clicNEWS Versão para impressão

Artigos

Nitrogen Uptake Regulation in Plant Level

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Nitrogen uptake seems to be regulated by the plant growth. For a given N supply, absorption is regulated by feedback signals through the plant canopy, and a positive signal due to the supply of C derived from photosynthesis and which corresponds to a negative re-circulation of reduced N in roots . With the increase of the leaf area index (LAI) is greater interception of the incident radiation, resulting in greater amount of carbon to the roots, which contributes to increase the storage capacity of N leaf expanding in the form of Rubisco, which is a form of the exhaust depletion of N uptake by the recirculation of reduced nitrogen compounds in the phloem. There is a proportionality between N uptake and LAI for many species, however N uptake per unit leaf area is variable and affected by plant morphology, especially the leaf / stem ratio. The expansion of leaf area is not always the only case for the storage of reduced forms of N. The growth of the stem and the thickness of the sheets are also a possibility for the isolation of N, as a means of escape for avoiding the reduction of N uptake by the roots.
The relationship between N uptake per unit mass of the plant, according to the LAI is not linear, as is the effect of dilution of N due to the lower leaf area ratio (smaller amount of biomass due to higher biomass accumulation in roots). Nitrogen uptake varies during the development cycle in bulk culture of roots and the absorption rate per unit weight of the root. Generally, aabsorção increases during the vegetative growth, reaches a maximum during the reproductive stage and decreases during the filling phase of grain or seed. These variations are explained by the availability and soil N, but factors intrinsic to the plant have an important role in this process, especially the cycle of amino acids between the stem and root and the supply of carbohydrates to the roots. Under field conditions, under varying conditions of supply of N, its absorption is co-governed by the potential rate of crop growth and soil N availability. Theoretically, the greater the rate of growth, the greater the absorption of N, provided there is no limitation in their ground. In this context, at a given moment, the culture growth rate is due to the absorbed amount of N and vice versa.
The N uptake across the plasma membrane is mediated by two types of carriers. The low affinity carriers operate outside when the concentration is high and N are known to be constitutive and not subject to regulation. The high-affinity carriers operate at low external concentrations of N and can be constitutive or induced by exposure to N. Thus, the absorption of N is modulated by a) presence of specific carriers, b) the affinity of these carriers in relation to the nitrate or ammonium, and c) the availability of nitrogen in the soil. Whatever the level of soil N, NO_3 regulates the level of absorption of N may, depending on the level N plant induce a luxury consumer when the levels are above the critical level internal N.

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