



Largs Golf Club

Advisory Report on the Golf Course incorporating the STRI Programme

Report Date: 25th August 2015

Consultant: Ian Craig

CONFIDENTIAL

Date of Visit: 3rd August 2015

Visit Objective: To review the annual condition of the golf course, take objective measurements from the three indicator greens and confirm ongoing maintenance requirements.

Present: Ms Doreen Reid – Captain
 Mr Robin Knox – Greens Committee
 Mr Iain Barr – Course Manager
 Mr George Morrison – Deputy Course Manager
 Mr Ian Craig – Turfgrass Agronomist, STRI Ltd

Weather: 14 °C and overcast.

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Executive Summary

- The prevailing weather conditions throughout 2015 have been very challenging with sustained low temperatures through the early part of the summer and well above average rainfall for the time of year. On average 150-200mm of rainfall has been experienced throughout the west of Scotland in the month of July, almost double the average for this month.
- Despite the difficult conditions, the general condition and presentation of the golf course is excellent and superb standards of performance are being delivered in response to accurate and sustainable maintenance.
- The greens are softer than they were at this stage in 2014 following the high levels of rainfall and subsequent high soil moisture, however they remain broadly within the firmness target.
- The ball roll qualities to the greens were quite simply superb. It is very pleasing to report a continued improvement in green performance year on year and despite the very high standards being set in 2014, a further improvement has been achieved this year.
- Organic matter accumulations in the upper soil profile continue to reduce in response to accurate and sensible maintenance practices, however the upper 20mm of the soil profile remains slightly outside target and some further cultivation work will be required.
- With the ever improving playing qualities of the greens, it is important that the intensity of maintenance is extended now to green aprons and surrounds. Work involving verti-draining, hollow coring, scarifying and sand top dressing is important to improve the firmness and ball release characteristics of these surfaces. The aim being to provide a seamless extension of the putting surfaces.
- The newly established tee on the 1st hole has performed extremely well throughout 2014 and was in very good condition at the time of inspection. Further work through the previous winter has been carried out with the reconstruction and extension of the Medal tee on the 5th hole, allowing greater variation in tee placements thereby improving the overall wear tolerance and playability of this surface.
- Sand top dressing work to the high traffic routes on the golf course, such as walk off areas between green and tee, has been ongoing and the benefits of this work have been evidenced throughout the winter months. These areas now retain grass cover on a more consistent basis through the winter months and surface stability and durability has been greatly improved.

Key Observations

Greens

The condition and playing performance of the greens, despite the poor weather conditions this year, is superb. The surfaces consist of an even blend of browntop bent and annual meadow grass and the condition and playing performance of these greens, despite the ongoing poor weather conditions, was simply superb. The surfaces are amongst the best inland greens observed so far this year and playing performance continues to improve on an annual basis in response to the excellent and accurate maintenance programme implemented.

Nutritional inputs are carefully controlled and this combined with the accurate use of Primo-Maxx growth regulator is helping to limit growth, meaning very little in the way of surface refinement is required to continually deliver excellent surfaces for routine play. Annual meadow grass seed head production has been particularly problematic throughout the country this year owing to the poor weather conditions, however little in the way of surface disruption was noted due to annual meadow grass seed head at Largs and this is largely attributable to the excellent botanical composition of the greens.

Evidence of microdochium patch was noted on several greens at the time of inspection. This is likely to be in response to the damp, humid conditions currently being experienced however an application of Heritage fungicide planned for the afternoon of the inspection day should suitably control this and ongoing monitoring of the surfaces for any further outbreaks should be sustained.

Pipe drainage has been installed to the notoriously wet 10th green, with a catch drain along the side of the green to collect much of the surface water before it reaches the green surface itself, with a main drain running across the green to remove any surface water. This work has been carried out to a good standard and the replaced turf has settled well with little or no impact on the playing qualities of the surface.

Toad rush was noted to the 18th green, this has been present previously however the particularly wet conditions experienced this year appear to have resulted in an increase in this weed species to the 18th green. On fine turf, toad rush tends to be only a minor blemish affecting poorly draining areas in wet years. The wet conditions this year have contributed to this and the surrounding topography to the 18th green is such that a great deal of surface water will run onto this surface in response to heavy and sustained rainfall. The long term aim must be to improve the drainage characteristics of this surface with extra verti-draining or treatment with the Air2G2 compressed air unit, however short term measures such as chemical control or hand weeding, or even plugging of the worst affected areas may be required should this begin to impact on the general playing quality of the 18th green.

Performance Data

The full suite of STRI Programme measurements were taken during the visit following a single cut at 3.1mm with the Triplex greens mower, no rolling was carried out due to the current mechanical problems with the roller. The results of the testing are shown in the table and graphs in the appendix section of the report and are summarised below.

- Average surface firmness was 84 gravities (range 80-88) which is just outside the ideal target range of 85-110 gravities. This is in response to the significantly high rainfall figures through the month

of July and an average soil moisture of 36% (range 35-38%) was also noted, which lies outside the ideal target range of 15-30%.

- Organic matter levels in the upper 20mm (see below) remain slightly outside the ideal target range and will therefore lead to slightly moisture retentive surfaces which will soften in response to rainfall. It should also be noted that the roller has been out of action for a number of weeks and more regular rolling as part of the routine maintenance programme will naturally lead to firmer surfaces.
- Average surface smoothness was 12mm/m and average trueness was 3mm/m which are both comfortably within the very challenging tournament target. These ball roll qualities are quite simply excellent and consistent with the best inland surfaces we test on a regular basis.
- Such excellent ball roll qualities are attributable to the careful management of nutrient inputs combined with the refinement programme in place and the ever improving botanical composition of the sward.
- Average green speed was 9ft 3in, which is ideal for routine play.

Organic Matter Content

Samples were taken and submitted to our laboratory for organic matter analysis at 10mm increments through the top 40mm of the soil profile. The results are shown in the table below with trends detailed in the appendix section of the report.

Organic Matter Content			
Loss on Ignition (%)			
	Green 3	Green 7	Green 13
0-10 mm	8.2	8.6	8.0
10-20 mm	5.6	6.7	6.7
20-30 mm	3.4	4.3	4.1
30-40 mm	2.8	3.1	2.9

- Average organic matter at the 0-10mm depths was 8.3%, which is still slightly outside the ideal target range of 4-6% however, has shown a reduction against 2014 at 10.7% and 11.8% in 2013.
- Average organic matter at the 10-20mm level is 6.3%, which is broadly within the target range and continues to show reductions in response to sensible cultivation practices such as hollow coring and the Graden sand injection scarification.
- Organic matter numbers below the 20mm increment are comfortably within the target range and of no concern.

Soil Chemical Analysis

Samples were submitted to our laboratory for routine chemical analysis of soil pH, phosphate and potassium. The results of the testing are outlined in the table below along with interpretation as required.

Soil Chemical Analysis			
	pH	P ₂ O ₅ (mg/l)	K ₂ O (mg/l)
3	5.2	5	24
7	5.1	5	24
13	5.1	51	28

- Average soil pH was 5.1, which whilst still on the low side is showing a gradual increase following the Microcal calcium carbonate applications over the last two years, which have gradually raised the pH from an average of 4.3 in 2012.

The Microcal applications should be sustained for one further year and should we see a further increase in response to this, these applications can then be relaxed.

- Phosphate levels appear to have dropped somewhat across greens 3 and 7, however both remain around the minimum threshold of 5mg/l and applications can be relaxed throughout the season with a granular application containing 5% phosphorous to be applied in the spring.
- Potassium levels would be considered ideal, meaning that inputs of potassium should be sustained at the current level.

Green Surrounds & Approaches

The general condition of these surfaces was excellent providing good extensions of the putting surfaces. Some verti-drain work has been carried out to improve the drainage characteristics of these surfaces, however with the ever improving performance of the greens, we should look to extend a similar level of maintenance to the approaches with hollow coring and possibly Graden sand injection scarifying work to be carried out to these surfaces to improve underfoot firmness during periods of wetter weather and some regular sand top dressing would be required in an effort to build-up appropriate accumulations of sand at the sward base. The long term aim must be to provide a seamless extension of the putting surface with consistent levels of firmness and ball release characteristics.

Tees

The general performance and overall health of the tees has been very good this season and the ongoing resurfacing works have been successful in improving and extending problematic tees. The Medal tee on the 1st hole was successfully extended in 2014 and has performed very well throughout the 2014/2015 seasons. The 5th Medal tee has also been reconstructed and has been established

using the Tillers Bar Medal blend (fescue and dwarf perennial ryegrass). The extension of this tee has resulted in excellent spreading of wear and tear with both Medal and Yellow tees being used on this surface routinely. The Bar Medal blend is working very well with the fescue and fine textured ryegrass blending in very well with indigenous species as well as demonstrating the excellent establishment and wear tolerance characteristics expected of a perennial ryegrass.

Key Recommendations

Greens

- The main area of focus to the greens must remain the reduction of organic matter through the upper 20mm of the soil profile. Whilst we have seen good reductions in organic matter over the last two years in response to hollow coring and Graden sand injection scarifying, some further cultivation work is required particularly to the upper 10mm in an effort to reduce these numbers down to target levels and once these targets are achieved it will be possible to relax the cultivation processes, provided that sensible maintenance and top dressing is sustained.
- We discussed verti-draining and hollow coring of the greens during the August maintenance weeks, the verti-draining will help to improve the infiltration rates and sustain a suitable surface firmness in during periods of wetter weather, however it is thought that the hollow coring should be concentrated to the problematic upper 20mm, as the soil profile beneath this depth requires no further treatment. Hollow coring to the targeted depth will facilitate the incorporation of sand into the upper profile without unnecessarily softening the surfaces thereby reducing the volume of sand top dressing required.
- The current nutritional programme along with routine applications of Primo-Maxx growth regulator are working very well in delivering consistent and superb surfaces and should be sustained.
- The toad rush infestation to the 18th green must be addressed and in the short term a herbicide application containing 2:4:D, such as Junction by Rigby Taylor, should be applied to the green. Alternately hand weeding or plugging of the worst affected areas could be carried out, however the long term aim must be to improve the drainage of this surface and extra verti-drain treatments should be considered as well as the Air2G2 air injection machine, which will help to decompact the underlying soil thereby facilitating the removal of water from the surface and reducing the likelihood of further infestation of the toad rush.
- A continuation of the Microcal calcium carbonate applications would be recommended for at least one more year in an attempt to increase and stabilise the soil pH.
- Ongoing browntop bent overseeding remains an essential maintenance operation as we look to continue the development of the excellent botanical composition of the surfaces. One to two overseeding operations during August and September this year would be ideal.

Green Surrounds & Approaches

- It would be ideal to continue to extend the maintenance into the green surrounds and approaches in an effort to develop surface firmness and all round playability. Twice yearly hollow coring and intensive sand top dressing would be required in combination with verti-draining or Air2G2 aeration to alleviate deep seated compaction and improve the overall drainage of these surfaces.

Traffic Routes

- Verti-draining and sand top dressing has been carried out to very good effect so far to high traffic routes from green to tee. The stability and durability of these surfaces in response to the wet weather continues to improve and already we see an accumulation of 5-10mm of sand at the sward base in response to these operations. This work should be continued on an on-going basis and extended out to further areas where necessary.

Signed



Ian W Craig BSc (Hons)

Turfgrass Agronomist, STRI Ltd

STRI is completely independent and has no alliances to commercial products, services or contractors. This ensures that our design, project management and advisory services provide the best solutions for each individual client.

The STRI Programme provides golf courses with measurements and data that help to monitor and assess golf course performance. The R&A has recently developed CourseTracker (www.coursetracker.org), a free, online business management tool for golf courses, to record, review and analyse golf club performance across many areas of your business, including the golf course. STRI believes The R&A CourseTracker combined with the STRI Programme provides the tools you need to objectively monitor and assess your golf course performance.

APPENDIX 1

PERFORMANCE DATA

Performance Data

STRI Programme Measurement Protocols

By taking measurements of the playing qualities we can accurately describe the standards being set and also compare the results against our target performance levels. Essentially, our aim is to produce a set of greens that receive approach shots correctly then provide smooth/true and well-paced surfaces for putting. It is important that the greens are performing consistently on any given day and as well as possible throughout the year.

Soil Moisture Content

The soil moisture content is measured using a Theta Probe Moisture Meter. Nine points are sampled on each green (3 x 3 grid pattern) and the average calculated. The Theta Probe measures volumetric water content (VWC) through the upper 60mm of the soil profile.

The moisture content of the soil profile has a significant impact on the playing qualities of the greens and also the health of the turf. When the soil moisture content is too high, the surfaces can become soft and the turf health can also suffer. When the soil moisture content is too low the consistency and uniformity of the turf can become compromised.

Surface Firmness/Hardness

The firmness of the greens is measured using the Clegg Impact Hammer. A 9-point sampling grid was employed to allow us to calculate an average hardness reading for each green and also determine the level of consistency within the 9 readings.

Green Speed

The speed of the greens is measured using a Stimpmeter. The speed is expressed as the average distance rolled by 3 golf balls that are delivered from the Stimpmeter ramp on a flat area of the green and repeated in the opposite direction. The greater the distance the faster the surface is deemed to be. At least two readings are taken from each green then the results were calculated using the Brede equation to take out any slope effects.

Smoothness/Trueness

The smoothness and trueness of the selected greens is measured using the Trueness Meter™. This device measures the smoothness (vertical deviation) and trueness (lateral deviation) of the putting surfaces with the level of deviation being expressed in millimeters per meter (mm/m). With these results, lower readings indicate a smoother or truer surface.

Our aim when maintaining the greens is to produce surfaces that are smooth and true for putting for as long as possible throughout the year. We are aiming to create smooth and true surfaces for putting that do not deflect the ball from its intended path ("snaking") or kill its momentum ("bobbling" and "chattering"). During the main playing season, our target range for smoothness is <25 mm/m of vertical deviation and for trueness <10 mm/m of lateral deflection. The lower end of these target ranges represents fantastic putting surfaces with the higher end providing really good standards for routine play. These target ranges are very challenging but we are striving to achieve the highest standards of play.

Performance Measurement Results							
Green No.	Speed (distance)	Smoothness (mm/m)	Trueness (mm/m)	Firmness Mean (gravities)	Firmness SEM (±)	Moisture Content (%)	Moisture Content SEM (±)
3	9 ft 1 in	12.1	3.0	88	1	35.8	1.2
7	9 ft 5 in	12.6	3.5	85	1	35.4	1.2
13	9 ft 7 in	11.6	3.3	80	2	38.1	1.1

Figure 1

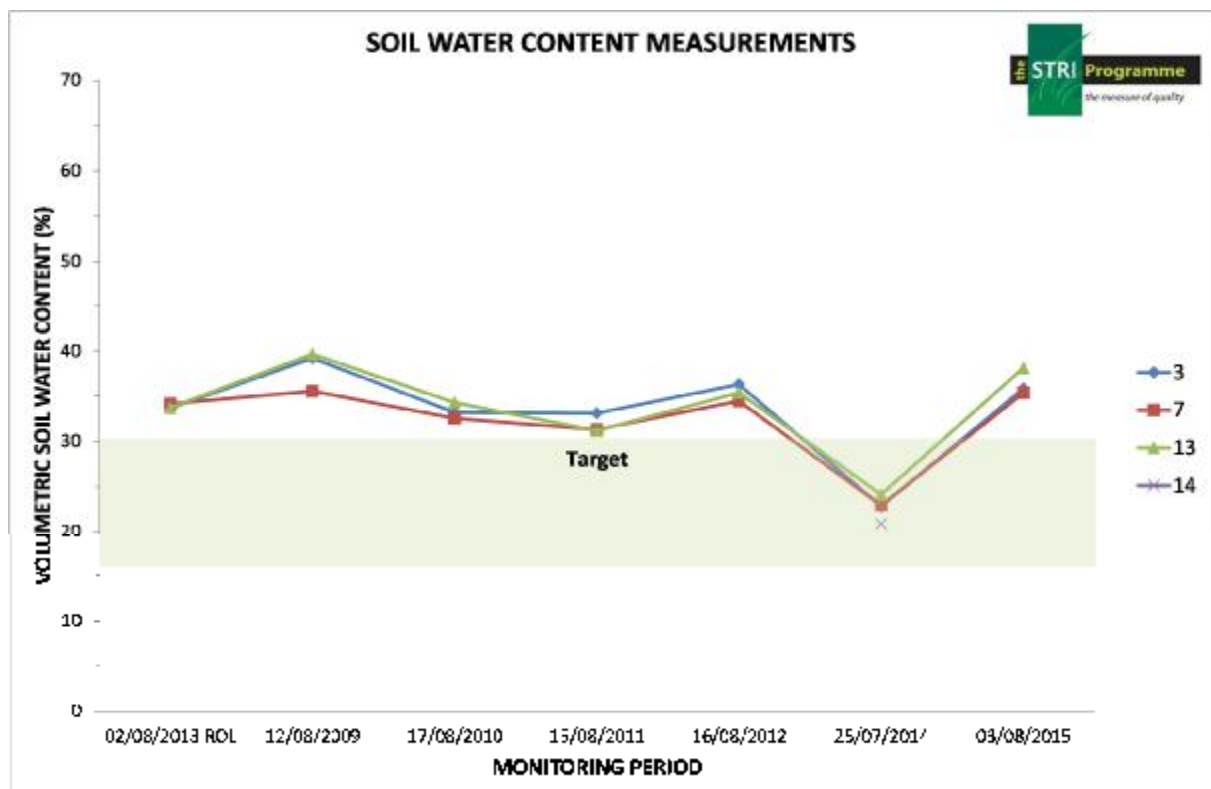


Figure 2

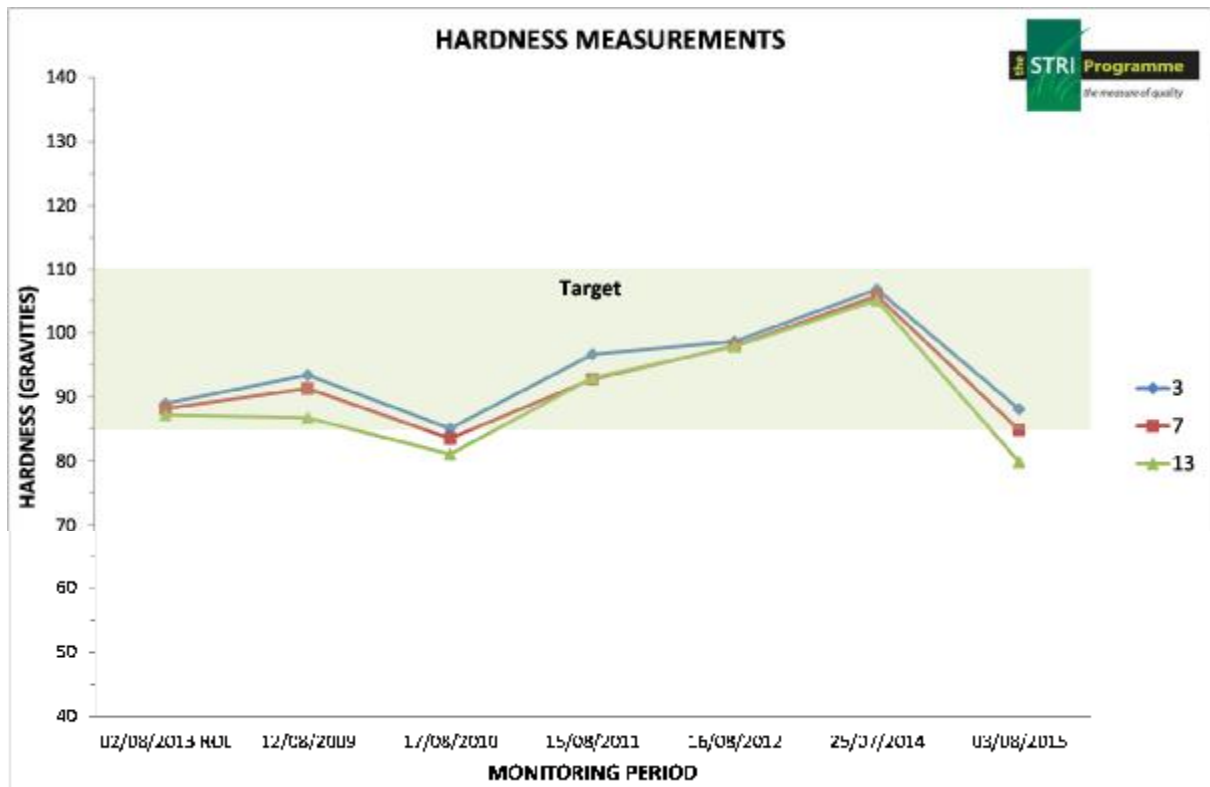


Figure 3

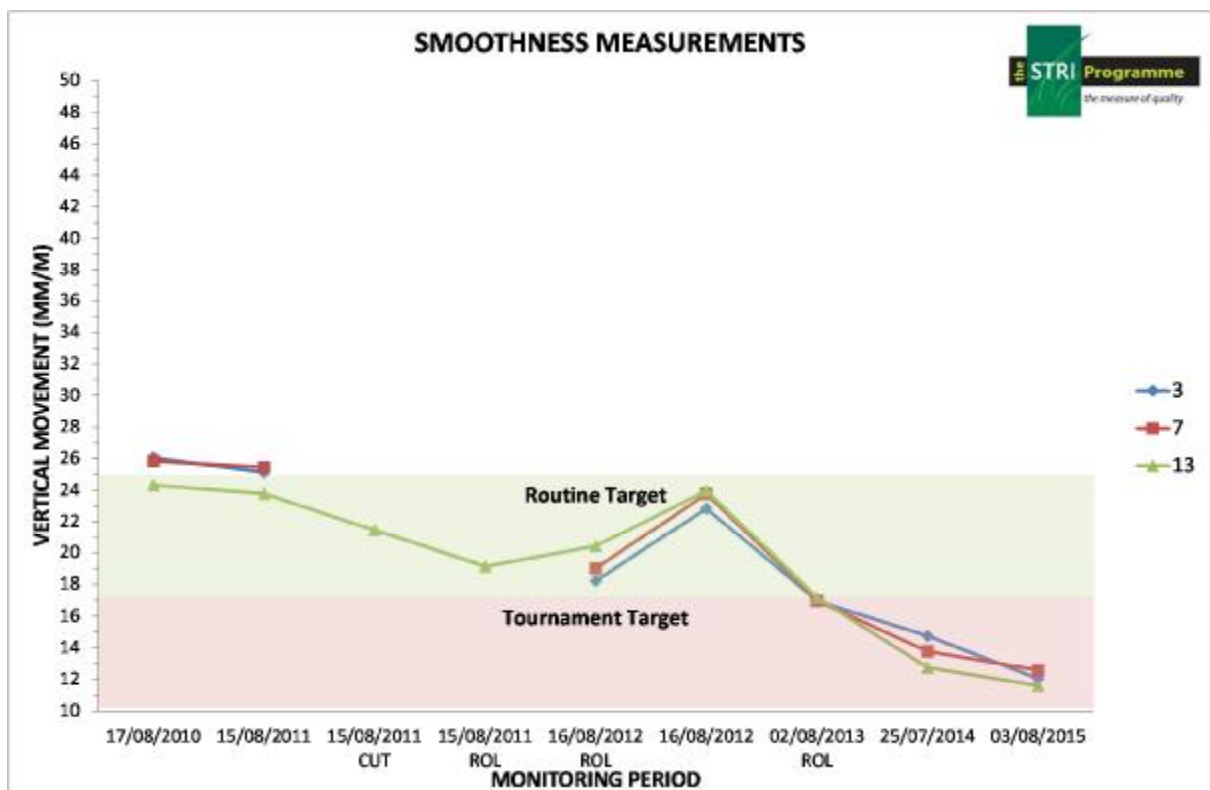


Figure 4

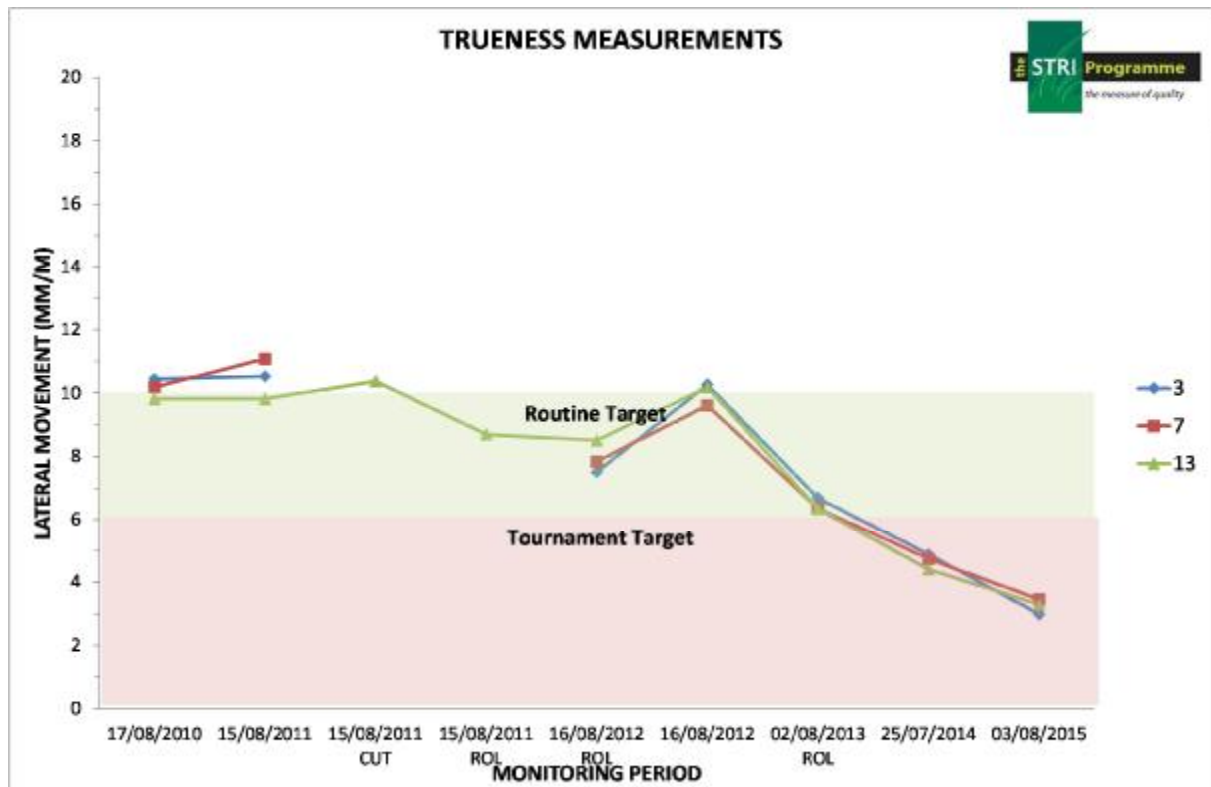


Figure 5

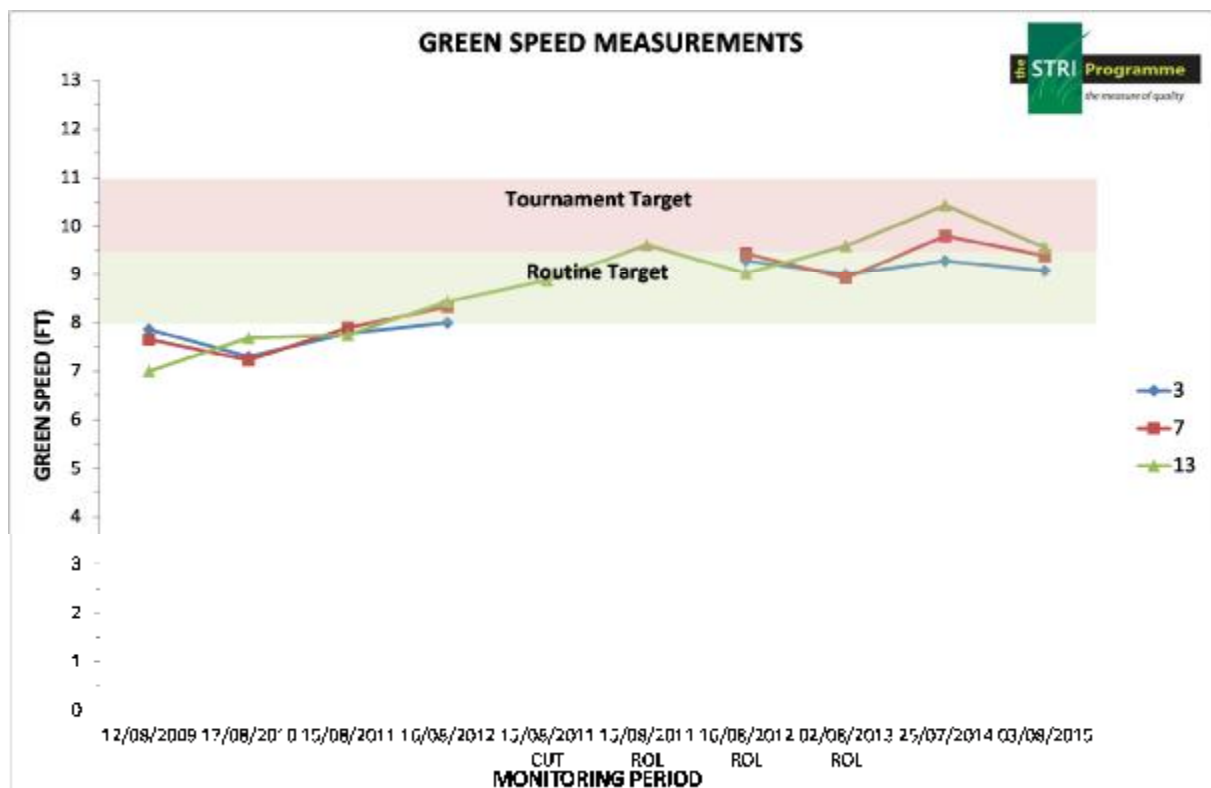


Figure 6

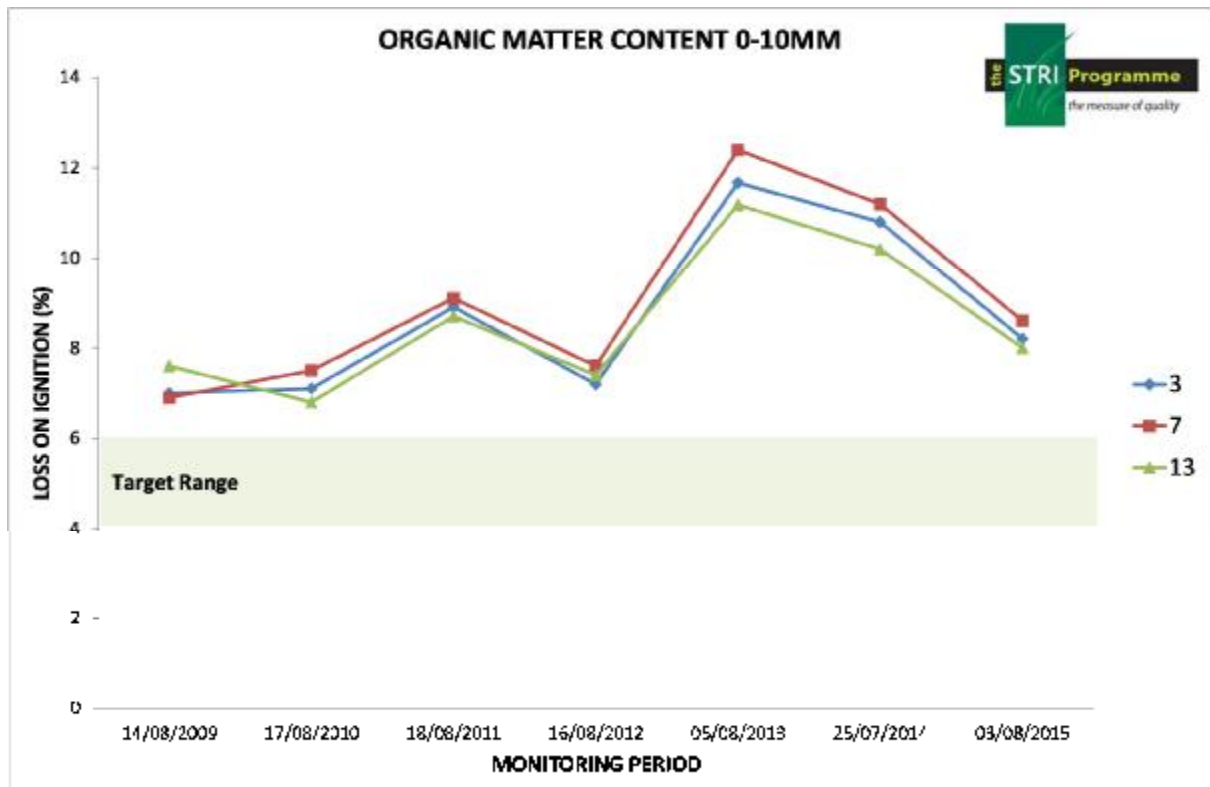


Figure 7

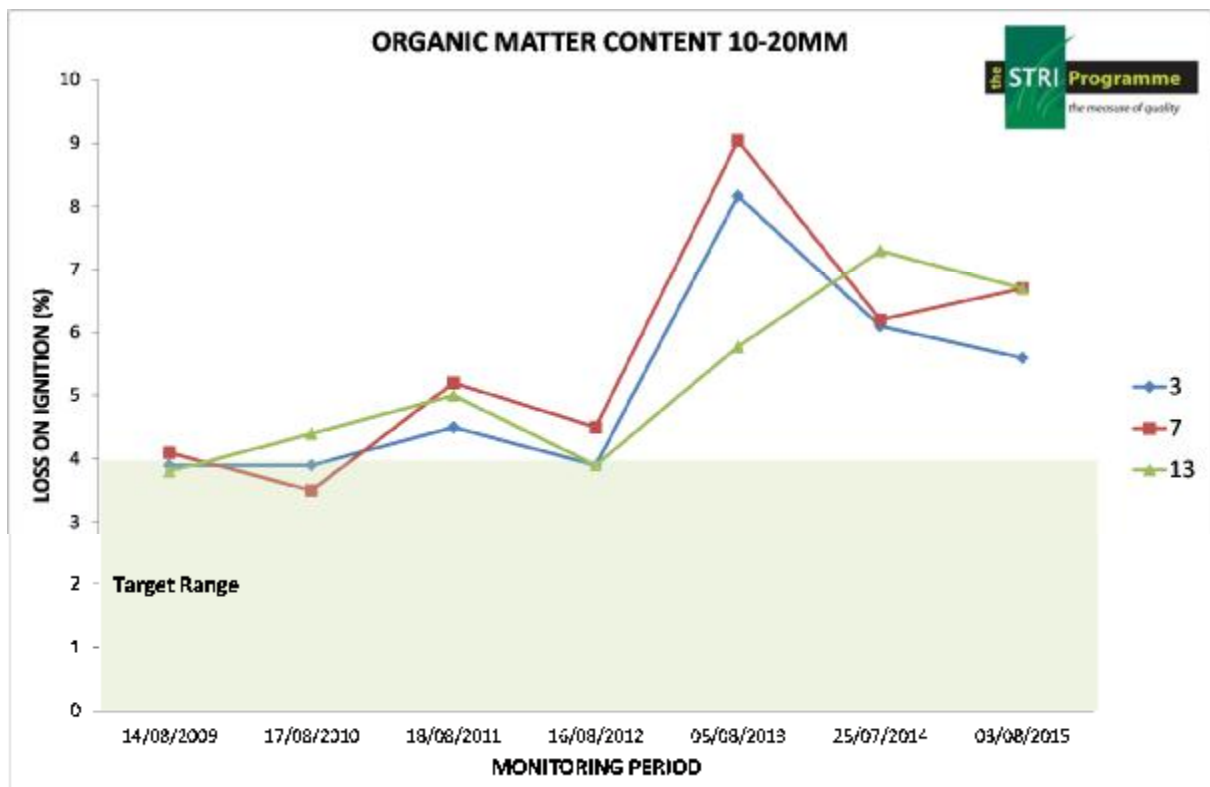


Figure 8

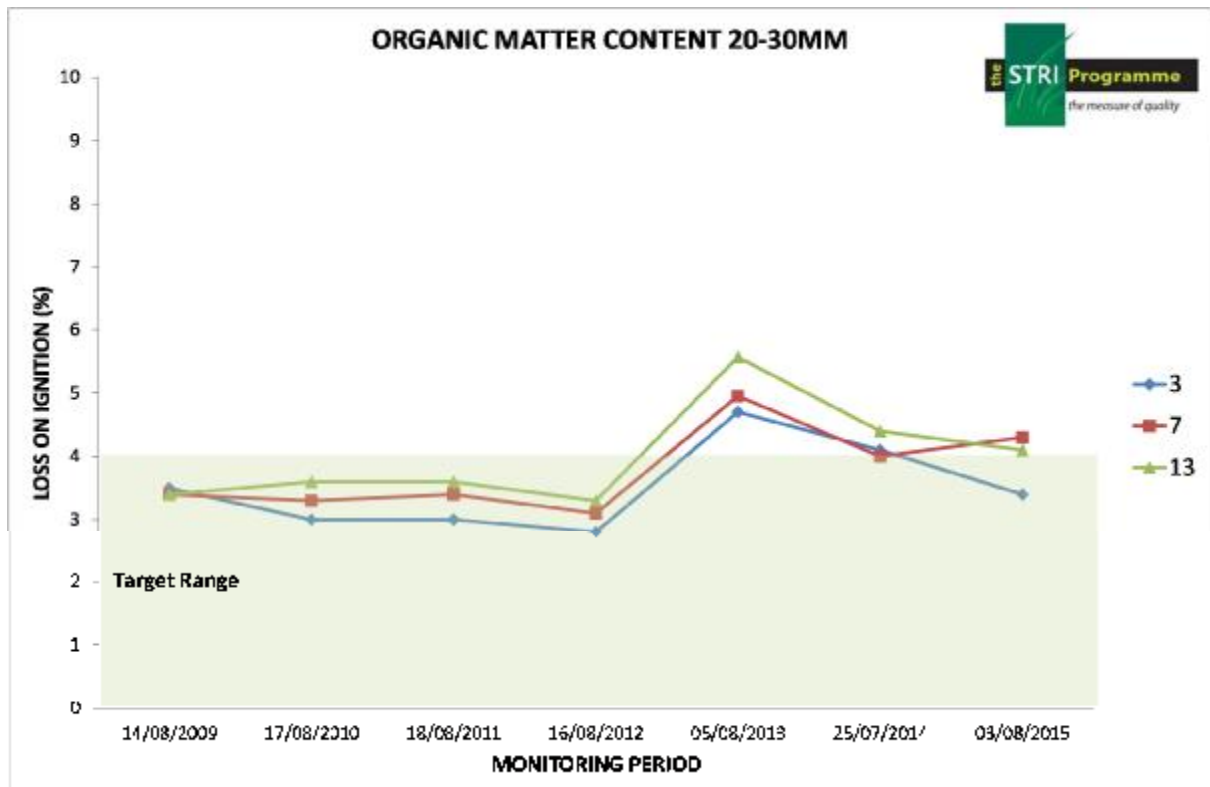


Figure 9

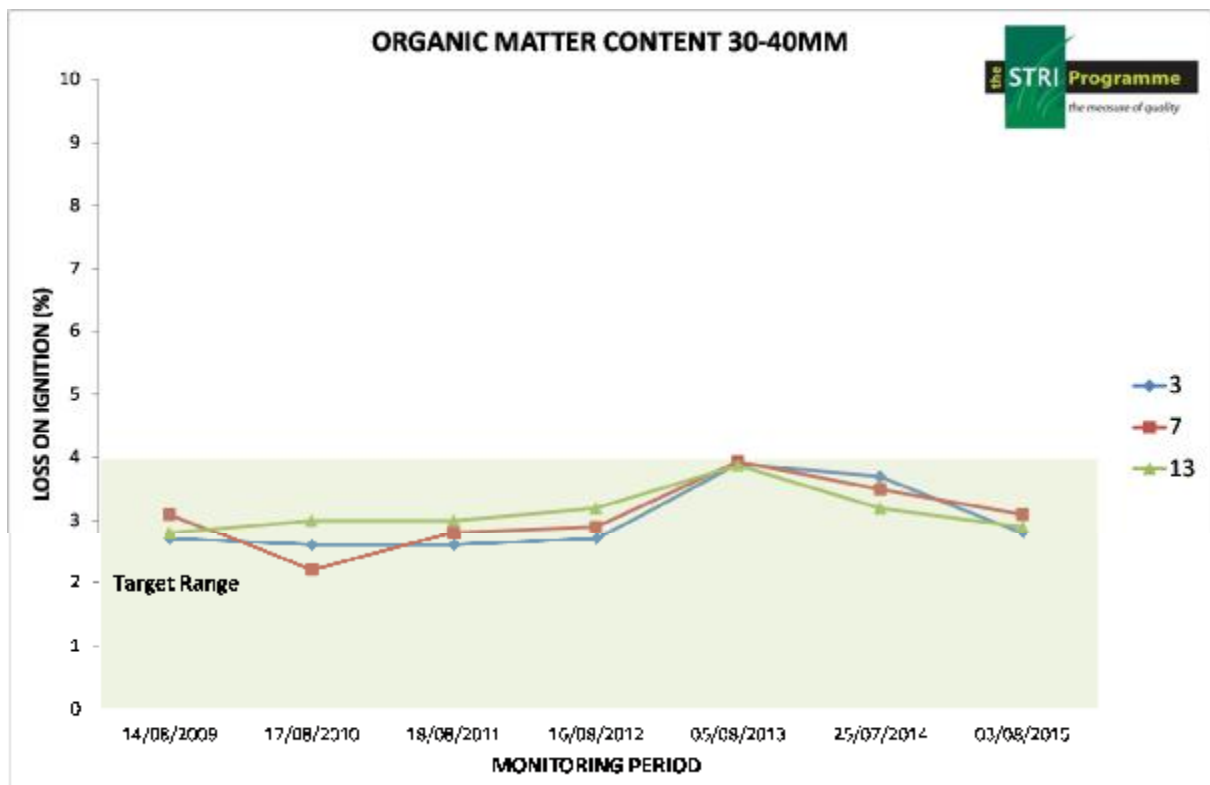


Figure 10