ANALYSIS OF THE SEASONAL EVOLUTION OF A SPORT TURF SURFACE FROM MOTRU (GORJ COUNTY) – CASE STUDY

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Abstract. *Turf grass became an essential element for sport and recreational purposes. Many sports are practiced on turf grass and it has multiple functions, the main for sport being the attenuation of the impact with the soil providing a very good protection by the considerable amortisation capacity in comparison with other types of surfaces. Thus, the presence of turf grass on soil surface diminishes water evaporation, maintains a lower temperature at the soil level due to the evapo-transpiration process. The object of this research is represented by a football field from the town Motru (Gorj County). The turf from Motru stadium is dominated by the species Poa pratensis and Lolium perenne. This has a relatively good condition because it benefits by constant maintenance works. There were collected data in 10 observation moments, respectively 18.03.2019, 27.03.2019, 1.04.2019, 13.04.2019, 20.04.2019, 24.04.2019, 12.05.2019, 26.05.2019, 9.06.2019 and 17.06.2019. The analysed features of the turf were: density, resistance to traffic, resistance to diseases, colour, finesse, summer resistance and global aesthetic aspect. After the analysis of the data regarding the turf grass from the Motru stadium we have concluded the following: the turf has medium quality regarding most of the analysed aspects; in spring was registered the decrease of the diseases resistance; on the turf surface are present several weed species, the most abundant being Taraxacum officinale, Cynodon dactylon and Trifolium repens. Some of the problems appeared at the level of the sport field from Motru were produced due to the high amount of rainfalls that have a high frequency, this fact was disturbed the application and frequency of the maintenance works as mowing, antifungal treatments and weed control. According with the obtained results there is recommended prevention of the diseases, one measure being the collection of the mowed biomass. In the periods characterised by high atmospheric moisture there is necessary the application of fungicides. Thus there is recommended planning of fertilisation and application of macro- and microelements for the improvement of the leaves colour. For the dicotyledonous weed control is necessary to be applied specific herbicides and in the case of bare soil spots is necessary the over-seeding recommendable with Lolium perenne.*

Keywords*: turf-grass, sport field, quality indexes*

INTRODUCTION

Sport turf is designated to the surfaces where take place different sportive activities. Because there are numerous sports that use turf-grass pitches were developed many turf-grass types. These must to be resistant to traffic with different intensities and to have a very good regeneration. Also, the pitches must to be in good shape indifferent by season and meteorological conditions. Extreme climate conditions (moisture, temperature and shading) (MOISUC *et al*. 2001, MOISUC *et* SĂRĂŢEANU, 2008).

The health and social benefits of sport and exercise practicing is well documented in literature, that why is necessary to use safe surfaces with good quality (STILES *et al*., 2009). Other researchers (PETROVIC *et* EASTON, 2005) consider that in some situations turf is polluting because it is intensively managed with many chemicals and high frequency maintenance works.

Researches on the impact of the players with the pitch surface were developed by in several works (EKSTRAND *et al.*, 2011; RENNIE *et al*., 2016; SÁNCHEZ-SÁNCHEZ *et al.*, 2017).

For the assessment of the soccer pitches regarding the FIFA requirement is applied a two-phase testing procedure. It includes testing of the product in laboratory and testing after the final installation. The testing phases are assessing the following features: interaction between player and surface, interaction between ball and surface, product composition, weather resistance, seam strength and service life (https://football-technology.fifa.com/en/media-tiles/about-football-turf/).

Other approach of the turf quality quantification was proposed by BARLETT *et al.* (2009), there being proposed four categories of tests for surface performance. In other researches is analysed the overall perception of the players regarding the pitch surface quality (ROBERTS *et al*., 2014).

MATERIAL AND METHODS

The topic of this work regards the analysis of the turf from a football field from the town Motru (Gorj County). Thus, the analysed qualitative features of turf there were common to most of the types of turf by visual observation of the field, they being used for the setting of the proper management of the field. The method of visual assessment of turf is widely used in the analysis of turf pitch (FRY *et* HUANG, 2004; CANAWAY 1990 cited by WOLSKI *et al.*, 2016, NTEP)

A synthesis of the main quality indexes of turf was described by MOISUC *et al*. (2001) is the following:

- ***Setting capacity*** is assessed according with the abundance of the vegetation at 2 – 6 months from setting (indifferent by the method used);
- ***Turf pitch density*** represents the soil coverage rate with turf pitch and is recommended to be assessed at a year from setting;
- ***Summer aspect*** refers to the green aspect of the turf pitch cover during summer, this can be influenced by drought, diseases *etc.*;
- ***Winter hardiness*** assesses the maintenance of the colour and vigour of the turf pitch during winter and early in spring;
- ***Resistance to traffic*** had in view the aspect of the turf pitch plants and the density after intense traffic;
- ***Resistance to diseases*** assesses resistance of the turf pitch plants considering that the disease changes the aspect, especially colour;
- ***Turf pitch texture*** of the leaves reflect the leaf report between length and width and determinate mainly the ornamental value of the grass;
- ***Rate of living ground cover*** differs depending by the component species of the mixture;
- ***Turf pitch general quality*** represents the synthesis of the quality indexes assesses, this being the result of the interaction of the external factors (drought, rainfall, attack of the pathogens, fertilisation, *etc*.) with foliage colour, density *etc*.

The assessment scale for the quality features of the turf pitch is from 1 to 9, when 0 means the turf has no quality and 9 means excellent quality (after MOISUC *et al.*, 2001 cited by SĂRĂŢEANU *et* MOISUC 2008)

The analysed football field has a vegetation cover dominated by the grass species *Poa pratensis* and *Lolium perenne* and generally is in a good shape due to regulated maintenance works applied. The data were collected in 10 observations, respectively in the following days 18.03.2019, 27.03.2019, 1.04.2019, 13.04.2019, 20.04.2019, 24.04.2019, 12.05.2019, 26.05.2019, 9.06.2019 and 17.06.2019.

The quality indices of the turf that were assessed during the researches from this work were the following: density, resistance to traffic, resistance to diseases, colour, turf pitch texture, summer aspect and turf pitch general quality.

RESULTS AND DISCUSSIONS

The football field from Motru is composed by a simple mixture of grasses, respectively *Poa pratensis* and *Lolium perenne*.

During the observation sessions from 18.03.2019, 27.03.2019 and 1.04.2019 there was noticed the existence of some important patches covered with dry plants. This fact is due to the presence of some fungal diseases favoured by the high air moisture and temperature from early spring till to the mid of the spring season. Thus, not all the dry plants were affected by diseases, a great part of them is represented by aerial parts of the grass species *Cynodon dactylon* that is a warm season species and starts the vegetation season later in April or during May at the end of spring, this species having the aspect of dry grass patches at the beginning of spring season where it has a high density. This species in our region is considered weed in turf pitch and it is almost impossible to be controlled in the turfs dominated by *Poa pratensis* because the herbicides that are controlling it are killing *Poa pratensis* too.

The following analysed time period (13.04.2019 and 20.04.2019) was noticed the appearance of *Taraxacum officinale* in a quite high rate, but this dicotyledonous species can be easily controlled by applying of specific herbicides.

In the following observation sessions (24.04.2019 and 12.05.2019) it was noticed the massive greening of the patches covered with *Cynodon dactylon*, this species forming in short time inflorescences.

In the last three observation stages (26.05.2019, 9.06.2019 and 17.06.2019) applied on the analysed turf pitch surface was noticed a certain improvement of all the quality features, due mainly mowing, this applied correctly creating a uniform and homogenous aspect of the turf surface. There were registered some difficulties in the correct applying of the maintenance works because there were frequent and abundant rainfalls that haven't allowed the correct timing of the main maintenance works, respectively mowing, treatments for the control of diseases and weeds *etc.*

The assessment of the quality features of the turf pitch that were available for evaluation during the analysed period of time were the following: density, resistance to traffic, resistance to diseases, colour, turf pitch texture, summer aspect and turf pitch general quality.

Below is analysed in a comparative manner the evolution of the main quality features of the sport turf from Motru football field in the time of the observation period.

Turf pitch density (figure 1) was good and even very good (13.04.2019 and 12.05.2019) during the analysed period, for this quality features there being given marks 8 and 9 on a 1 to 9 assessment scale.

Other quality features characterized for this turf surface is represented by the texture (Figure 2), this feature being influenced by the species that are composing the floristic structure of the turf pitch mixture. In the case of the stadium from Motru the leaf texture is coarse because of the dominant species that are present in the mixture (*Poa pratensis* and *Lolium perenne*), they not having very thin leaves.

Regarding the characterization of the quality index foliage colour (Figure 3) there was noticed an positive evolution, the values of the colour indices evolving from 5 in 18.03.2019 to 8 (13.04.2019, 12.05.2019, 26.05.2019, 9.06.2019 and 17.06.2019). Thus, the foliage colour had evolved from medium green to dark green, this meaning the increase of its quality during the vegetation period.

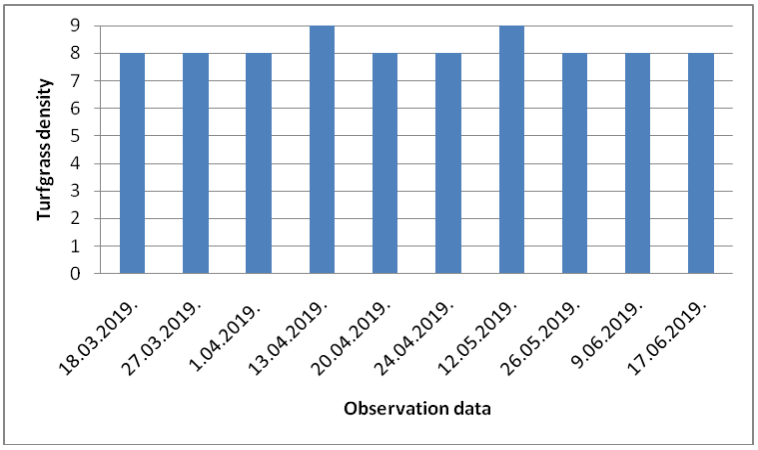

Figure 1. Analysis of the evolution of turf pitch density in the analysed time interval in Motru

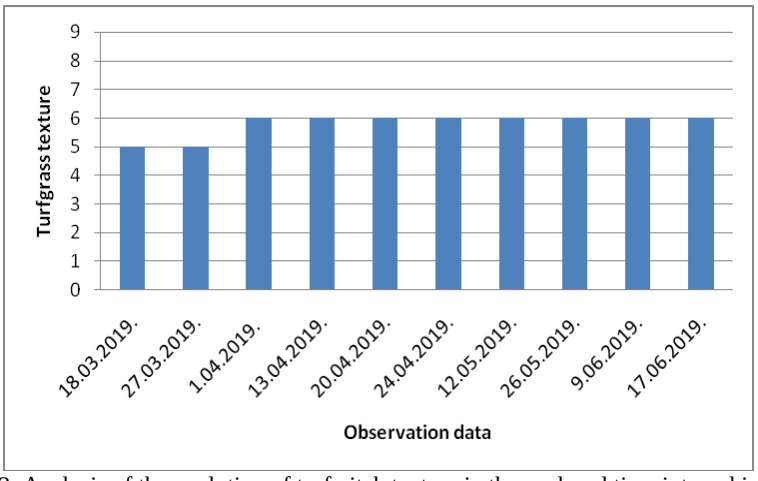

Figure 2. Analysis of the evolution of turf pitch texture in the analysed time interval in Motru

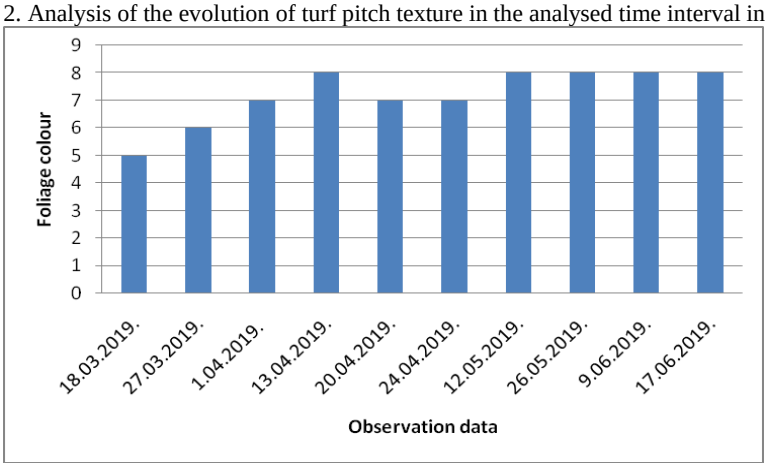

Figure 3. Analysis of the evolution of turf pitch foliage color in the analysed time interval in Motru

In the case of resistance to diseases (Figure 4) it was assessed as medium in the first part of the observations, but following the same trend as in the case of the foliage colour, respectively being marked with 8 (good) in 13.04.2019, 12.05.2019, 26.05.2019, 9.06.2019 and 17.06.2019.

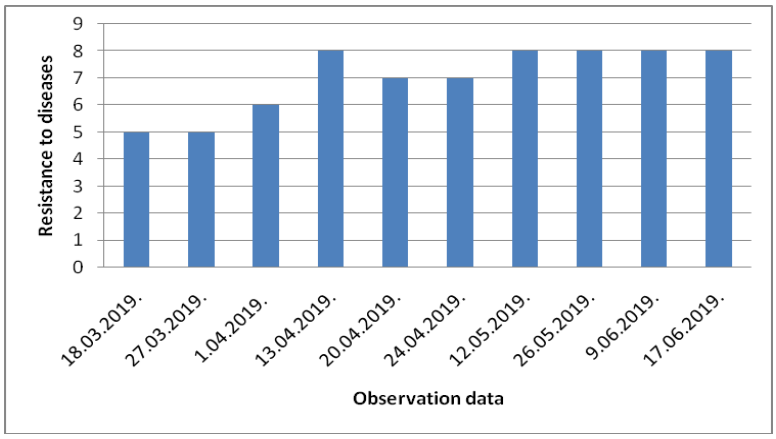

Figure 4. Analysis of the evolution of turf pitch resistance to diseases in the analysed time interval in Motru

Regarding the summer aspect or resistance (Figure 5) of the sport turf pitch from the Motru stadium this feature was marked with 9 (excellent), this aspect being considered best for the observation sessions (26.05.2019, 9.06.2019 and 17.06.2019).

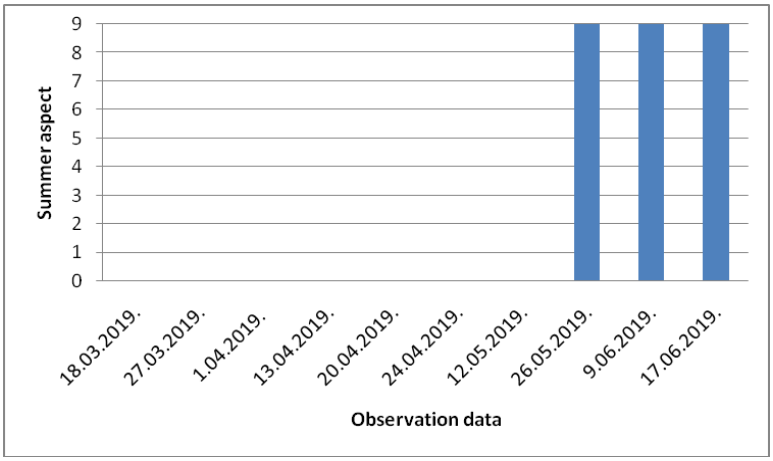

Figure 5. Analysis of the evolution of turf pitch summer resistance in the analysed time interval in Motru

One of the main qualitative features of the sport turf is represented by the traffic resistance (Figure 6), this being associated with the regeneration of the grass as soon as possible to be in a very good shape before the sport competition stages. For traffic resistance the marks given were 7 and 8 because it was considered that this qualitative feature was good along the analysed time period.

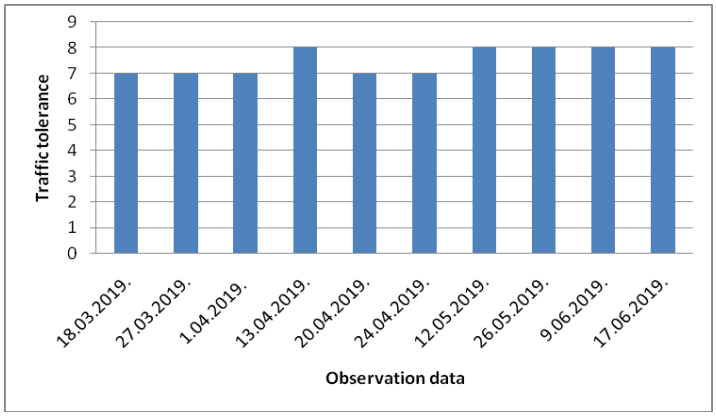

Figure 6. Analysis of the evolution of turf pitch traffic tolerance in the analysed time interval in Motru

The last quality feature of the turf analysed in this work is represented by the turf pitch general quality (Figure 7). From this point of view we have marked this feature in March with 6 because it was considered satisfactory, in April with 7 and 8, and in May and June with 8 because this feature was improved along the analysed time period.

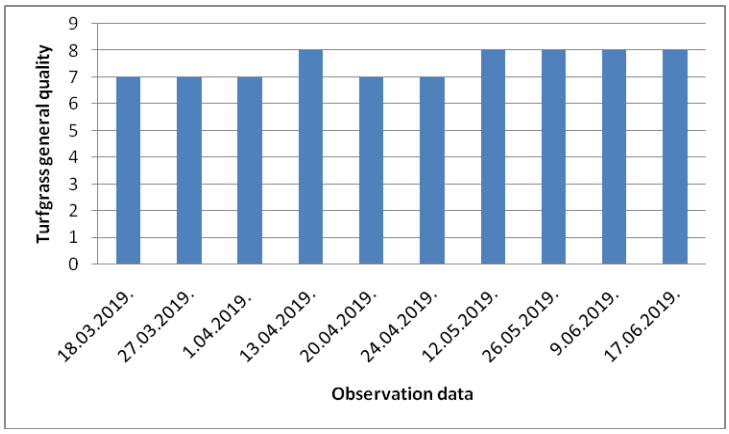

Figure 7. Analysis of the evolution of turf pitch general quality in the analysed time interval in Motru

A series of problems appeared at the sport field level were caused by the great amount and frequency of rainfall they being the main cause of the quality features decrease at the beginning of the vegetation season, but the problems disappeared with the warming of the weather.

CONCLUSIONS

After the analysis of the data registered during the observation sessions regarding the turf pitch from the stadium from Motru were concluded the following:

- Analysed turf pitch is satisfactory from the point of view of most of the studied features;
- In spring was noticed a decrease of the resistance to diseases;

- On the sport field are present in a high rate a series of weeds, the most abundant being *Taraxacum officinale* followed by *Cynodon dactylon* and *Trifolium repens*;

There is recommended the collection of the green mass resulted after mowing to avoid the appearance of the fungal diseases. Thus, is necessary to apply preventive antifungal treatments during the high moisture periods and to repeat the treatment as is necessary.

Also, is recommended the setting of a fertilisation programme with macro- and microelements to intensify the green colour of the foliage, to increase the resistance of the grass to environmental stress (drought, excess humidity *etc*.) and diseases, and to increase the regeneration capacity respectively the traffic tolerance.

For the control of dicotyledonous species is necessary to be applied herbicides. In the case of the patches without grass after weed control treatment is necessary the over-seeding with *Lolium perenne*.

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