THE FEATURES OF TURF VARIETIES COMMONLY USED IN LANDSCAPE AREAS

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Abstract

The aim of this study is to investigate the features of Festuca, Lolium and Poa turf genera and their species commonly used in landscape areas. All of these varieties are defined as cool climate turf grasses. Festuca genus includes one-year and multi-year species and especially the multi-year species are more suitable for landscape areas. Lolium contains the most used species for green turf areas. Poa is not only adapted to cool and rainy climates but also transition climates.

Key words: *turf, Festuca, Lolium, Poa, characteristics*

1. INTRODUCTION

With the increase in urbanization throughout the world, there is continuous interest in increasing the green ecological areas especially within cities and towns. Thus, creating 'green areas' for recreation and sports is becoming a great concern in cities and highly urbanized areas. With the high industrialization process, in the urbanized and overcrowded cities, in modern society, there is an increasing trend to improve quality of life through creating 'green areas' such as parks, ornamental gardens and recreational areas (Beard & Green 1994, Russi et al. 2004, Sampoux et al. 2012).

Due to the increased consciousness of modern society to recreational areas within cities, turf cultivation is becoming a significant agricultural sector, both from architectural and ecological point of view, with an important commercial value. Thus, nowadays, turf seed sector is expanding due to the fact, that at different areas, turf that is durable to drought, shade and trampling is of great demand in city parks, gardens and sports pitches. To meet the special requirements of a selected area for turf cultivation nowadays, a wide variety of species are used in turf mixtures depending on the climatic and environmental conditions, as well as the application purpose of the area where the grass land is being prepared (Nicholas et al. 2004, Cougnon et al. 2013, Haslgrubler et al. 2014). Nowadays, especially in temperate climates, species of *Festuca*, *Lolium* and *Poa* genera are the main preferred turf seeds for green areas. In the present review the main characteristic features of the main turf species of the aforementioned genera, in terms of their advantages will be described.

2. FESTUCA

The genus *Festuca* includes more the 100 species, most of which are widespread throughout the world. This genus belongs to the family Poaceae and subfamily Festucoideae (Thomas, Morgan & Humphreys 2003). Within the *Festuca* genus, there are species that are annual and perennial plants. This genus is especially used in the turf mixtures for multi-year application areas. These plants are well-adapted to temperate and rainy climates and at the same there are some species resistant to drought and infertile soil (Cougnon et al. 2013). The most important species of the *Festuca* genus, widely used in turf mixtures comprise *F. arundinacea*, *F. ovina*, *F. rubra commutata*, *F. rubra rubra*, *F. rubra trichophylla* (Avcioglu, 2014).

2.1. Festuca arundinacea Schreb.

Tall fescue (*Festuca arundinacea*) is durable to adverse climate conditions, as well as to trampling mostly at sports pitches. Due to these properties *F. arundinacea* is preferred particularly for sports

areas, hippodromes and highway landscapes (Cougnon et al. 2013). This species is well adapted to cool climate conditions. The width of its leaf lamina is quite big. It is not too much tillering, but it has quite dark green leaves, greatly affecting the appearance of the grassland. The roots of this species are very dense, strong and deep. It is produced mainly from seeds (Avcioglu, 2014). At cool and rainy regions and at temperate – rainy transition regions, when compared with other wheat-based plants, *F. arundinacea* is more resistant to hot climatic conditions. It is not resistant to extreme cold climatic conditions. It mainly develops well at low-acidic soils. Although this species develops best in fertile soils, it can be also grown successfully at infertile soils. Since it can be well-adapted to shadowy, arid and salty soil conditions, it is mainly preferred at hippodromes, highway and airport landscapes. An example of a green area of tall fescue is presented in Fig. 1.



Figure 1. A view of tall fescue (*Festuca arundinacea*)

Due to the recent breeding studies, new subspecies of tall fescue with thin lamina have been developed. The application of these newly developed tall fescue subspecies is being gradually prevailing in the USA, Spain, Italy, Greece and Turkey. Furthermore, these newly developed subspecies are widely used throughout the Mediterranean climatic zone in Bermuda or Uganda grasslands, especially to prevent "winter yellowing" by application of "over seeding". In order to obtain successful grassland from the areas where *F. arundinacea* is applied, harvesting from about 4-5 cm should be applied. Monthly 2-5 kg da^{-1} N should be provided to the grasslands where *F. arundinacea* is used and by disease preventing programmes very good green areas may be prepared (Avcioglu, 2014).

2.2. Festuca ovina L.

Naturally, sheep fescue (*F. ovina*) is wildly growing in North America, Europe and in Central and East Anatolia. Since it is no able to form a very green and quality landscape, its application in turf mixtures is not widespread. However, it is produced by seeding and is a perennial plant, which is quite resistant to drought and it can be well adapted to unfertile soils. *F. ovina* is especially used at sandy, acidic and poor soils. *F. ovina* is generally applied at highway landscapes where irrigation is limited (Avcioglu, 2014). An example of area with sheep fescue can be seen in Fig. 2.



Figure 2. A view of sheep fescue (*Festuca ovina*)

2.3. Festuca rubra L. *commutata*

This species is especially for the fact that it is a non-rhizomatous plant. *F. rubra commutata*, commonly known as chewing fescue, is not durable to cold climates, although it exhibits good stability and resistance to chewing, trampling and stepping on. Since it has a well-developed tilling structure increasing the strength of the turf, it is especially suitable for developing landscapes at sports areas. It is widely used in turf mixtures together with species such as *Lolium perenne* and *Poa pratensis* (Huylenbroeck et al. 1999). Fertilization of approximately 1-3 kg da^{-1} N per month is required for quality landscapes where *F. rubra commutata* are used (Avcioglu 2014). A green area with *F. rubra commutata* is presented in Fig. 3.



Figure 3. Chewing fescue (*Festuca rubra commutata*)

2.4. Festuca rubra L. *subsp. rubra*

Creeping red fescue (*Festuca rubra* L. *subsp. rubra*) is naturally growing in Europe. *F. rubra rubra* has several important advantages when landscape quality is considered. These are dense shooting, uniform and smooth structure as well as dark green leaves and strong rooting leading to an excellent appearance of the green areas (Fairey & Lefkovitch 1996). Throughout the world, at cold rainy climatic zones, as *F. rubra rubra* is one of the most preferred turf species, where shading and enough moisture can be applied, around buildings, at sports areas, etc. In Europe, this species is used in mixture with *Agrostis tenuis* Sibth. especially for kindergarten landscapes. It is generally applied via "over seeding" on Bermuda grass (*Cynodon dactylon*) which becomes yellowish during winter. It is approximately harvested at 2-5 cm height and around 2-5 kg da^{-1} N per month quality grassland may be created (Avcioglu 2014). Creeping red fescue can be seen in Fig. 4.



Figure 4. Creeping red fescue (*Festuca rubra* L. *subsp. Rubra*)

2.5. Festuca rubra L. *trychophylla*

Slender creeping red fescue *(Festuca rubra trychophylla*) is close similar to the other *Festuca* species, but it is more valuable for the worn-out areas and it has a desirable colour especially during winter (Demiroglu et al. 2010). It is more durable to drought and salty soils. The significance of this variety is continuously increasing, since this variety has the ability to cover up the free spaces among the other species, and especially during winter season *F. rubra trychophylla* has the ability to retain its characteristic green colour (Avcioglu 2014). Slender creeping red fescue can be observed in Fig. 5.



Figure 5. Slender creeping red fescue (*Festuca rubra trychophylla*)

3. LOLIUM

The *Lolium* genus is the oldest known genus that was cultured for turf purposes. For turf areas, this genus is one of the most preferred one within the Poaceae family, in terms of use in green areas. As it is well known the Poaceae family, formerly called Gramineae, is a grass family of monocotyledonous flowering plants. When suitable conditions for growing are achieved, the representatives of the *Lolium* genus are well adapted and capable of forming perfect turf areas (Sampoux et al 2012, Cougnon et al. 2013, Avcioglu 2014).

3.1. Lolium perenne L.

Perennial ryegrass (*Lolium perenne*) is a perennial plant, and is also called English turf. This plant is one of the most widely used plants throughout the world and historically it is known as the oldest known cultured plant of the Poaceae family. It is well adapted to mild winter and cool moist summer conditions, characteristic for Western and North-Western Europe (Sampoux et al 2012, Avcioglu 2014). It has thick tillering ability with a uniform structure. The colour of its leaves is bright green, and it has a great advantage among the other turf plants since its shoots are very suitable for grass cutting. Its characteristic root structure with a number of horizontal shoots has the capability of forming good turf areas. This perennial plant is produced by seeds. Nowadays, with the increase in the demand for developing green areas, annually, in Europe 33 000 tons perennial ryegrass seeds are sold for turf use (Sampoux et al. 2012). *L. perenne* is well-known for its very productive seeds that germinate quite fast after sowing. It is well adapted to climates with mild winter season and cool and rainy summer seasons. It is not durable to high temperatures during summer that is why this turf plant is not grown in the Mediterranean region. During the winter season it is quite durable to shade, and can be well-adapted to different soil types. Its performance is highest when grown on neutral or low acid soils. Nevertheless, at very humid and salty soils, its performance is rapidly decreasing (Wilkins et al., 2007, Avcioglu 2014).

4. POA

The genus *Poa* is well adapted to cool, humid and transition climates and comprises more than 200 species. The main characteristic feature of this genus is that the leaves of the representing species are in navicular form (cymbiform, boat like form) (Avcioglu 2014).

4.1. Poa pratensis L.

In the regions of both America, Asia and Europe, at cool and rainy climates throughout the world, *P. pratensis* grows quite well. At optimal growth conditions, this species is very good for green areas, with dark green colour and a lot of sprouts and shoots. In average at a period of 5 months this species has a very good capacity of forming green areas, due to its ability to form 6-15 cm long rhizomes from one sprout. From every nodal point of this rhizome, new sprouts are formed, and because of this, very hard root structure is obtained. Thus, the root structure of *P. pratensis* is very intense. The roots of this perennial plant might be enlarged to 15-20 cm depth in soil. Mostly, this plant is produced by seedling. Fraud and hot climate negatively affect the development of the roots and rhizomes of this species, thus leading to dormancy. When appropriate climatic conditions are provided, new sprouts are formed and this species again is able to form quality green areas. *P. pratensis* develops well at soils with pH of 6-7, but acidic and salty soils are inappropriate for the development of this species. Since this species is very durable to pressure, it is very appropriate for forming green areas intended for sports activities. Due to its high durability, this species is widely used for sod green areas. At average of height of 2.5-5.0 cm it should be cut. Monthly, the green areas prepared with *P. pratensis* should be fertilized at 2-3.5 kg da^{-1} N-fertilizer (Avcioglu 2014).

CONCLUSION

In the present review, some important characteristics of the major plants preferred for turf cultivation were discussed. The turf industry is one of the agricultural branches, having a tendency to develop with the increasing demand for green areas within cities. Thus, there is an emerging branch: the turf seed sector that is in search for economic and feasible grassland and turf seeds. Species from the genera *Festuca, Lolium* and *Poa* may provide quality green areas intended for parks, ornamental gardens, sports pitches, etc.

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