Nutrient (including iron) demand model in peach trees

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Abstract

Nutrient deficiencies occur in most areas devoted to agricultural practices, causing major losses to farmers. For instance, Fe deficiency in fruit trees growing in calcareous soils leads to decreases in fruit quality, yield and to early tree death. Nutritional disorders in crops are often corrected by adding mineral elements in standard routine treatments, often ignoring the real nutritional status of trees. Thereby, application of fertilisers on a regular basis can lead to an excess of available nutrients in relation to the real nutrient demand of crops. Such nutrient surplus can be either immobilised in the soil or leached, and can consequently contaminate superficial and underground waters. Therefore, our knowledge about nutrient budgets in fruit tree crops should be improved. This work is aimed to estimate the amounts of macro- (N, P, K Ca and Mg), and micro-elements (Fe, Cu, Zn and Mn) needed during a vegetative season by peach trees, by developing and validating a nutrient uptake model. The model is being developed by using orchard characteristics as well as experimental data concerning biomass and nutrient concentration (pruning materials, flowers, fruits, leaves, trunk and root) and growth parameters easy to be measured in the field and related to biomass increase, such as trunk and rootstock diameter. The model is expected to be able to predict the amount of nutrients needed by trees using only growth parameters. The model will be validated and refined with data collected in further growth seasons. Two different peach orchards (*Prunus persica* L. Batsch) grown in calcareous soils in the Northeast of Spain are being used in this study. Both orchards were flood irrigated, but rootstocks, cultivars, number of trees, frames, tree age and tree dimensions were different in the two orchards used. The use of this kind of models is expected to permit optimization of the amount of fertilizers applied to the orchards, thereby minimizing costs and decreasing soil and water contamination.

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