

NITROGEN USE EFFICIENCY OF DRIP-IRRIGATED 'ROCHA' PEAR TREES

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Abstract:

Synchronizing the availability of N in the rhizosphere with its uptake pattern by the trees throughout the vegetative cycle enhances the efficiency of its use. This study aimed to: *i*) quantify the N use efficiency in non-bearing pear trees, fertigated with ^{15}N and *ii*) identify N storage organs and access the distribution of N derived from the fertilizer (NDFF) in the organs of pear trees. One-year-old pear trees (*Pyrus communis* cv. Rocha on quince BA29 rootstock) planted in a loamy sand soil at 4 m x 1.5 m spacing, were supplied from April to October with 6 g N tree⁻¹ of ammonium nitrate, doubled labeled with 5 atom % of ^{15}N . Leaf samples were monthly collected to determine %NDFF. At the beginning of leaf fall five trees were wrapped with nets and all abscised leaves were collected. At the end of leaf fall trees were removed from the soil and divided into fine and coarse roots, trunk and shoots. Each plant sample was weighed and analyzed for total N and ^{15}N abundance. The trunk was the main storage organ of the tree (44.5% of the total N), followed by the coarse roots (24.8%). ^{15}N enrichment was greater in the trunk (0.18 g tree⁻¹), which represented 47.3% of the total ^{15}N recovered in tree tissues. Senescent leaves had the lowest %NDFF, retaining 6.2% of the absorbed N, which represented 9.6% of the tree ^{15}N enrichment. After the first year of N fertigation, newly-planted 'Rocha' pear trees showed a low N-fertilizer use efficiency (6.3%) possibly due to the lower N uptake during the initial three months after planting.