P82. GENETIC DIVERSITY AND FIELD UNIFORMITY OF KOREAN RICE VARIETIES

SEUNG KEUN JONG

Department of Agronomy, Chungbuk National University

Chongju 361-763, KOREA

OBJECTIVES

Field uniformity as well as genetic diversity is important for the plant breeders who try to avoid genetic vulnerability *in situ* as well as to maintain genetic diversity among varieties. The objectives of this study were to assess the genotypic diversity, based on pedigree analysis, among 77 rice varieties that were recommended in Korea, and to estimate the field uniformity (FU) of rice varieties currently cultivating. The results will be useful to determine the genetic vulnerability in rice and the relationship between the varieties released by breeders and the varieties growing in the rice fields.

MATERIALS AND METHODS

Total of 77 recommended rice varieties was used for the study, and data were summarized for the four regions (North-central, Central, South-west and South-east). Average coefficient of parentage (CP) for a region were obtained by averaging all pairwise CP values. FU was calculated as the summation of all possible pairwise CP values multiplied by the proportion of the estimated plantings occupied by the each variety. KIN software for CP computation and SAS for cluster analysis and dendrogram were used.

RESULTS AND DISCUSSION

1. Number of varieties recommended in four regions has been increased from 25~36 to 55~91 during the last 10 years.

2. The 68 varieties were classified into 7 distinct clusters excluding 9 varieties that were genetically rather isolated from other clusters. Both high average CP within a cluster (0.0306~0.2068) and low average CP between clusters (0.0000~0.0549) indicated that clusters of rice varieties are genetically distinct from each other.

3. However, the FU, weighted CP by the proportion of the area occupied, was 5~15 times higher (0.1611~0.8538) than the average CP (0.0338~0.0476) in four different regions. The greater FU was due to the cultivation of a few genetically related varieties in each region.

4. The great difference between CP and FU indicated that the genetic diversity based on the total number of recommended varieties does not show actual genetic diversity in the field. The greater FU indicated the necessity to develop effective monitoring system to relate actual genetic diversity and genetic vulnerability.

E-mail : skjong@cbucc.chungbuk.ac.kr   (Phone : 043-261-2517)

Fig. 1. Number of varieties recommended for cultivation from 1991 to 2000 in four different regions.
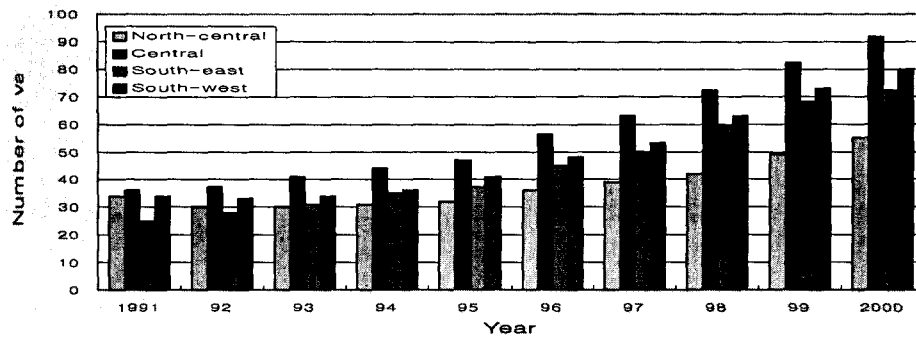
Table 1. Average CP within cluster and between clusters of the 77 rice varieties.

Clusters	1	2	3	4	5	6	7
1	0.0306						
2	0.0364	0.1207					
3	0.0281	0.0120	0.2110				
4	0.0220	0.0152	0.0242	0.1106			
5	0.0400	0.0079	0.0152	0.0450	0.2068		
6	0.0290	0.0091	0.0177	0.0467	0.0549	0.1577	
7	0.0034	0.0000	0.0033	0.0006	0.0000	0.0000	0.1380

Fig. 2. Relative occupation of the five major varieties in acreage for each region.
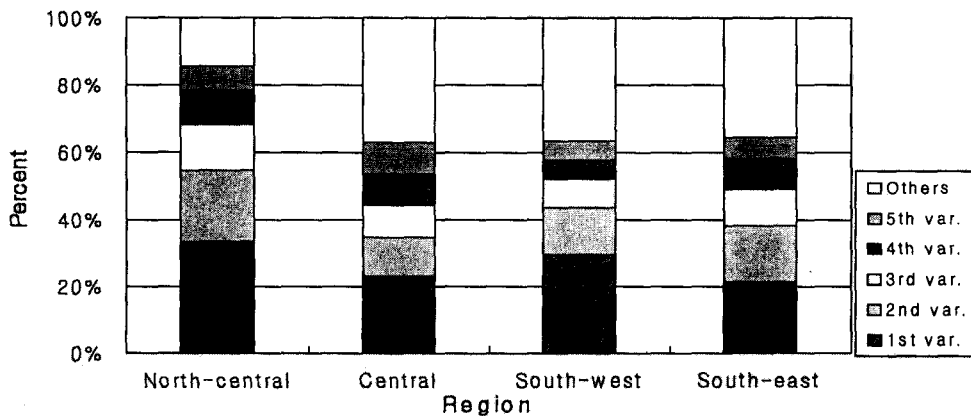

Table 2. CP and FU by region for rice varieties cultivating in Korea.

Genetic diversity	Region					Korea
	North-central	Central	South-east	South-west	Average	
CP	0.0338	0.0463	0.0453	0.0476	0.0432	0.0439
FU	0.1611	0.6045	0.8538	0.6017	0.5553	0.6257