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Bridging the Needs and Research on Turfgrass at the Age of Climate Change

Conveners

Assoc. Prof. Songul Sever Mutlu

Prof. Dr. Giorgio Gianquinto

Prof. Dr. Erik Ervin

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2	Selection of <i>Axonopus</i> and <i>Paspalum</i> genotypes based on vegetative propagules tolerance to low temperature storage	Andreza Goncalves dos Santos*, Stella Áurea C. Gomes da Silva, Sueyne Marcela Santana Leite Bastos, Simone Santos Lira Silva, Francesco H Dubbern de Souza, A C R Castro, Vivian Loges
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ABSTRACTS

ORAL PRESENTATIONS

OS 1:

CLASSIFICATION OF FINE LEAVED FESCUES (*FESTUCA* SP.) COLLECTED FROM ANATOLIA BY USING FLOW CYTOMETER

Metin Tuna^{1*}, Elbi Cansu Yilmaz¹, Nazli Ulutas¹, Buket Sahin¹, Ilker Nizam¹, Gulru Yucel², Evren Cabi², Gulsemin Savas Tuna³, Celalettin Aygun⁴, Saban Isik⁵, Erdal Aksakal⁶, Sureyya Emre Dumlu⁶, Mustafa Uzun⁶, Kadir Terzioğlu⁶, Murat Atici⁶, Mustafa Merve Ozgoz⁶, Serafettin Cakal⁶, Songul Sever Mutlu⁷

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Fescues which includes approximately 400 species, are a very complex group of *Poaceae*. The species of the genus *Festuca* are important components of grasslands and lawns in the temperate regions of the world, and are also used for soil conservation. The fine leaved fescue is a common term used to describe a group of morphologically similar fescue species with very fine and narrow leaves. Their morphological resemblance and the existence of numerous ecotypes makes fine leaved fescue species' identification and classification a difficult problem for breeders, turf scientists, and taxonomists. The objective of this study was to classify approximately 400 fine *Fescue* populations collected from Anatolia based on their nuclear DNA content and ploidy levels determined by flow cytometer using PI as fluorochrome. Based on the results of the nuclear DNA content analysis, DNA amount of the populations varied between 4.63 and 13.08 pg/2C and they were clearly separated into 5 different groups. The results indicate that newly established *Fescue* collection investigated in the study includes more than one species and ploidy level. This study proved one more time that *Fescue* genetic materials



collected from nature can have a mixture of different species and ploidy levels. Therefore, they need to be characterized correctly before include them in breeding programmes, and flow cytometer is the most accurate, fast and economic method for this type of studies.

Keywords: Flow cytometer, nuclear DNA content, ploidy, *festuca*, taxonomy

OS 2:

PRODUCTIVITY OF *CYNODON DACTYLON* (BERMUDAGRASS) GROWN ON COPPER AND NICKEL MINE TAILINGS AMENDED WITH SEWAGE SLUDGE

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This plant trial project was conducted at the Botswana University of Agriculture and Natural Resources, Gaborone to establish the concentration of sewage sludge that is necessary to ameliorate the BCL mine copper and nickel mine tailings to support plant life. *Cynodon dactylon* was used as a model plant to record its productivity when growing in the mine tailings mixed with varying amounts of sewage sludge at 0, 104, 312, 624 and 936 tonnes per hectare. These quantities were mixed with 40kg of mine tailing resulting in five treatments. Each of the treatments was replicated three times. The mixtures were then placed into 10 liter polyethylene bags in which grass seeds were planted. All treatments had emergence within two weeks but the first three failed within a week. For the last two treatments data was collected nightly over sixteen weeks. Different parameters were measured including grass height, clippings fresh weight, turf density, colour and root fresh weight. It was found that the BCL mine tailings have very low pH and cannot support plant life with little or no sewage sludge. It was also found that sewage sludge could successfully ameliorate BCL mine tailings when used at a rate of 624 tonnes per hectare or higher. However, there was no significant difference caused by addition of 936 tonnes per hectare of sludge. It is therefore recommended that a concentration of between 600 and 650 tonnes per hectare can be sufficient to amend BCL mine tailings and others of similar characteristics and under climatic conditions that are similar to Gaborone, Botswana.

Keywords: Mine reclamation, re-vegetation, compost, organic matter, ameliorate

OS 3:

EVALUATION OF VEGETATIVE BERMUDAGRASSES FOR TRAFFIC TOLERANCE

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Use of vegetative triploid bermudagrasses (*Cynodon dactylon* x *C. transvaalensis*) have gradually increased due to their high quality and homogeneity especially on golf courses and athletic fields. Traffic tolerance is one of the important selection criteria of bermudagrass breeding. The aim of this study was to evaluate traffic tolerance of vegetative (triploid) turf-type bermudagrass candidates developed through interspecific hybridization. The experimental design was a randomized complete block design with three replications, established at Alata Horticultural Research Institute, Erdemli, Mersin, Turkey on August 2016. Fully established plots were subjected to traffic stress in August 2017. Simulated traffic was applied using a Brinkman traffic simulator for 7 weeks at a level roughly equivalent to two soccer games per week. Percentage of turf cover, quality, grass and chlorophyll index were rated weekly. Turfgrass shear strength, surface hardness and turfgrass density were rated twice, at the beginning and end of traffic treatment. Significant variations observed for traffic tolerance among candidates and commercial bermudagrass cultivar 'Tifway'. The application of traffic reduced mean shear strength, shoot density, chlorophyll content and quality of the plots. Some of the candidates (T4-C3) performed better during the stress than 'Tifway'. The hybrid bermudagrass with superior traffic tolerance and turf performance can be used for sustainable landscaping and sports turf.



Keywords: *C.dactylon*, *C.transvaalensis*, interspecific hybrids, athletic fields, Brinkman traffic simulator, turfgrass

OS 4:

EFFECT OF TRINEXAPACETHYL ON C4 TURFGRASSES

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Reducing turfgrass mowing frequency is often the goal of landscape managers who recognize the need to save time, money, or manpower. The objective of this study was to investigate the effect of repeated trinexapacethyl (Primo 250EC) applications on three C4 turfgrasses; *Axonopus compressus* (Sw.) P. Beauv., *Paspalum vaginatum* L., and *Zoysia matrella* Willd. Trinexapacethyl (TE) was applied at 1.5 L/ha for *A. compressus*, 1.2L/ha for *P.vaginatum*, and 1 L/ha for *Z. matrella* once in every four weeks for a period of six months. Fertility was maintained uniform at 0.2 kg N/100 m² per month for all turfgrass species. Turf treated with TE consistently displayed better visual quality than untreated turf regardless of the turfgrass species. *Z. matrella* treated with TE yielded 83.9% lesser clippings by weight than untreated turf, whereas *A. compressus* yielded 77.3% lesser and *P. vaginatum* yielded 56.9% lesser clippings than their untreated turf. TE treated turf recorded increased turf density (TD) and dark green colour index (DGCI) and, decreased shoot height than untreated turf irrespective of turf species. All parameters analyzed were effective in predicting the efficacy TE application. No phytotoxicity was observed following repeated TE applications. On practical conditions, TE application could cut down mowing frequency by 70-80% as per local turf maintenance standards. Understanding the efficacy of TE application on common C4 turfgrasses could be utilized to improve the quality of urban landscape and to reduce turf maintenance cost in Singapore

Keywords: *Axonopus compressus*, *Paspalum vaginatum*, *Zoysia matrella*, clipping yield, Primo 250EC

POSTER PRESENTATIONS

PS 1:

ESTABLISHMENT PHASE CHARACTERISTICS OF BRAZILIAN NATIVE GRASSES FOR USE IN TURFGRASS

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The objective of this work was to evaluate the establishment phase characteristics of Brazilian native grasses with potential to be used as turfgrass. Vegetative propagules from accessions *Axonopus parodii* (AP 01), *Paspalum lepton* (PL 01) and *P. notatum* (PN 01, PN 02, PN 03, PN 04, PN 05 and PN 06) were planted directly in the soils spaced 10cm x 10cm. The experiment was conducted in a randomized block design, with four repetitions of each accession, in the Rain Forest Zone of the State of Pernambuco, Brazil (lat. 08°01'19"S; 34°59'33"W; 100 m a.s.l.) in October, 2013. For 69 days after planting (DAP), vegetative propagules of the accessions were evaluated in terms of turfgrass: survival rate (SR - %); soil coverage rate (SCR - %); lateral growth expansion (LGE - cm); and height (H - cm). The linear regression of the SCR was performed according



to the evaluation periods (0, 15, 30, 45 and 69 DAP) and scores were assigned to the accessions. The PL 01 presented the greatest SR (97.00%) and SCR (93.08%), similar to PN accessions (SR \geq 83.00% and SCR \geq 92.31%), across the 69 DAP. Although AP 01 had the lowest SR and SCR (77.00% and 84.62%), it exhibited the greatest LGE (26.69cm). The AP 01, PN 01, PN 03, PN 05 e PN 06 had lower values of H (\leq 12.60 cm) suggesting less mowing would be required. In terms of higher values to SR, SCR, LGE and lower values for H. The PN 1, PN 03 and PN 05 accessions had the greatest scores (10 points) for all analyzed variables. These preliminary results demonstrated that native species AP 01, PL 01, PN 01, PN 03 and PN 05 have positive attributes to breeding programs and selection to turfgrass.

Keywords: landscaping, native plants, ornamental Turfgrass

PS 2:

SELECTION OF AXONOPUS AND PASPALUM ACCESSIONS BASED ON VEGETATIVE PROPAGULES TOLERANCE TO LOW TEMPERATURE STORAGE

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In Brazil, generally turfgrasses are established by vegetative propagules such as plugs or pieces of stolons or rhizomes with leaves. Therefore, the vegetative propagules capacity of storage and transport to introduce a new material should be known, as it will impact on the establishment of the turfgrass. The objective of this work was to evaluate the tolerance to low temperature storage of vegetative propagules of *Axonopus parodii*, *Paspalum lepton* and *P. notatum* for turfgrass establishment. The propagules were stored in a cold chamber at 6.5°C and 85% RH, according to the treatments: zero storage days (0 SD) which served as the control; 2 SD; 4 SD; 6 SD; 8 SD; and 10 SD. The following characteristics were evaluated: fresh mass before storage; fresh mass after storage; loss of fresh mass. After the storage the vegetative propagules were planted and, after 40 days they were evaluated in terms of: survival rate (%); soil coverage rate obtained through image analysis (%); number of tillers produced; and total dry mass. Despite the loss of fresh mass under storage at 6.5 °C for 10 days, the *A. parodii* and *Paspalum* accessions were tolerant to low storage temperature in which their vegetative propagules were preserved, maintaining high survival rate, soil coverage and tiller development.

Keywords: Lawn, landscaping, vegetative propagation, tiller

PS 3:

SCHOOL TURF MOVEMENT IN JAPAN

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School turf movement in Japan may be unique comparing to the other countries. Statistical data and newspaper articles were analyzed to clarify overview of increasing movement of school turfs. Case studies of school turf were conducted to collect special examples to promoting school turf. School turf in Japan had been very few until 2000. After 2000, school turf has been increasing. This movement may have been affected by the launch of professional football league in 1993 and FIFA world cup in 2002. National and local government made budget to construct school turf in these era. But the budget for turf maintenance has been only a few. There occurred a movement that schoolchildren, parents and local residents plant turfgrasses and maintain the turf grounds by themselves. One of the reason was to get school turf by less budget. But the movement produced more valuable effects. The school children love turfground which are maintained by themselves. Many parents have become to





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visit school to help turfground maintenance. As a result, the communication between children and their parents, among families, between parents and teachers developed wonderfully. Farther more, the family members and neighbors have various skills. They have become to plan special events by make use of their talents and turf ground. There found many special entertainments according to the personality of each schools. For example, various sports events, Japanese tea ceremony, traditional Japanese storytelling, watching movie after sunset and so on. These events are played on the turf ground. Making paper from mowed leaves of turfgrasses were devised by the author and fellows. This program has been adopted by some schools. The schoolchildren make paper from cut leaves after mowing turf ground by themselves. This program further motivates children's interest in turf. Thus cultivating turf ground is now producing the turf culture in Japan.

Keywords: School, turfgrass, ground

