

Development of Molecular Markers Specific to Samdeok Zoysiagrass

JH Park, JY Kim¹⁾, YM Jang¹⁾, DY Kim¹⁾, JH Jung¹⁾, SH Jung¹⁾, and YW Seo^{1)*}

1)Division of Biotechnology and Genetic Engineering, Korea University

Objectives

The objective of this study was to identify the genetic relationship of Samdeok zoysiagrass using random amplified polymorphic DNA (RAPD) and amplified fragment length polymorphism (AFLP). RAPD was used to assessment of a genetic relationship in samdeok zoysiagrass and other zoysia species. SCAR and STS markers specific to Samdeok zoysiagrass specific molecular markers were also developed.

Materials and Methods

Plant material : Samdeok zoysiagrass, Anyang Z., Jangsung Z., SK Z., Konhee Z., Zenith, *Z. koreana*, *Zoysia matrella* (PI 231146, PI 264343), *Zoysia sinica* (PI 553019), *Zoysia macrostachya* (PI 553020), *Zoysia japonica* (PI 338566)

RAPD analysis : QIAGEN RAPD[®] 10mer Kits (OPA series, OPC series, OPD series, 1 primer of OPAA, 2 primers of OPAD, 1 primer of OPAJ, 4 primers of OPC, 2 primers of OPU, 3 primers of OPV, 1 primer of OPW, 1 primer of OPX, 1 primer of OPY, 17 primers of OPZ)

AFLP analysis : AFLP Analysis System (Life Technologies)

Results and Discussion

Genomic DNA was isolated from the leaves of Samdeok and other zoysiagrasses for RAPD and AFLP analysis. Total 381 polymorphic fragments were generated for Samdeok and other zoysia species [*Zoysia japonica* (Anyanh, Jangsung, SK, Konhee, Zenith), *Z. koreana*, *Zoysia matrella* (PI 231146, PI 264343), *Zoysia sinica* (PI 553019), *Zoysia macrostachya* (PI 553020)] using RAPD analysis. For the phylogenetic relationship between Samdeok zoysiagrass and other turfgrass species polymorphic fragments were analyzed by UPGMA program (Fig. 1). Sam 9-1, 11-2, 12-2 was representative selections of Samdeok zoysiagrass. We identified Two polymorphic bands with OPW-2, OPZ-4 primer. Two SCAR markers developed by conversion of RAPD products using OPW-2 and OPZ-4 were obtained (Fig. 2).

Total 28 AFLP polymorphic fragments between Samdeok and other zoysiagrasses were obtained using 31 selective primer combinations. Two STS markers designed from polymorphic AFLPs and specific to Samdeok zoysiagrass were identified (Fig. 3). Developed SCAR and STS markers can be used to identify Samdeok zoysiagrass.

* **Corresponding author** : (Phone) 02-3290-3005 (E-mail) seoag@korea.ac.kr

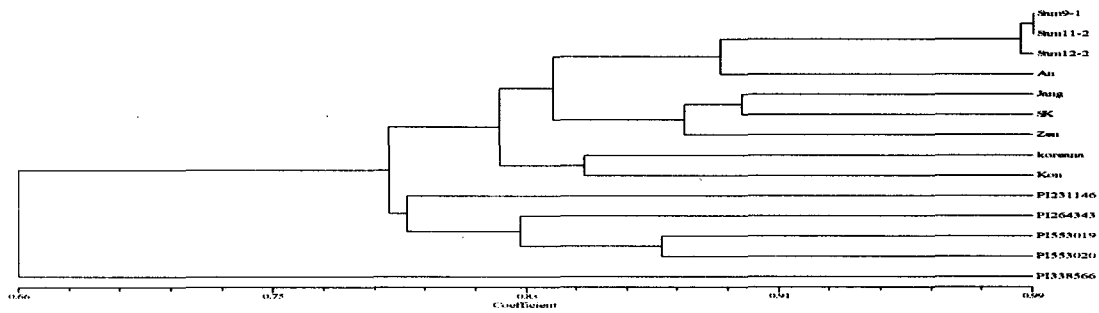


Fig. 1. Phylogenetic relationship of Samdeok zoysiagrass with other zoysia species using RAPD products (UPGMA). Sam : SamDeok Zoysiagrass, SK : SK Zoysiagrass, An : Anyang Zoysiagrass, Jang : JangSung Zoysiagrass, Zen : Zenith, Koreana : *Z. Koreana*, Kon : Konhee Zoysiagrass, PI 231146 : *Z. matrella*, PI 264343 : *Z. matrella*, PI 553019 : *Z. sinica*, PI 553020 : *Z. macrostachya*, PI 338566 : *Z. japonica*

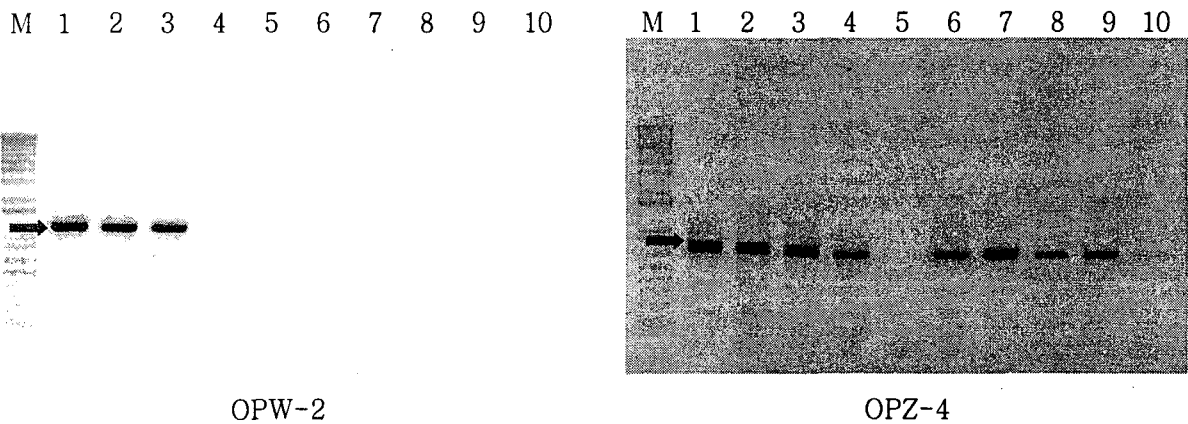


Fig. 2. Ethidium-bromide-stained electrophoretic profile of the SCAR markers derived from OPW-2 and OPZ-4. OPW-2 (arrow : 1224bp band) [Lane 1 : SamDeok-18, lane 2 : SamDeok-20, lane 3 : SamDeok-24, lane 4 : AnYang, lane 5 : JangSung, lane 6 : SK, lane 7 : Zenith, lane 8 : *Z. matrella*(PI 264343), lane 9 : *Z. sinica*(PI 553019), lane 10 : *Z. japonica*(PI 338566)], OPZ-4 (arrow : 752bp band) [Lane 1 : SamDeok-18, lane 2 : SamDeok-20, lane 3 : SamDeok-24, lane 4 : JangSung, lane 5 : SK, lane 6 : Zenith, lane 7 : KonHee, lane 8 : *Z. matrella*(PI 264343), lane 9 : *Z. sinica*(PI 553019), lane 10 : *Z. japonica*(PI 338566)]

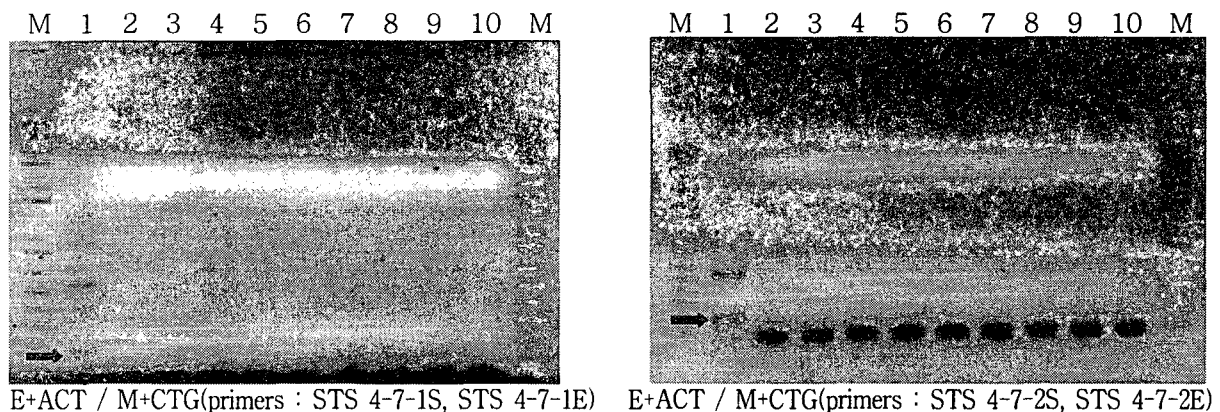


Fig. 3. Ethidium-bromide-stained electrophoretic profiles of the STS markers derived from STS combination primers(STS 4-7-1S/STS 4-7-1E, STS 4-7-2S/STS 4-7-2E). lane 1 : SamDeok, lane 2 : AnYang Zoysiagrass, lane 3 : JangSung Zoysiagrass, lane 4 : SK Zoysiagrass, lane 5 : Zenith, lane 6 : Konhee Zoysiagrass, lane 7 : *Z. matrella*(PI 231146), lane 8 : *Z. matrella*(PI264343), lane 9 : *Z. sinica*(PI 553019), lane 10 : *Z. macrostachya*(PI553020)