

Seedling Vigor of Lotus corniculatus L., L. tenuis (2n=4x=24),
and Their Hybrids*

S. N. Hur, C. J. Nelson, and P. R. Beuselinck

USDA,ARS, 216 Waters Hall, University of Missouri, Columbia, Missouri 65211

Seedling vigor improvement of birdsfoot trefoil is an important objective in our breeding program. The utilization of large-seeded L. tenuis accession, PI 302921 (Mo accession 266), to increase seed size may result in improved seedling vigor. An examination of seedling vigor of the parent species and the interspecific hybrid obtained using L. corniculatus as the maternal parent demonstrated that the physiological characters of the hybrid resembled those of L. corniculatus (Table 2). Initial seedling growth was determined largely by seed size, giving L. tenuis seedlings comparatively superior growth for 2 weeks. Later L. tenuis showed growth inferior to L. corniculatus or the hybrid. Maximum cotyledon size was reached 3 weeks after emergence, and was important for initial seedling growth. Later, seedling growth was determined by relative growth rate (RGR). The hybrid and L. corniculatus had higher RGR's than L. tenuis. Initial dark respiration rate of L. corniculatus was higher than L. tenuis or the hybrid, but in later stages of seedling growth L. tenuis showed the highest dark respiration rate. Differences in photosynthetic rate were not apparent until 3 weeks post emergence when net photosynthetic rate decreased sharply due to leaf age and shading.

Further studies are designed to examine the influence of the maternal parent on performance of reciprocal hybrids.

Table 2. Dry matter yields and photosynthetic rate per unit leaf area of L. tenuis, L. corniculatus and their hybrid.

SPECIES	WEEKS					
	1	2	3	4	5	6
	shoot weight mg/plant					
<u>L. tenuis</u>	4.5	26.1	126	345	1227	1461
<u>L. corniculatus</u>	2.5	16.2	148	465	1421	1839
Hybrid	2.9	25.0	194	525	1445	1991
	photosynthesis mg CO ₂ dm ⁻² hour ⁻¹					
<u>L. tenuis</u>	17.5	21.8	31.9	20.4	26.1	28.2
<u>L. corniculatus</u>	18.2	22.7	31.4	25.4	17.6	21.3
Hybrid	17.5	22.3	32.5	21.1	22.5	21.2

* Progress Report, Clovers and Special Purpose Legumes Research 16: 54, 1983.