Growth characteristics of ecotype superior line of bermudagrass and development of its rDNA markers

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Introduction Interest in turfgrass has steadily increased in Korea since the 2002 Korea-Japan World Cup . Use of zoysiagrass (*Zoysia japonica* L.) has been limited due to its slow recovery, low shoot density, short green period and low wear tolerance during dormancy (Lee *et. al*., 1999). Bermudagrass has high quality and fast recovery, but has low cold tolerance (Richardson *et. al*., 1978). This research compared the growth characteristics of a superior line of bermudagrass, named as Joyspy with other standard cultivars and to develop its rDNA markers.

Materials and methods Joyspy had been collected in Korea and growth characteristics were compared with the standard domestic cultivar Konwoo, and the standard imported cultivar Tifway-419 during 2003 and 2004. Plant height, leaf length, leaf width, leaf hair, covering speed, fourth internode thickness, fourth internode length, density (quality), disease resistance, green period and cold tolerance were examined. To find the rDNA markers of Joyspy, internal transcribed space (ITS) 1 primer detecting ITS 1 region of nuclear rDNA genes of fungi was used for PCR amplification and a new primer was constructed to detect the rDNA markers by PCR amplification.

Results Growth characteristics of Joyspy are summarised in Table 1. Joyspy had good growth characteristics such as high covering speed, narrow internode length, high density (quality) and cold tolerance compared to Konwoo and Tifway-419. From nucleotide sequencing of band amplified by ITS 1 primer, we found that eight nucleotides (CGGGAGTT) were missing in Joyspy. A new unique primer (front : 5'- GGC ATA ACA TGA CGT CAG GA – 3' : rear: 5'- GCG GAA GGA TCA TTG TCA – 3') was constructed to detect the missing region of nucleotides and a new rDNA marker was found for Joyspy by PCR amplification using this primer (Figure 1).

Table 1 Growth characteristics of the bermudagrass superior line ecotype Joyspy

Cultivar (line)	Plant height (cm)	Leaf length (cm)	Leaf width (mm)	Leaf hair (HML)	Covering speed (HML)	Internode thickness (mm)	Internode length (cm)	Density (Quality) (1~9)	Disease resistance (1~9)	Green period (HML)	Cold tolerance (1~9)
Konwoo	16	3.3	1.9	Low	High	0.9	2.5	3	1	Medium	5
Tifway-419	17	4.0	1.2	Low	Medium	1.0	4.5	5	1	Medium	7
Joyspy	10	3.5	1.5	Low	High	1.0	2.1	1	1	Medium	3

[#] 1: Strong (High), 9: Weak (Low)

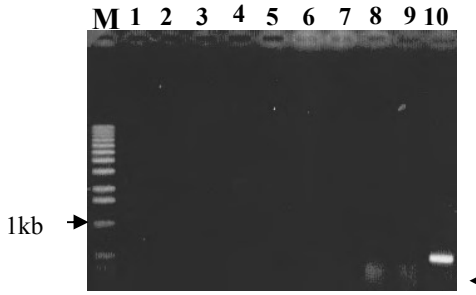

Figure 1 PCR amplification using unique primer
[#] Unique primer F : 5'- GGC ATA ACA TGA CGT CAG GA – 3', R : 5'- GCG GAA GGA TCA TTG TCA – 3'

[##] Lane 1-7: Zoysiagrass cultivars and lines, lane 1: Konhee, lane 2: Anyang-jungji, lane 3: Meyer, lane 4: S-94, lane 5: J01106, lane 6: J01067, lane 7: J01122, Lane 8-10: Bermudagrass, lane 8: Konwoo, lane 9: Tifway-419, lane 10: Joyspy (unique band indicated by arrow)

Conclusions Joyspy had good growth characteristics compared to other common cultivars of bermudagrass. Use of primers for amplification of fungal ribosomal RNA genes, specially ITS 1 primer detecting ITS 1 region of nuclear rDNA genes, was effective in developing the rDNA marker by PCR amplification.

References

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