

Evaluation of Nitrogen Fixation Capabilities of Selected Pea Lines Grown under Different Environmental Conditions in Canadian Prairie

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Abstract : Pea is a very popular pulse crop that widely grew in Western Canadian prairie. However, the N fixation capabilities of these pea lines were not well evaluated under local environmental conditions. In this study, 2 supernodulating mutants Frisson P64 Sym29, Frisson P88 Sym28 along with their wild parent Frisson, 1 hypernodulating mutant Rondo-nod3 (fix+) along with its wild parent Rondo, 1 non-nodulating mutant Frisson P56 (nod-) and 2 commercial pea cultivar CDC Meadow and CDC Dakota which are widely planted in Western Canada were selected in order to evaluate the capabilities of their BNF, biomass, and yield production in symbiosis with *R. leguminosarum* bv. *viciae*. Our results showed different environmental conditions and variation of pea lines could both significantly impact days to flowering (DTF), days to podding (DTP), biomass and yield of tested pea lines ($P < 0.0001$), suggesting consideration of environmental factors could be important when selecting pea cultivar for local farming under different soil zones in Western Canada. Significant interaction effects between environmental conditions and pea lines were found on pea N fixation as well ($P = 0.001$), suggesting changes in N fixation capability of the same pea cultivar when grown under different environmental conditions. Our results provide useful information for farming and better opportunity for selection of pea cultivars with higher N-fixing capacity during breeding programs in Western Canada.

Keywords : Canadian prairie, environmental condition, N fixation, pea cultivar

Conference Title : ICNF 2016 : International Conference on Nitrogen Fixation

Conference Location : London, United Kingdom

Conference Dates : June 23-24, 2016