	Ned Kelly Richard Larratt	Won 5&4
Ian Mawer Eddie Ainsworth	Geoff Ascroft Mark Snape	Won 2&1

Afternoon Score 4-1

MATCH RESULT

BIGGA 6.5

Combined Services 3.5



Gary Burgess and David Coupland won 3 & 2



Ian Mawer plays an exquisite chip which partner Eddie Ainsworth went on to hole the resulting putt



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Doing the Math

Martyn Jones switches on his calculator and explains how to work out nutrient requirements of turfgrasses and application rates of fertilisers.

A myriad of products is now available that claim to enhance the growth and health of turfgrasses and many are given names and descriptions that suggest that they are something other than a form of nutrient supply. Turf tonics, soil conditioners, organic dressings, biostimulants, seaweed derivatives, bio-conditioners, growth enhancers and biological disease suppressants are just a few of the terms given to some of them.

Some such products can contain appreciable quantities of plant nutrients; in some cases, as much as 5% or more of nitrogen. Often, nitrogen is added to products to stimulate an obvious turfgrass response and convince the greenkeeper that it is beneficial.



Disease outbreaks can be a consequence of inappropriate applications of nutrients

There can be observable amounts of other major nutrients, apart from nitrogen, in some of the products. Phosphorus and potassium may also be present. Some provide a source of iron, magnesium, manganese or other micronutrients; while some purporting only to contain specific micronutrients actually contain appreciable quantities of nitrogen. A number of them probably entirely owe their stimulating effects to the presence of the nitrogen.

These are, in fact, fertilisers. But because they are given other names, they do not include the nutrient content on their packaging. So beware! Inappropriate use of some such products can lead to disastrous results; unexpected and severe disease outbreaks, scorch, low temperature kill, or weed invasion.

Some greenkeepers claim to use virtually no fertilisers on their greens. However, on further discussion, it emerges that these same greenkeepers are using quite high quantities of some of these 'alternative' materials. Strangely, they don't recognise them as fertilisers because they are not applying them as a nutrient source.

This is particularly the case with the use of organic dressings. It would seem that, to them, fertilisers are only nutrient sources derived from synthetically produced chemicals. Some even refuse to

acknowledge 'lawn sand' or ammonium sulphate in the general term fertiliser. Experienced and knowledgeable greenkeepers know that a nutrient source is still a fertiliser by any other name.

When offered a product, it is prudent to ask for a nutrient analysis and copies of independent research data that may substantiate or disprove any claim. Expensive 'secret recipes' should be dismissed. Things that seem too good to be true usually are.

UNDERSTANDING WHAT IT SAYS ON THE BAG

Having determined if a product is a fertiliser or whether it is totally unrelated to nutrient provision, there are a number of other points to appreciate before we can calculate the amount required. This is assuming that you want control of the fertiliser programme and that you don't just accept the recommended application rates as they appear on the bag.

The first stage of understanding fertiliser calculations is to understand some of the terminology associated with fertiliser materials.



Interpreting the nutrient content of fertilisers is a vital part of greenkeeping

RATIO

This term refers to the relative quantities of the primary nutrients in a fertiliser product. For example, a 10:10:10 fertiliser has a ratio of 1:1:1, as would a 20:20:20. A 20:5:10 product has a ratio of 4:1:2. Ratio provides little information about the actual amount of nutrients in the bag. It is the analysis that provides the most useful information about the fertiliser.

ANALYSIS

This term refers to the percentage by weight of nutrients present in the fertiliser product. The analysis will be shown on the bag, either in prominent numbers on the front of the fertiliser package, or listed as part of the label. Nitrogen (N) is expressed on an elemental basis, whereas Phosphorus (P) and Potassium (K) are generally expressed as phosphorus pentoxide (P2O5) and potassium oxide (K2O).

Therefore, a 10:10:10 fertiliser product contains by weight 10 percent N, 10 percent P2O5 and 10 percent K2O. Consequently, a 25 Kg bag of this product will contain 2.5 Kg N, 2.5 Kg P2O5 and 2.5 Kg K2O.

A frequent mistake is to interpret the analysis as though the last two numbers refer to percentages by weight of elemental P (phosphorus) and K (potassium). This can lead to large errors in the calculation of fertiliser requirements.

Some, but not all, manufacturers include a converted equivalent for P2O5 and K2O. Care must be taken that the following conversions are always used when fertiliser calculations involving P and K are made.

- P2O5 contains 44 %P
- K2O contains 83 %K

CALCULATION 1 - CALCULATING THE AMOUNT OF NUTRIENT IN A BAG

A 25 Kg bag of fertiliser has an analysis of 20:5:10. How much N, P and K does this bag contain?

$$25\text{Kg} \times \frac{20}{100} = 5 \text{ Kg N}$$

$$25 \text{ Kg} \times \frac{5}{100} = 1.25 \text{ Kg P2O5}$$

$$25 \text{ Kg} \times \frac{10}{100} = 2.5 \text{ Kg K2O}$$

The amount of elemental Nitrogen (N) has been calculated to be 5 Kg, but another step is required to determine the amount of Phosphorus (P) and Potassium (K).

$$1.25 \text{ Kg P2O5} \times \frac{44}{100} = 0.55 \text{ Kg P}$$

$$2.5 \text{ Kg K2O} \times \frac{83}{100} = 2.075 \text{ Kg K}$$

Therefore, the bag of fertiliser contains 5 Kg of N, 0.55 Kg of P and 2.075 Kg of K.

CALCULATION 2 - CALCULATING THE AMOUNT OF FERTILISER TO APPLY

A second more useful type of calculation is used to determine how much fertiliser needs to be applied to a particular area to supply the grasses with a certain amount of the nutrients.

How much of a 20:5:15 fertiliser product would have to be applied to 500 sq. metres of green to supply the grasses with 150 Kg of N per hectare (10,000 sq. metres) per annum?

Note that 150 Kg per hectare per annum can also be expressed as 150 Kg h-1 yr -1.

The application rate of 150 Kg per Hectare of N is already known, therefore:

$$150 \times \frac{100}{20} \times \frac{500}{10000} = 37.5 \text{ Kg of fertiliser is required for the 500 sq. metres}$$

37.5 Kg of the fertiliser product will supply 500 metres² of green with N at the rate of 150 Kg h-1 yr -1. This quantity will, of course, be applied to the green in a number of increments during the year.

Calculating the quantity of P and K that the fertiliser product applies may also be required to determine a fertiliser programme. In these cases, the following additional calculations are made.

37.5 Kg of the 20:5:15 fertiliser product will also supply the 500 metres² with:

$$37.5 \text{ Kg} \times \frac{5}{100} \times \frac{44}{100} = 0.825 \text{ Kg P}$$

$$37.5 \text{ Kg} \times \frac{15}{100} \times \frac{83}{100} = 4.669 \text{ Kg K}$$

These figures will equate to application rates per hectare of:

$$0.825 \times \frac{10000}{500} = 16.5 \text{ Kg per hectare P (16.5 Kg h-1 P)}$$

$$4.669 \times \frac{10000}{500} = 93.38 \text{ Kg per hectare K (93.38 Kg h-1 K)}$$

Therefore, 37.5 Kg of the fertiliser product will supply the 500 metres² of green with Nitrogen (N) at the rate of 150 Kg h-1, Phosphorus (P) at the rate of 16.5 Kg h-1 and Potassium (K) at the rate of 93.38 Kg h-1.

If a nutrient application rate of 150 Kg h-1 N, 40 Kg h-1 P and 120 Kg h-1 K is desired, a further 23.5 Kg h-1 P and 26.62 Kg h-1 K are required from other fertiliser sources.

In the case of P, if Triple Superphosphate (48% P2O5) is to be the P source:

$$23.5 \text{ Kg h-1} \times \frac{100}{48} \times \frac{100}{44} \times \frac{500}{10000} = 5.56 \text{ Kg of triple superphosphate will need to be applied to the 500 m2 to satisfy the additional P requirement}$$