Nitrogen mineralization following compaction and cultivation of hoop pine plantation soils. (S07-blumfield003817-Poster)

Authors:

- T.J.Blumfield - *CRC for Sustainable Production Forestry*
- Z.H.Xu - *CRC for Sustainable Production Forestry*
- J.He* - *CRC for Sustainable Production Forestry*

Abstract:

The implications of soil compaction and remediation on forest productivity were investigated during an 18-month, in situ nitrogen (N) mineralization experiment during the early establishment period of a second-rotation (2R) hoop pine (Araucaria cunninghamii Aiton ex D. Don) plantation in subtropical Australia. Treatments were 0, 1 and 16 forwarder passes (forwarder gross weight, 40.2 Mg) and cultivation by disc plough (zero cultivation and cultivation). Sixteen-pass compaction resulted in N immobilization for the first 20 months with an eventual total N mineralization of 110 kg N ha-1 compared with 220 kg N ha-1 mineralized following 16-pass compaction with disc cultivation. Nitrification was the dominant process and there was a strong correlation between total N mineralized and nitrate N ($r^2 = 0.88$, $p < 0.001$). However, the potential for N loss through leaching following disc cultivation was high and there was a significant correlation between N mineralized and N leached ($r^2 = 0.75$, $p < 0.001$). Cultivation was a significant factor affecting all variables studied ($p < 0.001$) and the effects of 16-pass compaction were significantly different to those from 1- and 0-pass compaction.

Corresponding Author Information:

Timothy Blumfield
CRC for Sustainable Production Forestry
Environmental Science, Griffith University
Brisbane, QD 4111
Australia

phone: +61 7 3875 6709
fax: +61 7 3875 7459
e-mail: t.blumfield@mailbox.gu.edu.au

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