

D2 Marker-Assisted Selection(MAS) for the Ability of Plant Regeneration in Anther Culture of Rice

Department of Agronomy, Kyungpook Nat'l Univ. : Yong-Sham KWON^{*} · Kyung-Min KIM · Jae-Keun SOHN
National Institute of Agricultural Science and Technology, RDA : Moo-Young EUN

Objectives

The objective of this study was to analysis the relationship between DNA markers and plant regenerability and to evaluate the effectiveness of marker-assisted selection(MAS) in anther culture of rice.

Materials and Methods

- o. Plant materials
 - . Anthers of 43 rice cultivars
- o. Anther culture
 - . Anthers pretreated for 10 days at 12°C.
 - . Culture method : One-step anther culture.
- o. Molecular marker-assisted selection

Relationship between the DNA markers and the anther culturability was analyzed for marker genotypes in 43 rice cultivars.

Results and Discussions

Two QTLs associated with green plant regeneration in anther culture were detected on chromosome 3 and 10. The relationship between the RFLP markers linked to the QTLs and plant regenerability of 43 rice cultivars was analyzed. One of the markers, RZ400, was found two types of polymorphism among cultivars(Figure 1). And it could be effectively identified cultivars with high($10.4 \pm 3.7\%$) and poor($0.7 \pm 1.8\%$) regenerability based on the marker types in the cultivars(Table 1).

These markers would enable to screen rice germplasms with high anther culturability and its introgression into elite lines in breeding program.

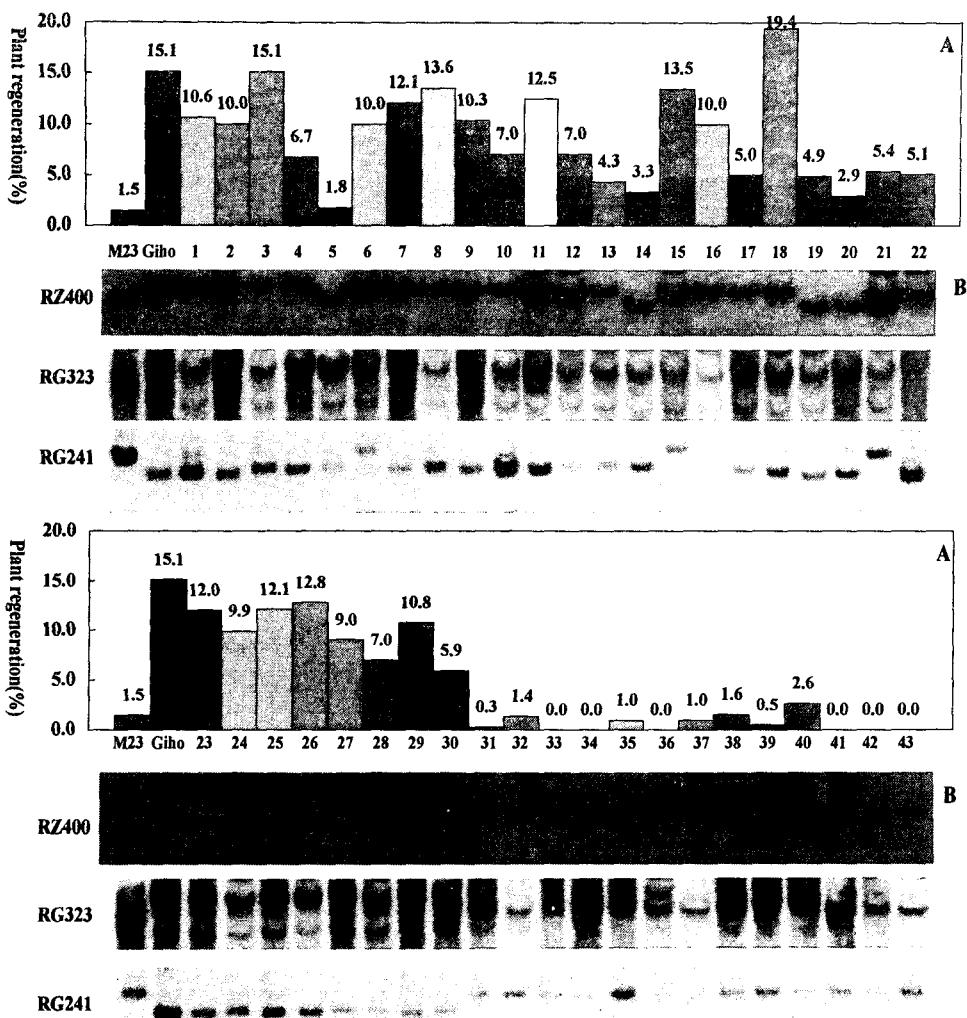


Figure 1. Relationship between DNA markers and plant regenerability in anther culture of 43 rice cultivars. A : Varietal difference of the ability of green plant regeneration in anther culture of 43 rice cultivars. B : Autoradiography of southern hybridization of genomic DNAs with radiolabelled probe RZ400, RG323, and RG241.

1. Gancheongbyeo 2. Geumbyeo 3. Singeumbyeo 4. Nagdongbyeo 5. Nonganbyeo 6. Daeribbyeo 7. Dongjinbyeo 8. Donghaebyeo 9. Sambaengbyeo 10. Samcheonbyeo 11. Sangnambatbyeo 12. Sangsanbyeo 13. Sangjubyeeo 14. Sinseonchalbyeo 15. Ansanbyeo 16. Yeongnambyeo 17. Unjangbyeo 18. Ilmibyeo 19. Ilpumbyeo 20. Janganbyeo 21. Joreongbyeo 22. Jimmibyeo 23. Chucheonbyeo 24. Palgongbyeo 25. Hwayeongbyeo 26. Hwacheongbyeo 27. Koshihikari 28. Sasanishiki 29. Tohoku 149 30. Tohoku 144 31. Gayabyeo 32. Namcheonbyeo 33. Dasanbyeo 34. Milyang 42 35. Milyang 62 36. Milyang 63 37. Samgangbyeo 38. Cheongcheonbyeo 39. Pungsanbyeo 40. Hangangchalbyeo 41. IR 29 42. IR 36 43. IR 841-76-1

Table 1. Relationship between DNA markers and plant regenerability in anther culture of 43 rice cultivars

DNA markers	Plant regenerability(%)		t-value
	Gihobyeeo type	Milyang 23 type	
RZ400	10.4 ± 3.7 ^{a)}	0.7 ± 1.8	3.481 ^{**b)}
RG323	9.4 ± 3.7	0.7 ± 0.8	2.142 [*]
RG241	9.4 ± 4.1	0.7 ± 2.6	1.992 [*]

^{a)} Mean ± SD. ^{b)} * and ** significant at 0.05 and 0.01 levels, respectively.