

Red Clover Varieties with Nitrogen Fixing Advantage during the Early Stages of Seedling Development

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Nitrogen is a growth-limiting nutrient at the early stages of forage stands establishment. Traditionally forage plants access to nitrogen at this stage of establishment is achieved through the addition of chemical fertilizers. However, the increasing price of inorganic nitrogen and the fact that nitrogen fertilizers have been linked to a number of environmental issues has spurred interest in developing alternatives nitrogen fertilizer. We hypothesize that there is genotypic variability among red clover varieties for nodulation traits that can increase the net N exudation in terms of dissolved organic N during the early stages of seedling development. To assess the genotypic variability and plant factors affecting root N release, nodulation, plant growth, tissue N content, and root N exudation of red clover (*Trifolium pratense* L.) six diverse varieties (three diploid and three tetraploid) were evaluated under controlled environmental conditions during the first eight weeks of plant growth after rhizobia inoculation.

Genotypic differences were found for nodulation and root attributes (root length, surface area, volume, and diameter), shoot and root N concentration, and N content. Also, genotypic differences were found for root exudate N content. The N content in root exudate was positively correlated with root growth attributes and root N concentration. The results of this investigation suggest that there is a great potential of using different red clover cultivars to help in reducing the addition of chemical fertilizers during the early stages of seedling development.