عنوان مقاله:

Improving Nitrogen Use Efficiency in Sustainable Agriculture

محل انتشار:

کنفرانس بین المللی توسعه پایدار، راهکارها و چالش ها با محوریت کشاورزی، منابع طبیعی، محیط زیست و گردشگری (سال: 1393)

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خلاصه مقاله:

In this review, we present the recent developments and future prospects of improving nitrogen use efficiency (NUE) in crops using various complementary approaches. These include conventional breeding and molecular genetics, in addition to alternative farming techniques based on no-till continuous cover cropping cultures and/or organic nitrogen (N) nutrition. Whatever the mode of N fertilization, an increased knowledge of the mechanisms controlling plant N economy is essential for improving NUE and for reducing excessive input of fertilizers, while maintaining an acceptable yield and sufficient profit margin for the farmers. Using plants grown under agronomic conditions, with different tillage conditions, in pure or associated cultures, at low and high N mineral fertilizer input, or using organic fertilization, it is now possible to develop further whole plant agronomic and physiological studies. These can be combined with gene, protein and metabolite profiling to build up a comprehensive picture depicting the different steps of N uptake, assimilation and recycling to produce either biomass in vegetative organs or proteins in storage organs. We provide a critical overview as to how our understanding of the agro-ecophysiological, physiological and molecular controls of N assimilation in crops, under varying environmental conditions, has been improved. We have used combined approaches, based on agronomic studies, whole plant physiology, quantitative genetics, forward and reverse genetics and the emerging systems biology. Long-term sustainability may require a gradual transition from synthetic N inputs to legume-based crop rotation, including continuous cover cropping systems, where these may be possible in certain areas of the world, depending on climatic conditions. Current knowledge and prospects for future agronomic development and application for breeding crops adapted to lower mineral fertilizer input and to alternative farming techniques are explored, whilst taking into account the constraints of both the current world economic .situation and the environment

کلمات کلیدی:

alternative farming, cover cropping, fertilizers, genetics, tillage