SPRING / SUMMER WORKSHOP MARCH 2019

Foreword

This workshop is by the Sussex Cricket Foundation for the Sussex Association of Cricket Groundsmen via the County's three pitch advisors: Brian Sandalls, Brian Fletcher and Andy Mackay.

The aim of the day is to give you an understanding of the sort of skills and knowledge you need to know in order to tackle the transition from late winter into the cricket season to prepare the best possible surface that you can with your resources. This will not be the last word in cricket groundsmanship, but rather a foundation on which to build.

We have devised this workshop, and priced it accordingly, in order that a good standard of basic training is accessible to all clubs in the county. This is not intended to replace or compete with any training that is on offer elsewhere, and there is no official accreditation attached other than a certificate of recognition from the Sussex Cricket Foundation that you have attended it. For further/formal training then the Institute of Groundsmen offer a worthwhile and robust range of training courses.

This booklet is not intended to be the full course notes for the day but rather to support what you will learn. I would value any feedback as to whether the detail is too little or too much etc so that we can continue to improve going forwards.

Access to the pitch advisers or support for your ground related turf matters should be done through your Foundation area managers, but you should also feel free to contact me directly at andy.mackay@sussexcricket.co.uk

Any Mackay

Contents Page

Agenda **3**

Setting up mowing equipment **4**

Pre-season rolling and rolling principals **9**

Transition from winter to spring/summer **13**

The use of fertiliser **17**

Soils on cricket squares and soil testing **27**

Chemical applications **33**

Squaring off a cricket square and establishing pitch positions **34**

Foot hole repairs **35**

How to prepare a cricket pitch (watering, mowing, grooming, rolling, marking out) **36**

Agenda

Saturday the 16th March

Timings are approximate

11:00	Welcome
11:10	Setting up mowing equipment – (Assemble over by groundsman's shed)
11.30	Pre-season rolling and rolling principals - (back in pavilion)
12:00	Transition from winter to spring/summer
12:10	The use of fertilisers
12:30	Soils on cricket squares and soil testing
13:00	Chemical applications

13:15 Lunch *Homemade Chicken & Bacon Puff Pastry Pie, peas & new potatoes*

(Vegan Pie alternative)

Hot Chocolate Brownies with Cream (Vegan alternative available)

13:45	Squaring off a cricket square and establishing pitch positions – (outside)
14:30	Foothole repairs

15:00 15 min Break for tea/coffee – (pavilion)

15:15	How to prepare a cricket pitch – (outside)
16:00	Questions/Answers/Forum
16:30	Close

With grateful thanks to Jan Smith of Preston Nomads CC for providing the catering

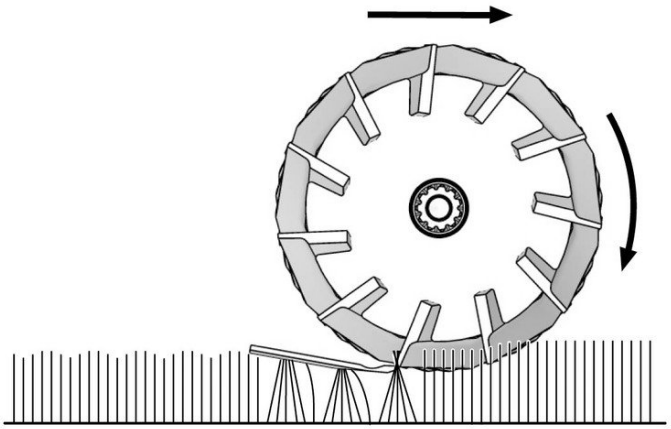
Setting up mowing equipment

It might sound obvious, but mowing is the single most important task that we do. It is important therefore that we have an appreciation of how a mower works and how we can best make sure that we are using it appropriately and that it is working as it should. It is a common thing for people to have mowers set incorrectly or not know how to adjust them properly.

This segment is by no means training in the use of a cylinder mower, and anyone using mowing or other mechanical equipment in the workplace must be formally trained in it's use. Furthermore, before using any machinery, the operator should have read the operating manual, have risk assessed the task and situation, performed pre-start checks and be wearing the correct PPE.

<u>How does a mower work?</u>

There are two elements of the mower involved in the cutting action as it travels over the grass: 1) The bottom blade (sometimes referred to as the bedknife) 2) The cutting cylinder ….and one is useless without the other.



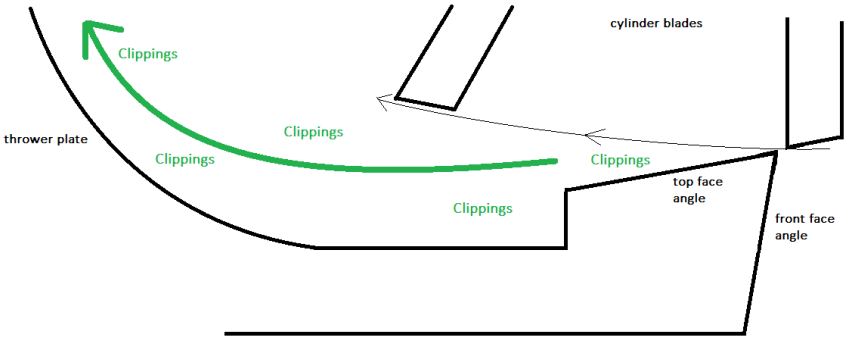
- The bottom blade pushes/gathers the grass forwards and presents the leaves for cutting.
- The spinning cylinder gathers the leaves and pushes them backwards for cutting.
- So whilst a freshly mown surface may look smooth it is not (see picture).
- Generally speaking, the higher number of blades on the cylinder and the smaller the cylinder, the smoother and more regular the cut. We often refer to this as 'cuts per metre'.
- We need more cuts per metre where a very smooth surface is important (cricket pitch , golf green etc)
- …but small cylinders or cylinders with a lot of blades struggle to cope with a large volume of clippings and so we would often choose a mower with fewer blades and a larger cylinder for use on the cricket square and outfield because the mower can cope better with less frequent mowing and longer leaves/larger quantities of clippings and because good cricket ball roll on the cricket square and outfield does not necessarily need an ultra smooth cut.

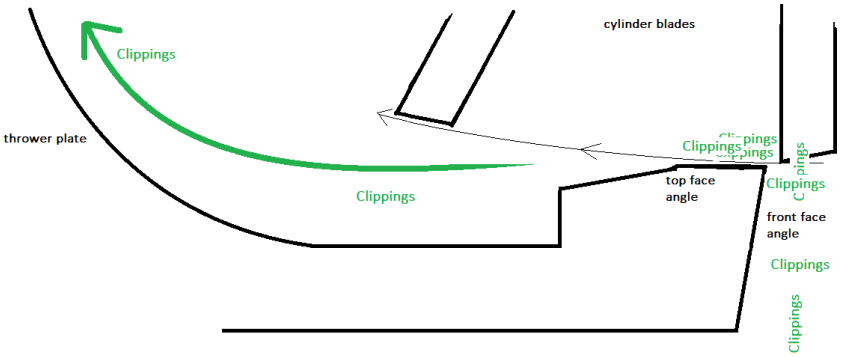
- Therefore we tend to use a mower with 7 to 11 blades on a small diameter cylinder as a pitch mower and a slightly larger cylinder with five to seven blades on the square and outfield….but there are no hard and fast rules of course.

<u>The bottom blade</u>

There are two important cutting components on a bottom blade: the 'front face' and the 'top face'.

The front face is usually sharpened at an angle of between -5 to-15 degrees, relative to a plane at an imaginary right angle to the path of the cylinder, and the function of this is to stand the grass up and gather it for cutting.



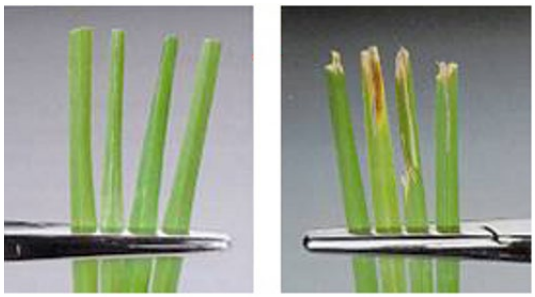


The top face is simply there to allow space for the grass to pass through the mower immediately after cutting. If there is no top face angle, or it has become eroded due to excessive contact or wear then the clippings cannot all squeeze through after being cut and will form a beard at the front of the mower or even ultimately prevent the cylinder from turning, as well as requiring much more power to drive the cylinder. The angle of the top face is dictated by the volume of clippings, i.e. the larger the volume of clippings, the larger the angle.

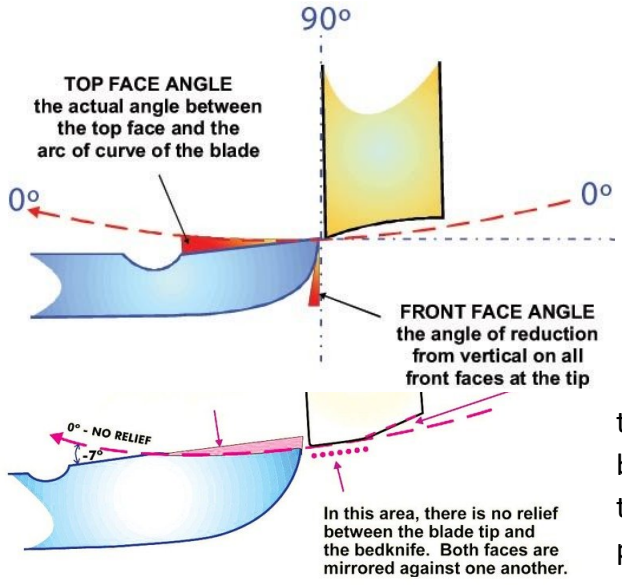
Why is it important to set the cut on a mower well?

Before the invention of the lawnmower grass was cut with the scythe, so when Edwin Budding invented his machine, the mechanism was always intended to replace that scything action and not, as most people think, to produce a 'scissoring action'.

If a sharp mower is set up with a very small gap between the cylinder and bottom blade then it will cut grass with a 'scything' type action. This is known as a 'zero contact' cut. When we have contact between the two, grass is being cut with a 'scissoring' action. Grass cut with a zero contact cut has a far cleaner cut and will heal much quicker and therefore: be less prone to disease invasion, will require less water, will produce deeper roots and will look better, not to mention putting less strain on bearings, wear and tear on bottom blades and require between 10 and 15% less engine power, saving fuel in the process. In the image to the right, we see the difference in grass leaves between a zero-contact cut on the left and a contact cut on the right.



Of course, if the gap is too large then the mower won't cut at all well, if at all, because the cylinder will just fold most of it over the bottom blade as it passes and so the best way to measure the correct gap is with a piece of ordinary 80gsm paper, or special cutting strips. (Some manufacturers recommend measuring this gap with a feeler gauge). With a zero contact cut the mower will cut the paper when it is held vertically to the front face of the bottom blade, but not when held horizontally, i.e. the gap required is about that of the thickness of a single piece of paper. A contact cut will cut or chew paper whatever angle it is presented at



. We all make the assumption that a cylinder mower delivers a superior cut as compared with a rotary mower, but this is only true where the mower is relatively sharp and well set up. You would be far better off cutting the square with a sharp rotary mower than a dull and poorly set cylinder mower.

Backlapping is where a gritty paste is used to lap the contact surface of the cylinder blades and the bottom blade together. It will temporarily restore a cut on a badly performing cutting unit. Try to avoid

backlapping as whilst this will temporarily give you a better cut, all you are doing is making the contact between the cylinder and bottom blade more profound and you will quickly be worse off….but if you must backlap then at least make sure that you have had the cylinder blades relief ground in order to minimise the area of contact.

Setting the cut

Depending on the mower in question, setting the cut either requires moving the bottom blade upwards to meet the cylinder or the cylinder down to meet the bottom blade.

1) Make sure the engine is turned off, the spark plug lead removed and the fuel switched off
2) Wear gloves and make sure that the mower is on flat, level ground.
3) If it is a pedestrian mower then tilt the mower backwards and lay the handle on the ground (if possible working on a table or bench), if it is a ride on mower then either lift the cutting units or remove them entirely if they are small, greens type ones.
4) Locate the adjusters at either end of the cylinder and gently adjust in small increments at each side of the cylinder, testing the cut with paper and by turning the cylinder by hand. Remember, that adjusting one side will also make a small but significant difference to the other side. Go back and forth checking and adjusting until the cylinder cuts the paper cleanly in three places along the width of the bottom blade. Back the adjustment off as much as possible whilst it still cuts paper.

Keeping a high quality of cut

It may not always feel realistic to expect to have a very high quality of cut throughout the year where budgets for re-grinding are tight, but it is unfortunately far too common to see mowers which have been recently re-ground at significant expense then badly adjusted soon after and hence dulled prematurely. If you have your mowers re-ground once a year then with some care, and assuming that your bearings are in good condition, there is no reason why you wouldn't have a decent quality of cut throughout the entire season (assuming also that you don't hit anything).

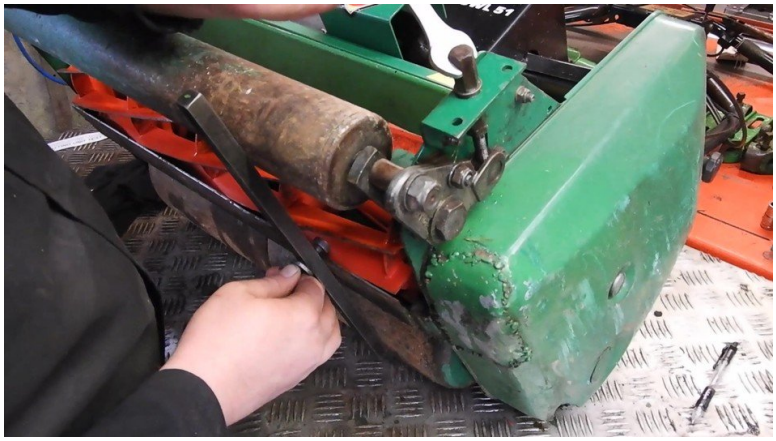
Firstly, you should at all times make very careful and patient adjustments to the cut trying to maintain a zero contact, or as close to a zero contact cut as possible. It is not unheard ofl to see cylinder mowers go a whole season needing only four or five tiny adjustments to the cut where they have been kept on a zero contact cut all year. Don't just tighten the cut until it cuts paper, but back it off again as much as you can to achieve the same effect.

Secondly, once you find that you have sufficient wear to the bottom blade that you have to have a contact cut, spend a few minutes putting the front edge back on the bottom blade with a hand file (or angle grinder fitted with a paddle/sanding disk) and you will arrive back at a zero contact cut because you will have removed the wear on the blade and brought the front face back to a point. It is far more important to have a very sharp bottom blade than to have a very sharp cylinder.

Thirdly, always clean the mower after use and put it away dry – this will aid with the longevity of the machine as well as help to maintain a sharp, rust free cylinder. N.B. Often an air hose is the best tool, but if washing must be used, keep jet-washers away from the cylinder ends where the bearings are.

Finally, grease your mower regularly and especially look after the bearings. Nothing will ruin a cut faster than a bearing slightly out of kilter.

Height of cut



Since grass is cut at the point where the cylinder meets the bottom blade, the height of cut is however far this point is from the ground.

The bench height of cut is the distance between the ground and the top edge of the bottom blade, and this is measured with a height bar. A height bar consists of a stiff bar with a threaded bolt through, long enough to place the top of the bolt over the front lip of the bottom blade and have the ends of the bar go past the centre points of each roller.

To set the height of cut, the distance between the bottom of the bolt head and the bar is set using a ruler and then the front roller is moved up or down until the bolt of the height bar can be just slipped snugly over the lip of the bottom blade, being neither too easy to achieve nor requiring too much effort. This is termed the 'bench height'. On some mowers it is possible to adjust the rear roller also when making large changes to the height of cut.

The true height of cut will depend on how soft or hard the ground conditions are as well as the type of roller fitted to the machine. On golf greens, where a mowing height may be as low as 2mm in extreme cases, these factors are of huge importance, and true height of cut is measured using a special prism. In cricket, where we cut much higher and where on the actual pitch ground conditions are firm, the difference between bench height and actual height of cut are often academic, although be aware that a contact cut will cut grass shorter than a zero contact cut because a contact cut pulls the grass blades into the cutting mechanism.

We will discuss when to choose different heights of cut later in the day.

Pre-season Rolling and Rolling Principals

Why roll?

We roll in order to compact the soil by reducing pore spaces and hence increase strength of soil so that:

- It is more resilient to the pitching ball.
- Even out the surface (but it won't do this as much as you might imagine!)
- To increase the consistency of resilience across the whole surface and reduce difference in bounce along a pitch.
- Organise pore spaces and facilitate drying

The desirable characteristics of a cricket pitch are consistent and good bounce (and pace), which are achieved by preparing a pitch in order to achieve maximum surface resilience that is as even as possible throughout the surface. Resilience (AKA hardness) is achieved by compacting the soil and then drying so that the bulk density of that soil increases and the surface absorbs as little energy from the ball as possible. Bulk density is the measurement of the weight of a given volume of soil, i.e. if we pack more soil into a smaller space (perhaps by rolling) then the bulk density of the soil increases. In a clay dominated soil, the greatest influencer of bulk density is drying.

One of the effects of the roller is to compact the soil by closing some of the larger air spaces and another is to organise pore spaces and facilitate the drying process. A roller will only compress pore spaces which contain air, not ones filled with water and so a pitch must be allowed time to dry between rolling sessions otherwise there will be nothing for the roller to compress.

It goes without saying that we must also be able to grow grass in the soil, so a sensible line should be struck between achieving a hard wicket and making a road!....but with the normal range of rollers used in cricket (1 to 3.5T) we don't need to worry about over compacting things.

Why PSR?

- Re-compacts the square after effects of winter, such as excessive and prolonged wetness and especially frost heave.
- Removes granulation from worm action
- Helps to dry the square
- Reduces the amount of rolling needed in the season
- Smooths out very minor indentations in the surface

Wetting of the soil, and particularly frost heave will reduce compaction and increase porosity over winter. Also, worms will have been moving about and reducing the integrity of the surface. Rolling helps to re-compact the square and re-organise the pore spaces in the soil, which in turn facilitates the drying process. Pre-season rolling also de-creases the amount of rolling necessary in summer.

Pre-season rolling aims and how to go about them

- The aim is to achieve a good, even level of compaction to the full depth that the heavy roller will work to.
- A true surface that dries evenly
- Don't rush PSR
- Start with light cylinder mower and make several passes in different directions (union jack pattern, but the bulk of the rolling pre-season is best done in directions across the line of play) until the surface is firm enough and dry enough to take the next weight of mower or roller without marking.
- Move up to a heavy mower such as a 36" (if you have one). Otherwise use the pedestrian roller or ballast up the mower with bags of loam.
- When the surface is in a state to take the heavy roller then continue rolling in different directions. A good rule of thumb is that the surface is ready for that weight of roller only when it can be applied to the surface without leaving any marks of crease in the soil.
- One to three passes in a day is plenty, then allow time to dry (could be a day, could be several days).
- Finally finish off with the heavy roller ballasted up to it's maximum weight.
- How long and how many passes is needed with each mower/roller depends on the weather and how quickly the surface dries/firms up
- First pass or two can be quite quick (so the roller doesn't sink in too much), then begin to slow down for subsequent passes. Last few passes should be at normal rolling speed (very slow walking pace)
- PSR at the County ground varies drastically from year to year. In the driest, warm springs we have done as little as five passes with the 36" mower, five passes with the heavy roller unballasted and seven passes with the heavy roller ballasted,…and all be completed in the space of about a fortnight. In other years we can roll more than twice this.
- Avoid stressing the grass too much (i.e. give it some time off if it starts to look too unhappy)
- Avoid rolling until three or four days after granular fertiliser has been applied and it has been washed in otherwise you risk scorching the grass or staining the leaf (particularly if

the fertiliser contains iron). A friend of mine (ahem) once turned his whole square black by rolling too soon after applying fertiliser with 4% iron in.

TIMING!

- Timing is everything. The rolling research shows us that rolling when the soil is in the right state will yield the maximum return on effort.

- The right moisture content is different for all square and soils and depends on the type and weight of roller. Generally, the heavier the roller, the drier the soil should be before rolling (but there needs to be some moisture present and the soil should be in a plastic state.)

- The rolling research also tells us that it is through drying following rolling that bulk density increases the most significantly, not through the rolling itself…..so don't spend hours rolling in the wrong conditions, and allow some drying time in between or you will be wasting your time (and fuel). The worst thing you can do is to roll when it is too wet. This will simply smear the soil, could create root shear and significantly reduce drying and pitch performance.

- The right time to start could be early to mid February, or it could be the end of March (this year it looks like the latter!). You don't need to wait for strong grass growth, but do be mindful that you shouldn't damage the sward to achieve your aims.

- Ideally take cores to assess how effective the rolling has been so far and if you need to do more or not.

- Wrap up warm, get something on the radio or ipod and drink plenty of hot tea in between sessions.

……Finally, rollers come in all shapes and sizes. The roller in cricket is iconic and the symbol of all our efforts on the ground. Often though a roller gets blamed for the pitches being too slow, which brings to mind a popular saying about a workman and his tools. If you have a roller that works, and so long as it is the 1 to 3ish Tonne range then it is very unlikely that any pitch performance issues relate to the size, weight, shape or otherwise of the roller and far more likely to do with the timing of the rolling, the sward, thatch, the soil type and what is going on underneath the surface. The writer has yet to see a square magically transformed by a roller change, excepting where a very light roller has been exchanged for a much heavier one. That is not to say that some rollers aren't more appropriate for some soils or standards of square, but rather that only when you have perfected everything else on the square should you be

seriously thinking about changing your roller for the fancy one you saw in the back of the Groundsman magazine!

Here's a case in point. This is the ancient and beautiful roller at Somerset CCC, which has been producing very good pitches for more than a few decades! How many clubs do you know that have scrapped something like this?

Transition from winter to spring/summer

During winter the square will have been allowed to grow a little longer than usual, although mowing should still take place as and when needed, making sure that never more than one third of the total length of grass is removed at any one time. Ideally the square will have been renovated successfully so that there is an excellent grass cover, no outstanding worn ends (or worse, footholes), the effects of casting worms will have been controlled, low nitrogen fertilisers applied every five to six weeks as conditions dictate, a cautious eye will have been kept on disease outbreaks, drag brushed frequently, solid tine spiked and generally loved almost as much it is during the cricket season. (The finer details of this will be dealt with during an autumn winter workshop).

The easy transition: If you have a square where these things have been done, the transition into spring is relatively pain free and easy.

As the days lengthen and more light is available to the plant then mowing heights can be gradually reduced, arriving at the summer mowing height by the start of the season.

As activities on the square increase, especially rolling traffic, fertilisation will be required in order to ensure that the grass stays healthy and can recover from the wear. As temperatures begin to rise approaching spring nitrogen input will increase, being careful not to over apply nitrogen or too soon least lush growth leaves the grass susceptible to disease. Ideally growth is not being forced but rather fertiliser applied to meet the swards needs as the natural spring flush of growth begins. Some early spring fertilisers contain ammoniacal nitrogen, which is much more readily absorbed by the plant when the soil temperatures are still cool, and this is a useful tool for the first spring application of the year coming out of February and into March.

If there is any moss in the square then applying iron, either as a standalone treatment of as part of a fertiliser will scorch it and make it easier to remove. The sooner this is done the better, and even better still is to have no moss at all. Regular applications of fertiliser containing 4-6% iron through winter will mean that there is no moss at all come early spring. Stand alone iron treatments are another option, either being applied in granular form, liquid form through a sprayer or via lawnsand… although lawnsand is needed in relatively high quantities to be effective and so is not best practice on a cricket square if it can possibly be avoided.

Verticutting or very superficial scarification should take place once growth vigour has significantly increased, being careful not to touch the surface of the soil but rather to just work through the grass canopy. This is done in order to remove any leaf litter in the sward, to encourage tillering and to thin out/groom the grass canopy to assist in pitch preparation and aid surface drying.

Deep aeration will have usually ceased around Christmas time, but occasional sarrel roll spiking can help prevent the surface from capping off under the mower and allow fertiliser to enter the soil more easily.

If all the above is observed, then rolling can commence when conditions allow.

The difficult transition: Unfortunately, many squares receive a cursory renovation and are then virtually ignored through winter, and often autumn also. A square is poor condition in early spring is likely to be far inferior than if it had been properly cared for. The following are some tasks that may be needed prior to the start of the season in a suggested order:

- Methodically pick over the square and remove any worm casts with boot, rake or lute, leaving a smooth surface.
- At the same time repair any small holes or hollows on the business area of the square with loam and seed, packing in well to leave a level surface (perhaps consolidate with the back of a lump hammer?)
- Do not attempt to level ends yet, tempting as it is, because it will be disturbed by pre-season rolling and, if wet may even seriously delay operations…far better to wait until after or towards end of pre-season rolling to level ends and seed, particularly because there is a higher chance of the seed germinating then.
- Hand-lift any weeds, repairing as necessary with loam and seed or apply a selective weedkiller once good growth is observed.
- Mow the surface as high as is needed in order to not remove more than 1/3rd of the leaf. The height of cut will then be gradually reduced over the space of two or three weeks.
- Apply a low nitrogen fertiliser such as 4:0:8 plus 4%fe or 5:2:10 etc at a rate of between 35 to 55g/m2 depending on how malnourished it is. Wait two or three days before using any machinery on square or walking about on it. Ideally also take soil samples and send off for nutrient analysis before the fertiliser is applied…this will inform you what sort of fertiliser you may need to use during the rest of the year.
- Square off the square using 3,4,5 triangle (or multiples of) in order to establish true stump lines and ensure that pitches are properly square. You must do a 3,4,5 triangle along both stump lines. If present, an artificial pitch is a good guide.
- Mark in individual pitch positions.
- Switch/brush any worm casts off the surface before undertaking any mowing or rolling each morning
- Once turf colour improved, begin pre-season rolling.
- Continue mowing as necessary, aiming to get the sward height down to 12-18mm by the end of March(but no lower).
- Once pre-season rolling completed, and preferably no later than two or three weeks in advance of the first game, level any low pitch ends and seed them. If PSR not finished then simply roll the business areas and avoid going over the ends.

Mowing heights on a cricket square

In the author's opinion, people get too hung up on mowing heights.

The aim is to choose a height that is manageable, promotes the health of the sward and the characteristics of the grass plant that are desirable for cricket, and of course provides a smooth ball roll.

In summer, mowing heights on the square should be 12 to 18mm (or there abouts…the lower end of the the range perhaps for the higher standard squares). This encourages a tighter sward but still leaves plenty of leaf for growing good, deep roots and recovering from use. If the sward is cut any lower on a regular basis it may prove difficult to get rid of the green colour and there may be excess seam movement as well as making it harder for the grass to grow roots and recover as easily from stress. Cut much higher than 18mm in summer and there is a risk of a thinner sward which sits artificially wet. Lengths over around 18mm are perceived to be 'long' by players and may not provide good ball roll.

In winter, cutting heights should be raised so that the plant can make the most of reduced light levels and develop good strong root systems and so mowing can be on a less frequent basis. There is a relationship between the length of the shoot (leaf) and the length of the root, and generally speaking, the longer the shoot is allowed to grow, the longer the roots will too.

Winter mowing heights on a cricket square should be in the range of 15 to 25mm. Keeping the sward at the lower end of this figure will allow greater air movement, faster drying and hence less disease and moss. It is difficult to maintain a cricket square below 15mm in winter as the shorter the leaf, the more frequent mowing it will require, and opportunities to mow in winter may be few and far between. Maintaining a cricket square at lengths over 25mm (or not cutting at all) will lead to a less dense sward and an artificially wet, disease and moss prone surface.

Pitch (wicket) mowing heights for match day are very much a matter of personal choice. It is rarely necessary to mow below 4mm in height, and good results and better recovery can be achieved by leaving the grass around 6 or 7mm. The most important thing is not grass length but how dry the surface is (which will be hugely influenced by how well the grass has been made to stand up during pitch prep.)

Regular verticutting of the whole cricket square every two weeks (ish) makes pitch preparation a lot easier and discourages prostrate growth and large, unsightly crowns. Verticutting is when close-centred and thin blades are run vertically through the sward with the aim of pruning sideways growing leaves and/or lifting sideways growth so that the mower can find it. It will also go a long way to preventing thatch build up by removing leaf litter and helps to improve presentation. Verticutting (not to be confused with scarification) should never go into the soil, but rather work just above it. Ryegrass has a 'tufted' growth habit and if left to grow in isolation or with a lot of space between it and the next plant will grow outwards. On a cricket pitch this means large, ugly crowns and a two paced pitch. The best solution is to establish a good seed pattern during renovations, but verticutting will help to

keep things growing in the right way. Verticutting also helps to lift seed heads up from annual meadowgrass, and regular verticutting can therefore help reduce invasion from weedgrasses.

The use of fertilisers

Fertilisers: an overview

Do we need fertilisers?

It would be wrong to say that turf needs fertiliser in order to thrive….it does not. How much fertiliser are the grass verges or motorway embankments getting?

HOWEVER, sportsturf must cope with the demands of wear, regular mowing, high population densities, short mowing heights and often 'unnatural' rootzones. Simply put, sportsturf which does not receive the right level of fertiliser input will not meet the requisite level of quality, at least not for long. Out of all the operations that we undertake as groundsmen, fertilisation delivers the biggest bang for your buck in terms of turf quality. Generally speaking, the higher the standard of sportsturf, the more intensively it is managed and the higher the levels of nutrient input required because more plants per square inch = a higher population to feed.

Most cricket squares in the UK are 100% ryegrass and intensely used squares may require a significant input of between 150 to 220kg/N/ha per year if they are to recover from the wear and stress of cricket pitch preparation.

Simply put

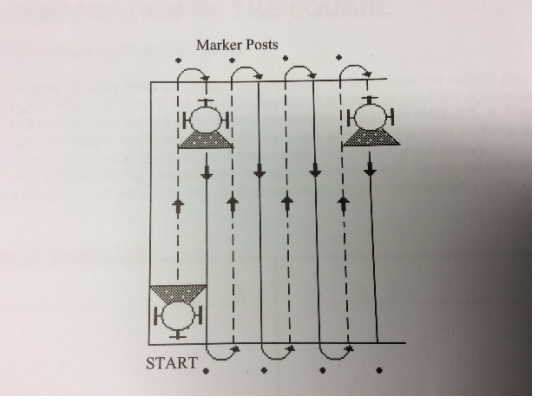
A great deal of detail follows, but simply put, it is important to have annual or bi-annual soil nutrient testing done in order to make sure that nothing is missing in the soil or that nothing is in great excess.

A typical, fertilisation plan on a 10 pitch cricket square using conventional granular fertilisers might look something like this (just by way of an example):

Jan 4th	Feb 15th	March 20th	April	May 1st	June 12th	July	Aug 1st	Sept 10th	Oct 15th	Nov 25th	Dec
25kg 4:0:8 + 4fe	25kg 4:0:8 + 4fe	25kg 11:5:5 +8fe (coldstart)	-	25kg 14:5:10	25kg 14:5:10	none	20kg 12:0:12	25kg 8:12:8	20kg 6:5:10	25kg 4:0:8 + 4fe	none

…but all cricket squares are different due to physical make-up and the amount of use. The biggest factor is weather, and in mild winters particularly, fertiliser inputs can be much higher or more frequent than planned.

All clubs should have a disc-spreader for the application of fertiliser. Spreading should be measured out and done on a 'wheel to wheel' basis, as per the below diagram:



Fertilisers are highly corrosive and so the spreader should be washed well after use.

The soil and nutrients:

Soils are (weakly) negatively charged due to their mineral makeup and organic matter (sands, however, are usually inert). *<Think of two magnets whereby the opposite poles attract and matching poles replel….it is no different with the tiny particles of fertiliser in the soil.>* The nutrients in the soil are either positively charged or negatively charged, meaning that positively nutrients such as NH^{4+}, K+ , Mg^{2+} , Fe^{2+}, Fe^{3+} etc tend to hang about in the soil because they are weakly bonded to the surface of soil particles until they are consumed or chemically bonded in some way, just as negatively charged particles such as NO^{3-} , HPO_4^{-2} etc are actively repelled from these sites and so leech away quickly.

There are other things going on in the soil solution such as oxides having a weak positive charge, the presence of soluble organic compounds and chemical reactions such as phosphate reacting with iron and/or aluminium ions to form insoluble compounds. <u>The key thing to pay attention to here is solubility</u>, since the grass plant can only absorb these things through the root in the form of a weak solution. This becomes relevant, for example, when a soil test might reveal high levels of Phosphate, but in reality, most of this might be insoluble and so the plant cannot get at it without some other intervention or process converting it back to a soluble form (a particular issue on clay rich soils).

When you come across the term ‘CEC’ or ‘cation exchange capacity’, this is a measure of the number of available ‘electrical sites’ which effectively allow the soil to hold on to nutrients rather than them being leeched readily away. E.g. a sandy soil with low organic content will have a very low CEC, whereas a clay soil or an organically rich soil will have a high CEC.

Types of fertiliser:

- ‘Conventional’ granular (lasts about 6 weeks)
- Slow release granular (lasts anything from 8 weeks to 9 months, depending on the product)
- WSF (usually ‘cheap and cheerful’ applied as liquid, lasts 2 to 4 weeks)
- Liquid fertilisers (lasts anywhere from 2 to 8 weeks, depending on the formulation)

There are pros and cons to each, but they all essentially do the same thing in the end: i.e. supply the plant with what it needs to grow.

There are some excellent products available from all of the suppliers, but we sometimes need to step back from the glossy brochure and remember the basics; separate what we need from what we are being upsold into buying and keep things simple.

For example, it is recommended (except for those prepared to mess about a bit more than normal) that a dedicated turf fertiliser was used on the cricket square. After all, it is a small area and very important. However, if funds are tight, you will be able to achieve good results on the outfield by using agricultural fertilisers, which are a fraction of the price. Do you really need that ultra-fine granule that is aimed at golf greens with a mowing height of 3mm, or can you use a courser (cheaper) grade of fertiliser?

All types of fertiliser can be used at any time of the year, however, many people choose to use granular fertilisers in winter because they last well (and choose ones that the grass can access well enough in the colder temperatures), but in the cricket season people often prefer to use liquid fertilisers because they do not need watering in, which is useful when windows for applying fertiliser would otherwise be small, meaning that fertiliser can be sprayed in the morning and play can take place later later that day with no damage (although it is always better to time applications for non match days to give the plant the best chance of accessing it). Although a rule of thumb is that conventional granular fertilisers last around six weeks and liquid fertilisers applied as a 'foliar feed' last around two, there are an increasing number of slow release liquid fertilisers capable of lasting at least four to six weeks and sometimes more.

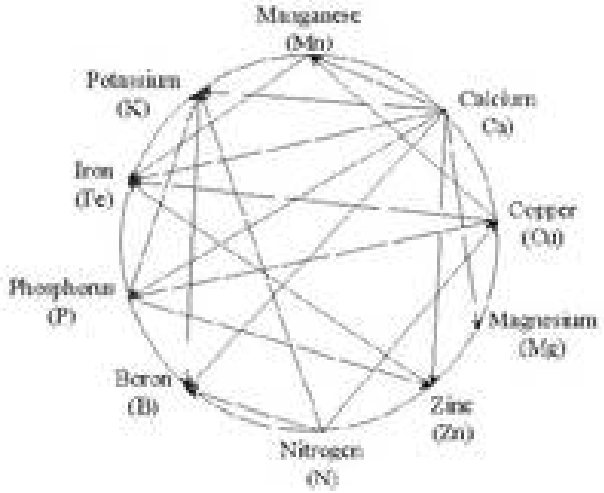
Water soluble fertilisers are put into water and applied as a liquid. They are cheaper to buy than many liquid fertilisers.

What do I need to apply?

There are many different nutrients involved in healthy plant growth. Some are supplied in abundance by the environment, such as carbon, oxygen of hydrogen. Others, such as nitrogen, are needed in relatively large quantities, whereas others, such as molybdenum are needed in very miniscule amounts and it is rare to encounter a shortage in the soil. Those needed in the greatest quantities are known as Macronutrients, those in lesser quantities, Micronutrients (or often 'trace- elements). However, grass will grow only as well as the limiting factor, or in other words, if everything is abundance except for one nutrient, this one nutrient will hold things back; and there are thirteen nutrients required for unimpaired growth, in addition to sunlight, water, carbon dioxide and oxygen. If, for example, our turf was short of water or sunlight then we would be pretty quick to react….why then do we often pay little heed to what is lacking in the soil, as the effect can be just as limiting in many ways?

It is also worth understanding that the various nutrients react with one another and that an excess or shortage of one may affect the availability of another.

A high level of the nutrient below	Reduces the availability of the nutrient in this column
Calcium	Boron, Iron and Magnesium
Potassium	Magnesium
Phosphorus	Zinc
Nitrogen	Copper
Copper	Iron



<u>The important lesson to take from this is that you can only start to understand what your soil needs if you have a soil nutrient analysis done. Until you know what is or isn't in your soil you cannot know what to apply (or not)</u>. For example, it's ok applying a simple 5:5:10 year round, but if you have an excess of potassium already then you will make it worse, magnesium will be hard to come by for the plant and you will get yellow, droopy leaves and poor chlorophyll production….the result being a sick plant. You would have been better off applying nothing at all!

Soil tests should come with a set of guidelines for 'ideal' levels of the nutrients tested and may also come with recommendations about remedial measures.

A once a year, or every other year is fine, since you are looking at trends in the soil, not just specific values.

It is important to take soil samples at a time when fertiliser hasn't recently been applied, or you will get a false reading.

N.B. Soil tests do not test for nitrogen…..you must make assumptions about how much nitrogen to apply (we will come to that later)

Understanding the bag/bottle

The three nutrients needed in greatest amounts are N (nitrogen), P (phosphate) and K (potassium) and these are the three figures displayed prominently on the bag or bottle. There may also be other things like Fe (iron), Mg (magnesium), S (sulphur) etc. These macronutrients are what we are buying the stuff for in the first place.

The figures displayed represent the percentage of each contained within. i.e. a 20kg bag of 10:10:10 contains 10% of N, P and K. or 2kg of each…the rest is just a carrier (often sand of some other inert substance bonded together) to allow us to spread these things safely and conveniently.

It is worth noting that legally a label can vary by a certain amount each way, so a bag of 11:5:15 could have the same amount of nutrients as a bag of 12:6:14.

Also be aware of fertilisers that may seem cheaper than others but that come in a 20kg bag rather than a 25kg bag.

When calculating how much of a liquid fertiliser you need, the figure on the bottle still gives you the percentage of each nutrient within, but this is a liquid amount, i.e. 10L of 35:0:0 contains 3.5L of N. However, we equate all fertiliser use to kg/ha so that we have a standard by which to understand what is being applied, irrespective of the area involved, so liquids must be converted to weight. Liquid fertilisers have a specific gravity (usually between 1.2 and 1.3 g/ml). To obtain the weight within we must therefore multiply the volume of each nutrient by the weight of that liquid. i.e., the 10L bottle of 35:0:0 contains 3.5L of N, but if the specific gravity is 1.3 then it actually contains 4.55kg of N.

We tend to apply granular fertilisers at similar rates (usually 35g/m2, but not usually outside the range of 20g/m2 to 50g/m2. Go too low and we get poor coverage) so we naturally rely on the analysis of that fertiliser to give us an idea of whether it is a 'heavy' amount or not. This tends to mean that in summer we might apply a 12:4:6 at 35g/m2 and in winter we would naturally apply something with lower N such as a 5:2:10. Indeed, this is how the fertilisers are marketed to us. i.e.granular fertilisers are easy to understand in that you put 'X' amount on and a percentage of that is the nutrient. Also, most of us cut our teeth on granular fertilisers and so the cause and effect of these make sense to us easily.

Let's say that we apply two 25kg bags of 4:0:8 to a cricket square measuring 1200m2. We are applying 50kg of product and within that there is 50 x 4% of N and 50 x 8% of K, i.e. 2kg of N and 4 kg of K. We then convert this into kg/ha in order that it make sense and can be compared with other areas of a different size. i.e. (2kg / 1200m2) x 10,000m2 = 16.7 kg of N/ha

Liquid fertilisers, by comparison, are a bit more abstract. Many people naturally recoil from a product with a high analysis such as a 35:0:0, however, we apply these with water as a much weaker solution than appears on the bottle. i.e. if you put just one litre of 35:0:0 (with a sg of 1.3) into a tank of water and spray it over our 1200m2 cricket square, you would actually be applying (1 x 35%) x 1.3 = 0.455 kg of N for the square or (0.455/ 1200m2) x 10,000m2 = 3.8 kg N/ha. ….so 1L of your apparently high analysis fertiliser has only supplied just less than a quarter of the nitrogen applied above paragraph in the apparently low analysis granular fertiliser. Of course, you could also apply 10L to the same and supply more than double the granular input…

Liquid fertilisers are useful because the dosage can be easily altered and yet application in very accurate.

Nitrogen, nitrogen types and inputs

Nitrogen has several roles within the plant, but we tend to think of it as being responsible for growth rate and colour, or at least deficiency will result in slow growth and repair and poor turf colour.

The main form of nitrogen that can be taken in by the plant for most of the growing season is Nitrate ($NO3^-$). When the soil temperature is low or nitrate is in very low concentrations, the plant will take up Ammonium ($NH_4^{+)}$).. and this is a good early season strategy, however, for most of the year the Ammonium must be converted to nitrate before the plant can consume it.

Because Nitrate is a negatively charged ion, it is readily repelled from the soil (leeched). However, grass is quite efficient at using nitrate up quickly before it can escape. Nitrate is also readily converted by bacteria in a process known as denitrification and becomes the gas N^2 and so is lost into the atmosphere (this is also known as volutisation). This can be quite significant in warmer parts of the year (up to 40% loss), and so what you apply to the turf might not necessarily be what the plant is getting..

'Conventional' fertilisers are ones which supply nitrogen in the nitrate form so that it is readily available to the grassplant. Slow release fertilisers may be coated so that they release the nitrogen at different times as they need time for the outer shell to break down (depending on the thickness of the shell), or they may need some other form of intervention. Other forms of slow release fertiliser supply a percentage of readily available nitrogen as well as nitrogen in more complex forms (which are positively charged or physically big in size and so sit about in the soil quite happily), which need biological intervention and denitrification to convert into nitrates , the idea being that by the time the grass consumes the readily available nitrates, the more complicated forms of nitrogen are being converted to nitrates so that as the first nitrates are consumed, there is a steady supply following this up.

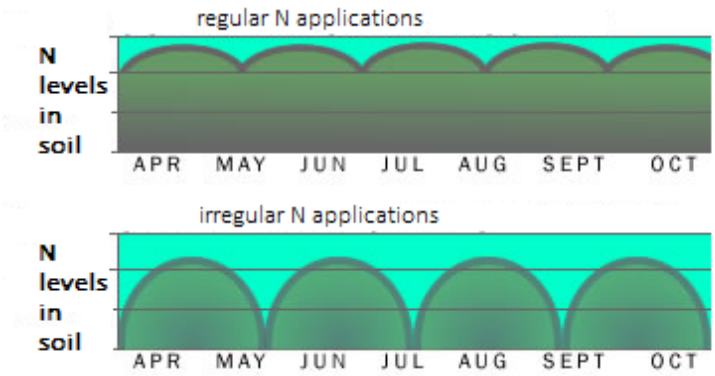
Nitrogen can be supplied in various forms, e.g. Ammonium sulphate, Ammonium nitrate, Sodium nitrate, Potassium nitrate, Urea, Calcium nitrate, Ammonium phosphate, dried blood, hoof and horn or synthetic slow release forms such as Methylene Urea or IBDU, all of which have different amounts of N in.

The question of how much nitrogen to apply in a year is dependent on soil types and intensity of use, but in cricket you should be applying somewhere in the region of 150 to 220kg/ha. Most of this will be in the growing season. If you want to get really smart then google 'growth potential and fertilisation', otherwise make a sensible fertiliser plan through the year, check that the figures stack up and follow the plan with one eye on turf colour and clipping yield etc, tweaking as needed and according to the weather conditions.

Feed famine:

Many of us tend to apply fertiliser when we notice the colour drop off. This is usually too late! The diagram below shows the difference between spoon feeding little and often and applying lots every six weeks or so. It's a bit like the difference between you eating three relatively small meals a day, every day or eating one huge meal every two days….with the latter your

body would spend a lot of time not working quite right and the outcome would likely be ill health.



So, whilst our conventional granular fertilisers may last six weeks, it would be far better to apply a half rate every three weeks. This is where liquid fertiliser really comes in…it is much more accurate and much easier to supply small amounts regularly, however, it may not be for everyone (especially those short on time). Slow release fertilisers help to alleviate the feast/famine scenario, but you must choose the correct technology. Coated slow release fertilisers are not appropriate on a cricket square during the playing season.

So what role does each nutrient fulfil?

(below from https://www.pitchcare.com/news-media/the-role-of-nutrients-in-turfgrass-and-the-soil.html)

Phosphorus (P)

Phosphorus is critical for the promotion of root development and the establishment of turf, so we often recommend higher levels for young turf. It is also required for the breakdown of carbohydrates and the transfer of energy. Turf deficient in phosphorus has spindly shoots, and can be purplish or reddish in colour. Excessive levels should be avoided on fine turf as it encourages weed grasses such as annual meadow grass, and makes the turf more prone to disease.
Phosphate is very persistent in the soil and so should only be used with care. Ryegrass dominated winter sports turf can cope with higher levels of phosphate than fine turf. It is normal to recommend adopting a zero phosphate fertiliser programme on golf or bowling greens.

Potassium (K)

Potassium serves to promote the formation of strong cell membranes and improve tolerance to stress such as from cold, heat, wear, and disease. Turf which is short of potash often has yellowish soft drooping leaves, and a poorly developed root system. However, potash is very mobile in the soil and can be quickly leached out, so it would be worthwhile to try to maintain high potash levels. Potassium and magnesium work in combination and it is important to try to maintain a ratio

of about 1.5:1 potassium to magnesium.

Calcium (Ca)

Calcium aids in the uptake and movement of other nutrients around the plant, and is a major constituent of cell walls. It also encourages good respiration especially in periods of high heat and humidity. Turf, which is deficient in calcium, has reduced root growth and pale leaves and does not respond well to nitrogen or iron fertilisers.
Calcium needs to be used with care, as it is also alkaline and can affect the pH of the soil. Fine turf does best in an acidic soil so calcium if needed should only be applied in small amounts, ideally as a liquid.

Magnesium (Mg)

Magnesium promotes winter hardiness and early growth. It is essential for nitrogen metabolism and chlorophyll synthesis, and helps the turf to utilise iron and phosphate. Turf which is short of magnesium has yellowing drooping leaves.
Magnesium interacts with both calcium and potassium so should be kept in balance with those. Ideally the calcium to magnesium ratio should be about 10:1.

Sulphur (S)

Sulphur is necessary for the utilisation of nitrogen, and forms proteins in the plant. Turf requires one unit of sulphur for every 14 units of nitrogen that it uses. Since the introduction of the clean air act sulphur is becoming deficient, symptoms include slow growth and yellow leaves. However we often encounter greens with high levels of sulphur which can lead to the formation of black layer when iron is present. This is also indicative of poor drainage and anaerobic conditions. These lead to a reduction in microbial activity and an accumulation of thatch, which forms an ideal environment for disease. In high sulphur situations it is often recommended to choose a fertiliser with a low sulphur content.

Zinc (Zn)

Zinc is important for cell elongation, sugar consumption and uniform growth. Turf which is deficient in zinc is withered and has mottled leaves. High levels of phosphate in the soil can interfere with zinc uptake.
Golf or bowling greens which are high in Zinc; can have problems with the lock up of various nutrients especially iron. Application of seaweed and humic acid products can help to reduce the level by increasing the cation exchange capacity.

Manganese (Mn)

Manganese is important for nitrogen uptake, activation of enzymes, and photosynthesis. It

may also play a part in protecting the turf from disease. Deficiency symptoms include spotted or mottled leaves. Manganese is often deficient in sandy soils, and is most available at pH 6, but high pH reduces its availability greatly.
If manganese is in short supply it is often worthwhile to apply a manganese supplement to help with vigour and disease control.

Copper (Cu)

Copper is essential for chlorophyll production and the correct operation of photosynthesis. It also acts as an enzyme activator. Deficient turf has stunted withered leaves with often a dark blue/green colour, and dead or brown spots.

Iron (Fe)

Iron is necessary for chlorophyll formation, good colour, and resistance to disease. Since iron is very widely use for cosmetic greening, it is unusual to find any deficient turf, but symptoms can include yellowing, spindly leaves. Most golf courses and bowling greens have a high level of iron in the soil because of historic usage. This can lead to lock up of potassium and phosphorus and has the tendency to promote black layer when high levels of sulphur are present. The high iron levels are likely to be resistant to change; however it is possible to use a specialist wetting agent to release the locked in iron and flush it out of the soil profile. The reduction in iron levels can also be helped by reducing the amount of iron applied to the turf.

Boron (B)

Boron aids in shoot and root growth by assisting in the control of hormones and the translocation of sugars around the plant. Turf, which is deficient in boron, is stunted with discoloured leaves and cracked roots.

So what do I need to apply to my cricket square?

The answer to this is to get a soil test done and then decide! However, even if your soil test reveals that you have high levels of P, you should still apply this when seeding (such as an 8:12:8 at 35g/m2) because you want something that is very readily available to the new plant as it is growing new roots, and P isn't very mobile in the soil solution.

Also, as a rule of thumb, you should apply more K in autumn and winter. Autumn/winter fertilisers usually have about double the K to the amount of N in them.

Nitrogen levels should be tailored to the growth pattern of the grass.

The above picture represents the key growth points in the year, i.e. more nitrogen is needed in spring, less during the hot months of summer, and again there is a growth spurt in autumn before falling away for the colder months. Your nitrogen use should mirror this (though it is assumed that the drop-off mid-summer is due to heat stress, which may or may not be the case in the UK!).

There is a lot of information on the internet and in various books should you want to know more.

Soils on cricket squares and soil testing

We have arrived at clay dominant soils for cricket because they allow us to produce the resilient surface that is needed for the modern game.

- A good cricket soil offers three things:
  Pace

  Bounce

  Wear tolerance

- Hardness & resilience = pace and bounce and wear tolerance.

  Some sands will pack down very, very hard and give excellent vertical bounce but lack the resilience needed i.e. when the ball is bowled it would tear through the surface.

  Resilience = shear strength of the soil.

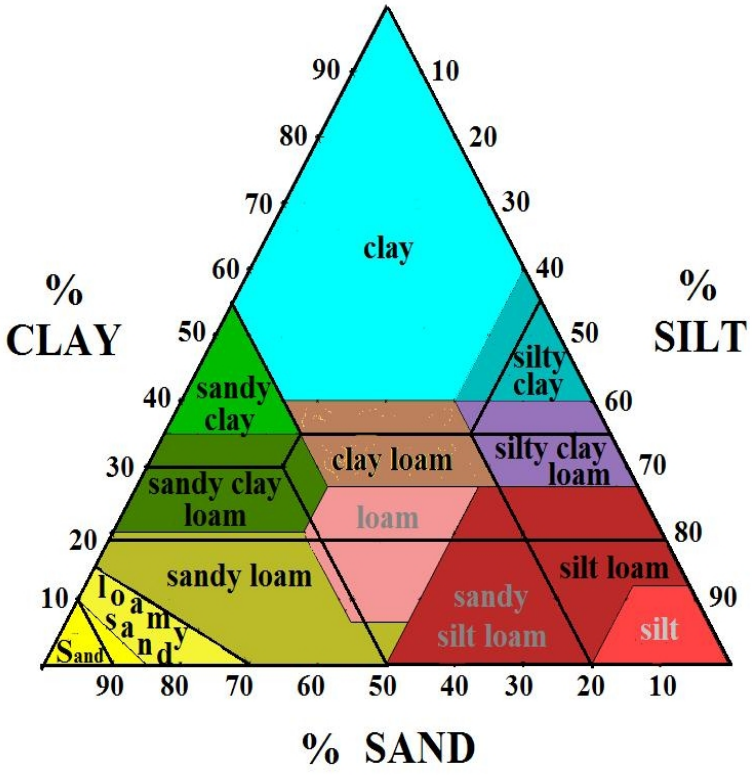
Particle sizes in soils

Name of soil separate	Diameter limits (mm) (USDA classification)
Clay	less than 0.002
Silt	0.002–0.05
Very fine sand	0.05–0.10
Fine sand	0.10–0.25
Medium sand	0.25–0.50
Coarse sand	0.50–1.00
Very coarse sand	1.00–2.00

- Soil = Sand, Silt, Clay and organic matter (and other minerals and nutrients).

  If the Sand, silt and clay are the streets and buildings of a city, the organic matter is the people! If you had a city without people in it you don't have a city.

A soil textural triangle showing the subtle differences between the USDA (colours) and UK- ADAS (black lines) soil classes



- In cricket we obsess about the clay content of the soil because it is the clay fraction that binds the other particles together and gives us the shear strength in the soil. Clay also goes incredibly hard when it dries, but you can also get this from the sand element.

  ….And as a rule of thumb, the higher the clay content the harder the wicket (one dry enough) and the greater the pace, bounce and durability of the surface,

  however, this is not a hard and fast rule

- Prof Bill Adams produced a paper in 1983 based on lengthy research, both in the field and the lab and concluded that for Club cricket, clay content should be between 24-30% and 28-38% for County cricket.

  Adams also stated that the strength of the soil as determined by a Motty Test should be not less than 40kg for Club cricket and not less than 55kg for County Cricket

- The measure of hardness on a cricket wicket is called BULK DENSITY.

  As the soil dries it shrinks and the bulk density increases, i.e. the weight per volume increases.

  So in a moist cricket soil full of pores prior to wicket preparation it might be 1.4g/cm3.

When we apply the roller we close air spaces and increase the bulk density. As the soil dries it shrinks and increases the bulk density even more.

In a prepared wicket it is not unusual to find the bulk density has risen to between 1.7 and 1.9g/m3

……..or more.

- Organic content Research by Prof Bill Adams has shown that Organic matter has far more bearing on bulk density, moisture content and hardness than any other thing.

  As the organic matter increases, so the hardness, bulk density and shear strength decrease, i.e. less pace and bounce.

  Adams reported that a cricket soil should contain no less than 3% organic matter and no more than 15% (when measuring you should always disregard the top 20mm of the sample). But more recently we tend to class 10% as the upper limit.

- We need some organic matter because we need life in the soil and we need to be able to grow grass in it. It is important to be aware, however, that low slow wickets are more often caused by high organic contents (and thatch) than by a lack of clay content. There are of course many other factors such as excess moisture below, layering etc.

  But the binding strength of a soil is key to it's performance on a cricket wicket, and knowing what it is is a very useful tool when diagnosing problems in a square.

  Incorrect soils will wear too quickly and the wicket will cut up too much, loose the top or go dusty too quick. There may be low bounce or lack of pace. You may find it too difficult to grow grass in it with the available resources

<u>Motties:</u>

Working out your organic content, exact soil texture and % of clay and bulk densities is something that really needs soil sending off to a lab and costs money. However, calculating your soil strength via the motty test is a kitchen sink experiment, easily done at home and will give you a real insight into your square, as well as a good indication of your clay content.

- The Motty test or ASSB test (Adams and Stewart Soil Binding test) was introduced in the 1960's by Stewart and Adams who adapted it from the pottery industry where it was used to test the suitability of clays for crockery.
- The introduction of the motty was one of the first Performance Standard Tests, which could assess the quality of something and standardise it so that it was of use to groundsmen up and down the county.
- Adams and Stewart had discovered that a relationship existed between the rebound bounce of a cricket ball, the binding strength of a soil (assessed via the motty test) and the pace of a prepared cricket wicket.
- A motty is a small ball of loam which is dried and then squashed between two boards on a kitchen scales. The point at which it breaks gives you a value for the binding

strength of the soil. Several repetitions are made, the most extreme value at each end of the scale is discarded and then an average is taken. It is important that motties are made properly, dried steadily and are of the correct size.

To make motties:

(a) Transfer half a cupful of finely rubbed down soil (less than 2 mm) under test to a clean plate.

(b) Moisten the two samples with distilled water if available (otherwise with tap water) until they can be moulded by hand. Water must be added slowly to ensure that the soil does not become too sloppy to mould.

(c) Mould vigorously by hand over a period of 5 minutes to destroy all aggregates. Add more water if necessary.

(d) Roll the soil into a ball and place it on a clean plate. Cover the soil with a wet cloth (wrung out by hand) and leave standing for 2 hrs.

(e) Remould the soil by hand, making sure that it is plastic but not sloppy. It should have the consistency of putty and have little tendency to stick to the hands. It should also readily mould into a ball without forming cracks. Adjust moisture state if necessary by allowing it to dry further or by adding small amounts of water.

(f) Roll the soil into a worm approximately 12.5 mm (0.5 inch) in diameter on a plate and cut into cylinders 25 mm (1 inch) long.

(g) Carefully mould each cylinder into a ball and then roll between the palms of the hands.

(h) Place the two sets of balls onto clean plates and allow to air dry in a cupboard for 5 days.

(i) Place each dried ball in turn on a board placed on a zeroed bathroom scale (the board protects the scale) and break by slowly increasing foot pressure on a small board or metal plate placed on top of the ball. Note the reading on the scale when the ball breaks.

(j) Discount the lowest value in each set and obtain the mean value of the rest.

- The following table gives an indication of what these values mean:

ASSB / Motty Value	Equivalent clay content for well made Motties	Strength category
113Kg (250lb) and over	Over 55%	Exceptionally Strong
91-113Kg (200-250lb)	44-55%	Very Strong
68-91KG (150-200lb)	33-44%	Strong
45-68Kg (100-150lb)	22-33%	Moderately strong
23-45Kg (50-100lb)	11-22%	Weak
9-23Kg 20-50lb)	4-11%	Very weak
Under 9Kg	Below 4%	Non- binding

There are other things that can be done with motties:

- The diameter can be measured with calipers prior to drying and then again afterwards so that the amount of shrinking can be measured (and this will give you an indication of cracking etc).
- In the 80s Stewart added an exciting adaption to the motty test. By this time, investigations had revealed that the cause of a number of unsatisfactory wickets was the lack of integration of new topdressing with the existing soil on the square. In many instances, new loams will not bind with the old, or shrink and swell at different rates and when this gets buried under later topdressings we have LAYERING or continuity breaks….the death of many a square in terms of pace and bounce.
- How then was a groundsman to know whether this years loam was compatible with last years? Perhaps you are thinking of changing loam and want to know if it will sit well with the new stuff?
- Stewart came up with the idea of making motties out of the old material and the new, cutting them in half and then joining the two materials together. When the motty test was applied to the 50/50 motties, compatible loams will not show a marked tendancy to split apart at the join……some incompatible soils may even split apart in the drying process.
- So it is vital that loams be compatible. Compatibility, or lack of it, is not really to do with the relative clay content of each loam, but more to do with the amount and rate at which the soils shrink during the drying process. Two loams with different shrink/swell characteristics will separate as a wicket dries during preparation and will leave voids and ‘soft’ spots in a wicket, leading to dead wickets. The problem is that you won’t even know about it until 20 years down the line when this layer of loam is

at a depth of around 20 mm or more, since when it is near the surface the sheer mass of roots in the top will compensate to a degree.

- In many ways, a motty is like a mini cricket wicket (without the grass): You moisten the soil if necessary, you smooth out any granulation, you squash the air spaces out of it. You give it a smooth skin when you roll it into a ball, and then you dry it steadily.

CHOOSING A CRICKET SOIL

- You must match your cricket loam with your available resources.
- There is no good in choosing a very heavy loam and then not having the time, machinery, knowledge of resources to deal with it.
- As a rule of thumb, the less time, resources and expertise you have the lighter the loam. You will get far better wickets with a lighter loam than you will with a heavy one if your resources are limited.
- It is unusual to find that a lack of pace and bounce are due to the type of loam being used….the cause is usually something else like thatch, layering, insufficient drying, too much organic matter etc, so before you consider changing loam, eliminate everything else.
- Don't change loam without checking compatibility with what you have!
- It is not impossible to change loams when the two are not compatible but it needs to be done correctly, changing over gradually by mixing the new with the old 1:3, then 1:1 then 3:1, at all times making sure that you have provided a good key to enable the new material to integrate into the surface well, if necessary hollow coring first (but do limit the depth of cores to 2" max or you will struggle to satisfactorily fill them).

Chemical applications

By chemical application, we mean the application of weedkillers, fungicides, pesticides, lumbricides etc.

It is not the intention of this course to give you a great deal of information of chemical applications to the cricket square because to do so yourself requires a formal qualification.

We are lucky enough to have Brian Fletcher as a pitch advisor who is BASIS and FERTS qualified and so can advise you on the use of chemical applications.

If you are not qualified to do so you must not apply any pesticides yourself. The formal qualification for pedestrian sprayers is the NPTC Pa1 followed by the Pa6, and for tractor mounted boom sprayers the Pa1 followed by the Pa2.

NOTES:

Squaring off a cricket square and establishing pitch positions

Prior to the season beginning or the first pitch being prepared, it is important to ensure that the square is indeed square and that the individual pitch positions are marked out and are 22 yards in length in order to establish the true stump lines.

We do this using a 3,4,5 triangle or multiples of those numbers.

The larger the measurements the more accurate you can be.

Once the stump lines are 22 yards apart and the corners square the positions of the corners of each pitch should be marked using either a ‘T shape’ or by some other method. If the club can afford it, installing permanent plifix ‘carrots’ will mean that the squaring off process is not needed again.

This is a practical demonstration, but you are urged to makes notes or draw diagrams!

NOTES:

Repairing a Foothole

When a foothole needs to be repaired on a pitch that is to be used again the following day:

- Brush out all debris from foothole until as clean as possible.
- Gently add water to base of foothole, making sure the whole area gets wet, from bottom to top edge. Do not make a puddle, add water slowly and evenly, rubbing in with fingers until consistency is similar to just melted butter (a mist sprayer is the perfect tool for this job). This 'slip' provides a binding agent for the new material.
- Add slightly moist cricket loam to hole. Moisten loam in a bucket or barrow by spraying with mist sprayer whilst mixing vigorously with other hand. Be sure to continuously mix whilst adding the water. The loam should be moist enough to hold its shape when squeezed in the hand, but easily broken again to a breadcrumb-like consistency. When adding the loam, the shape of the foothole should be mirrored above the level surface of wicket, so level is proud of the surface by roughly the foothole depth.
- Compress the mix with your foot, working from the outside of the foothole to the centre.
- Using a punner (elephant's foot) and again, working from the outside edge towards the centre, compress the mix using light blows at first. Gradually increase the power of the blows until the mixture is flat and at same level as surrounding ground. The final blows should be very heavy.
- When satisfied with the level, add wicket dust to the foothole, rub in well with palm of hand, then brush of excess with dustpan and brush.

How to prepare a cricket pitch

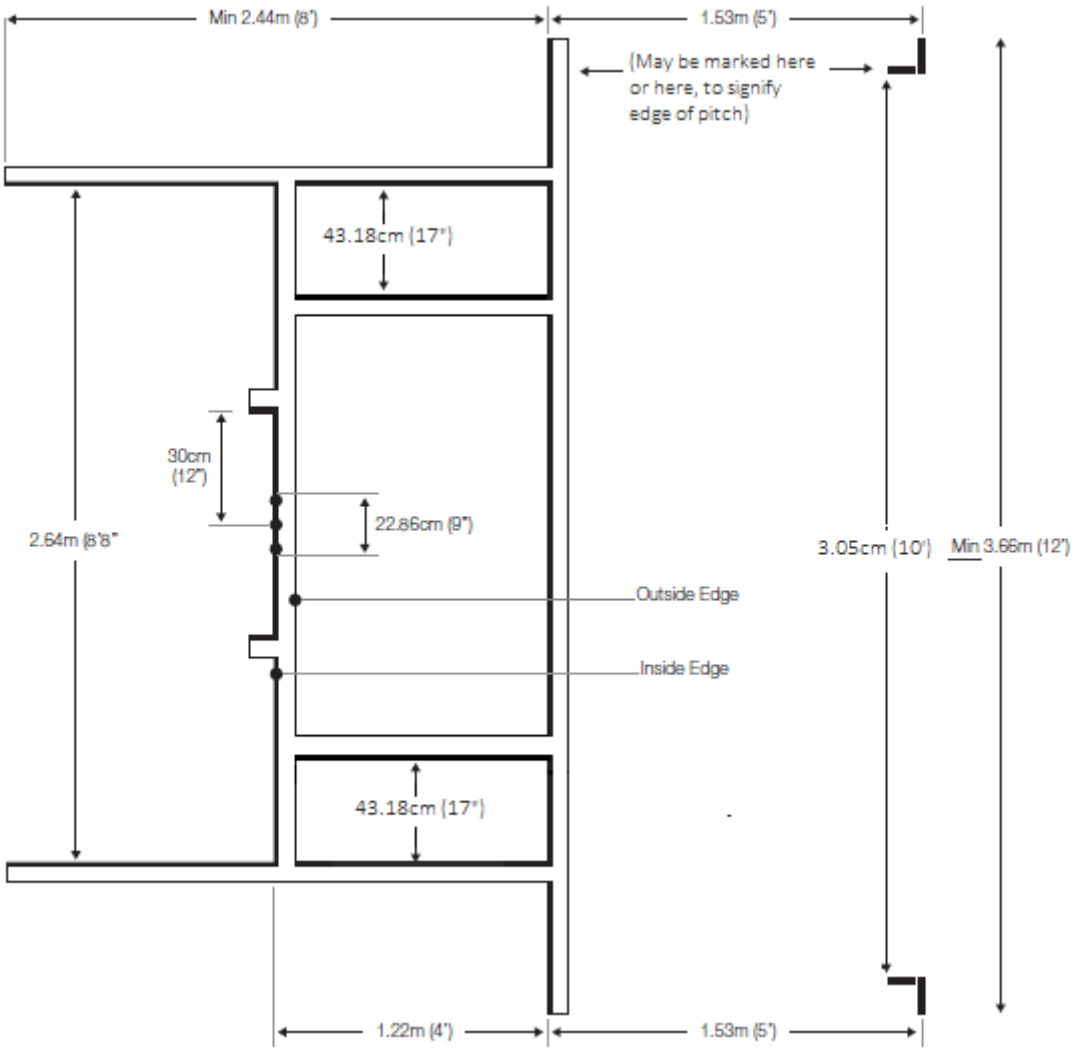
Different people have their own exact methods of how to prepare a cricket pitch, and since each square is different, each set of fixtures unique and every pitch preparation subject to different weather conditions, so must your pitch preparation be flexible and suited to your own square.

Early or late in the season the length of time needed to prepare a pitch may be longer, just as during very hot weather pitch preparation time gets shorter, but here follows a brief guide for a suggested ten-day pitch preparation, suitable for most clubs:

- Day 1: - Establish the edges of the pitch to be mown and mow at 10mm.
  - String lines are invaluable if you haven't perfected the technique of mowing laser straight!
  - Thin the grass out and groom it to remove as much lateral growth as possible and expose some soil between grass plants using a verticutter, scarifier, hand scarifier, brush, springbok rake or whatever is at your disposal, mowing in between passes. Under no circumstances should you be penetrating the soil.
  - Examine the pitch and repair any depressions or scars by levering up the soil gently with a smallish flat head screwdriver.
  - Water the pitch well enough so that the top 100mm is soft and malleable. This will probably require either the use of a sprinkler hose, travelling sprinkler or several applications with the hose as well as covering under a flat sheet.
- Day 2: - Check that enough water is present in the soil by inserting a probe or removing a core. The probe should be able to be inserted with ease to a depth of around four inches and a core should be plasticine.
  - Only when the soil is sufficiently wet to depth can rolling commence.
  - Remember the rule of thumb…the soil should be malleable but not wet. The soil should take a depression from the thumb, but the thumb should not be wet (slightly damp is ok)
  - If the roller marks the surface then it is too wet and must be allowed to dry.
  - Ideally brush the surface prior to mowing
  - Mow at 10mm
  - Roll for 20-30 mins
  - Brush again to stand the grass back up
- Days 3 – 7: - Brush, mow, roll daily or as your time allows. Make sure the pitch is protected from rain as soon as the preceding weekend's games have finished, giving you seven days drying as worst case scenario, but taking the covers off whenever you can to allow good drying.
  - If the weather is good the two rolling sessions can be done in a day if time allows, allowing drying time in between.

- Do not cut the grass shorter than 10mm as the leaf is required for drying the pitch via the roots (transpiration)

- Day 8-9: - reduce the grass height to your match height, brush and groom as much as necessary as part of the process.
  - If the pitch is nearly dry, i.e. the top is becoming very difficult to penetrate with a screwdriver then heavy rolling can either stop or reduce to a daily polish. If more rolling is needed to facilitate drying then 10-20 mins per session with drying time in between.
  - Don't be afraid to roll with the hand roller if you have one.
  - The last few days are ideally about allowing the surface to harden off.
- Day 9: - Mark the pitch out accurately and neatly. Presentation is important.
- Day 10: Final brush, cut and polish with roller ready for play.



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