Dominant symbiotic pea mutations

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Dominant forms occur extremely rarely among symbiotic mutants. A natural strain-specific *Sym*-2 with dominant inheritance has been described in *Vicia faba* (1). We isolated two new symbiotic mutants, K27a and K28a, after treating seeds of pea cultivar Rondo with EMS. The mutants showed dominant inheritance.

The experiments were performed in the greenhouse on ceramsite as a substrate. Standard nutrition solution containing the total dose of mineral nitrogen (Knopp solution) was used. In another series of experiments, the plants were grown in pots with a mixture of ceramsite and vermiculite to which a start dose of nitrogen in the amount of one fifth of the normal was added only during early plant growth. The illumintion regime was 16 day/8 night hours. The temperature was 20-21°C in the night hours. The plants were inoculated with *Rhizobium leguminosarum* strain 250a at the seedling stage. Nitrogen fixation was measured with a gas chromatograph using the acetylene assay (2).

The mutants are superior to cultivar Rondo in plant height, root weight, seed productivity and in symbiotic characters such as nodule number and nitrogen fixation activity (Table 1, Fig. 1). The mutants will be tested for allelism with each other.

Table 1. Morphobiological characterization of cultivar Rondo, K27a and K28a mutants.

Cultivar, mutant	Plant height, cm	Root length, cm	Fresh weight		Per plant		
			Stems and leaves, gm	Roots, gm	Pod number	Seed number	Seed weight, gm
Rondo cultivar	52.7±1.1	19l6±0.7	22.5±1.5	2.0±0.2	4.3±0.3	16.9±1.8	5.8±0.6
K27a mutant	97.4±4.2	23.4±0.5	43.1±4.2	2.8±0.4	7.0±0.8	20.2±2.9	7.2±1.0
K28a mutant	94.0±3.1	22.4±1.2	35.5±3.1	2.5±0.4	7.9±0.8	26.5±2.9	9.2±1.0

The results of analysis of the hybrids demonstrated dominant inheritance of the mutant characters (Table 2).

Table 2. Segregation pattern in hybrids from crosses of mutants to cultivar Rondo.

Hybrid	F_1	Segregation in the F_2 (mutant : initial cultivar)		χ^2	P
		Observed	Expected		
K27a mutant x Rondo	Mutant type	76:30	79.50:26.50	0.62	0.43
K28a mutant x Rondo	Mutant type	78:27	78.75:26.25	0.03	0.87

1. Esser-Monning, K., Roskothen, P., and Robbelen, G. 1995. Plant Breeding. 114: 363-365.
2. Hardy, R.W.F., Holsten, R.D., Jackson, E.K., and Burns, R.C. 1968. Plant Physiol. 43: 1185-1207.

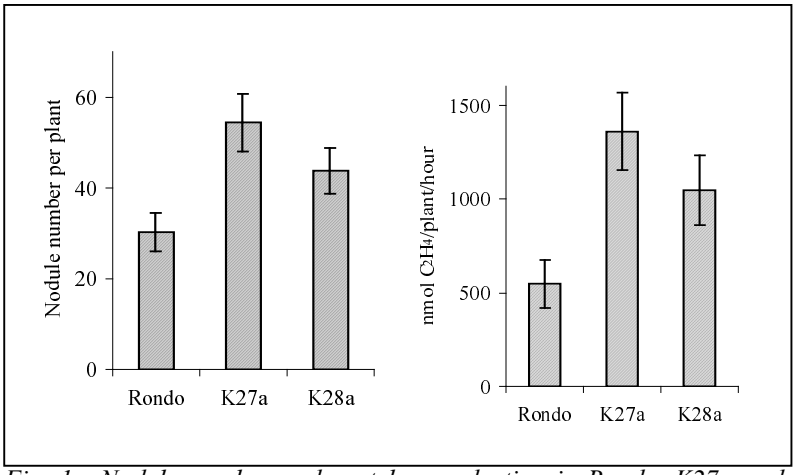

Fig. 1. Nodule number and acetylene reduction in Rondo, K27a and K28a mutants.