Growth characteristics of superior lines of Zoysia grass (*Zoysia japonica*) and development of its DNA markers

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Introduction Demand for turf grass has steadily increased for recreation and sport fields after the 2002 Korea-Japan World Cup in Korea. Zoysia grass has the advantage of easy management, including low water and fertiliser requirement, but has limitations such as low recovery, low shoot density and short green period (Kim *et al*., 1999). Objectives of this research were to select superior lines in the collected clones, compare the superior lines of zoysia grass with other standard cultivars for growth characteristics and to develop the DNA markers of superior lines.

Materials and methods Zoysia grass clones were collected in Korea and their growth characteristics (Table 1) were compared to standard cultivars "Konhee", "Anyang-Jungji" and imported cultivars "Meyer" and "S-94" during 2003~2004. To find the unique band of superior lines of zoysia grass, SRILS UniPrimer (URP primer) originally developed from rice repetitive sequences (Kang *et al*., 1997) was used.

Results Growth characteristics of superior lines of zoysia grass are summarised in Table 1. A superior line named "Joydent" had good growth characteristics such as narrow leaf width, high covering speed, high density (quality) and disease resistance compared to "Konhee" and "Anyang-Jungji", "Meyer" and "S-94". PCR amplification using primer no. 6 from 12 URP primers tested appeared to have the unique band of superior line in lane 6 (Figure 1). New primer (front, 5F : 5'- AGC CTT GAA GTG TTC GAG TG – 3'; rear, 5R : 5'- ACC ATG CAT AGC GTA GCT TC – 3') from the nucleotide sequencing of this unique band was constructed for PCR amplification. "Joydent" had negative band using this primer (Figure 2).

Table 1 Growth characteristics of superior lines of Zoysia grass

tivar (line)	Plant height (cm)	Leaf length Cul (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)
Konhee	9	5.2	1.8	Low	High	1.0	2.5	1	1	High
Anyang-Jungji	29	12.0	3.8	Low	High	1.9	5.4	3	5	Medium
Meyer	26	9.1	4.2	Medium	High	1.8	4.9	3	5	Medium
S-94	27	12.8	5.2	Medium	High	2.1	4.5	3	5	Medium
Joydent	14	5.2	1.5	Low	High	1.3	2.7	1	1	High
J01067	24	9.3	3.8	Medium	Medium	2.1	5.1	3	3	Very high
J01122	23	8.7	4.6	High	High	1.8	3.6	1	1	Medium

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

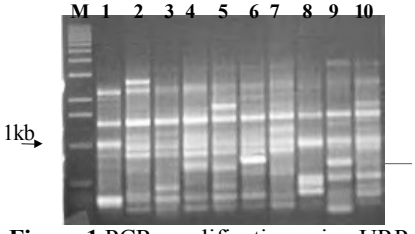

Figure 1 PCR amplification using URP primer
[#] URP primer no. 6(GC50%)

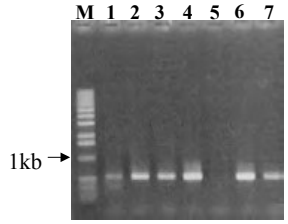

Figure 2 PCR amplification using unique primer
[#] Primer 5F : 5'- AGC CTT GAA GTG TTC GAG TG – 3'
5R : 5'- ACC ATG CAT AGC GTA GCT TC – 3'
[##] Lane 1-7: Zoysiagrass cultivars and lines, lane 1: Konhee, lane 2: Anyang-jungji, lane 3: Meyer, lane 4: S-94, lane 5: Joydent, lane 6: J01067, lane 7: J01122

Conclusions Superior lines of zoysia grass had good growth characteristics compared to other common cultivars. URP primers were primarily used to detect unique bands of zoysia grass lines by PCR amplification. New primer constructed from the result of nucleotide sequencing was found to have a negative unique band by PCR amplification.

References

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