SNOOP: A SIMULATION MODEL FOR THE DYNAMICS OF WATER AND NITROGEN IN OIL PALM.

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RESUMO - SNOOP (Soil Nitrogen Overview – Oil Palm version) is a modeling approach with the aim of estimating the dynamics of water and nitrogen in soils under oil palm cultivation. The model is composed by two main sub-models: Hydrologic and Nitrogen Dynamics. The hydrologic sub-model runs independently of the nitrogen dynamics sub-model. The nitrogen dynamics sub-model however, uses intermediate and output variables from the hydrologic sub-model and for that reason cannot be run independently. These sub-models are based on the routines of the EPICSEAR crop model, a variant version of the EPIC model modified to Brazilian conditions. The pertinent parameters have been adjusted for simulations of the conditions of oil palm cultivation. The model runs at daily time step and the limit is set to one year. It is written as Microsoft® Excel workbook. The reason for the choice as workbook is to enable the users not only run simulations with a complete set of past or hypothetical data but also to allow on-time estimations of the size of soil water and N pools when climate, fertilizer management and production data are input on a daily basis. This way, the model can be used as a Decision Support System for N management . The main feature of the model is that it requires essentially easy-to-get input parameters. Therefore, the input variables are classified into 3 categories: Compulsory variable, Optional variables and Dependent-Compulsory variables. The Compulsory variables are those required as user supplied for running the model. Optional variables are variables that if supplied by the user, the value supplied will be used by the model, if omitted the model will estimate a default value for this variable based on the Compulsory ones. Dependent-Compulsory variables are variables that are required as user supplied depending on the options of the user or required if any specific optional variable is omitted. Additionally, input parameters required exclusively by the nitrogen dynamics sub-model are underlined and can be omitted if only the hydrologic sub-model is to be run. The workbook of SNOOP comprises 25 worksheets, being 2 for input, 11 for outputs and 12 for intermediate calculations. The model considers 3 soil layers for calculations and the hydrologic sub-model simulates each day: soil water content; soil water in the root zone; rainfall; surface runoff; percolation; lateral subsurface flow; potential evapotranspiration; potential plant transpiration; actual evapotranspiration; soil evaporation; actual plant transpiration and water stress index. The nitrogen sub-model simulates: Soil NO3 pool; Soil NH4 pool; Pool of N in active OM; Pool of N in stable OM; N-NO3 fertilizer input; N-NH4 fertilizer input; Organic N input; N in wet deposition; N-NO3 loss in runoff; N-NO3 loss in lateral subsurface flow; N-NO3 leached; Volatilization of N-NH3; N-NH3 nitrification; N mineralization from fresh OM; N mineralization from active OM; N flow between stable and active OM; denitrification; N- immobilization; N demand by oil palm; potential soi N supply; N uptake; N stress index.

Palavras-chave: Oil Palm; Modelling; Nitrogen