

OA2. Gain and diversity resulted from genetic thinning in a clonal seed orchard of *Pinus koraiensis* S. et Z.

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Objective

The main aim of this study is to give a theoretical background for genetic aspects (gain and diversity) and management (genetic thinning) of the clonal seed orchard of *Pinus koraiensis*.

Materials and Methods

Genetic thinning was carried out in a clonal seed orchard of *P. koraiensis* which was established by grafts in Chuncheon (4ha). Grafts were planted at spacing of 5m x 5m in 1978. Genetic thinning was based on genetic information (GCA) that was obtained from open-pollinated progeny tests. Gain and diversity resulted from genetic thinning were estimated.

Results and Discussion

Genetic thinning increased gain and relative effective number (Table 1). Thinning 25% of seed orchard (from 12.1 to 11.0 ramets/clone) raised genetic gain to 3.9% and reduced the status number to 37% of the initial orchard census number. Further gain of 6.6% and diversity of $N_s = 43\%$ were attained after 50% genetic thinning. When the genetic information was used to determine the initial theoretical genetic gain (i.e., pre-roguing), the estimated gain was 0.8% due to an unintentional ramet variation among clones (Fig. 1).

Table 1. Clone number (N), ramet number (n), gain (%) and status number (N_s) resulted from genetic thinning in a clonal seed orchard of *P. koraiensis*.

	pre-roguing	25% roguing	50% roguing
N	132	109	82
n	1,591(12.1)*	1,200 (11.0)	800 (9.8)
gain (%)	0.8	3.9	6.6
N_s (N_r)	48.9(0.37)**	40.0 (0.37)	34.9 (0.43)

()*: average number of ramets per clone,
 ()**: relative effective number ($N_r = N_s / N$)

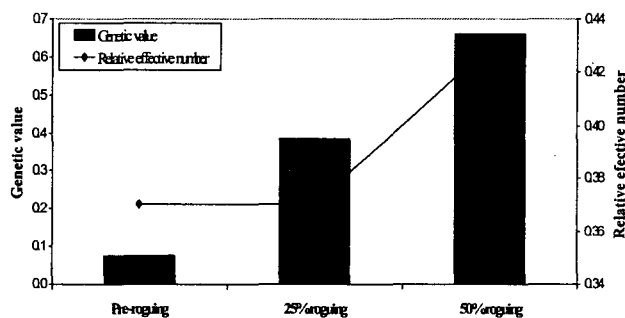


Fig. 1. Average genetic value (gain) and relative effective number pre- and post-genetic thinning

It can be beneficial to intentionally use an unequal number of ramets per clone, where clones with high breeding values contribute most to the seed orchard crop, thus gain is maximized without appreciable genetic diversity loss. When dealing with unrelated clones with known genetic value (e.g., GCA, seed productivity), this means using a ramet number directly proportional to the genetic value (i.e., linear deployment).

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