The Daisy Model Newsletter
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1 The Daisy code, v. 6.44-45

The last official release for all platforms is still version 6.45 for MS Windows, 6.45b for Mac OS and 6.44 for Linux.

We are working on an official release of version 7 and a preview can be seen here: [Release v7.0.0-beta.3 · daisy-model/daisy (github.com)]

In version 7 the default values for linear ammonium sorption to clay and organic matter (K_clay and K_OC) have been changed as the earlier linear sorption parameters (the "NH4"-model) was based on a wrong parameterization of the vS_S-model. The changed sorption parameters will in general result in a higher NH_4^+-N crop uptake and a lower NO_3—N crop uptake, due to lower sorption. Nitrification is reduced too. A complete description of the parameterization of ammonium sorption, together with some tests investigating the effect of the different parameterizations is available in the Technical Documentation Chapter 7.

2 New projects and people

The 4-year European PHISES project has just begun. The project investigates how different managements affect the soils ecosystem services with focus on the filter function for new groups of pollutants, mainly PFAS and Nitrification Inhibitors (NI). Camilla Jakobsen, that recently defended her Master Thesis *Sorption of PFAS in Zero Tillage Soil,* has been hired to simulate the fate of PFAS with Daisy building on data from her master.

3 Courses

Last week the PhD "Short course on Daisy" took place at the University of Bayreuth, in cooperation between Prof. E. Diamantopoulos and the Daisy team.

There were 11 participants and, in addition to the normal curriculum, we presented the AgroEco-HPM project and simulated C dynamics under conservation agriculture.

4 Progress on AgroEco-HPM

We are developing a new tool for post-processing Daisy outputs in R (daisyrVis). More information will follow when the tool is ready for use.

The Technical Documentation are progressing. Chapter 6 on solute transport, Chapter 7 on mineral N, Chapter 8 on pesticide fate, Chapter 9 on soil organic matter and Chapter 10 on crop growth are well on the way and can soon be found on the homepage as well.

5 Recent articles where Daisy has been used

Grønning et al. (2024-preprint) calibrated the cover crop models for oilseed radish, winter rye and hairy vetch against two years of experimental field data from a sandy loam. The models were evaluated against one year field data from a loam soil and showed a good fit. The calibrated cover crop models were tested in realistic crop rotation scenarios and showed that cover crops could mitigate negative environmental impacts from agricultural production by reducing N leaching and contribute to soil C sequestration.

Manevski et.al. (2024-preprint) used Daisy to simulate water balance in poultry paddocks with grass and willow using the *"permanent"* vegetation model. The simulated water percolation was combined with measured soil nitrate concentrations to obtain daily nitrate leaching. Nitrate leaching was obtained from the poultry paddocks with hens stocked at low (6 m^2 hen^{-1}) and high density (4 m^2 hen^{-1}) and fed with a diet in which the soybean portion was partly replaced with 'green' protein from biorefined local biomass. The results showed that nitrate leaching was significantly lower under willow compared to grass and marginally lower at low- compared to high stocking density.

6 References

Grønning, Celine Rendbo, Lars Stoumann Jensen, Tine Engedal, Maria Skovgaard Andersen, Veronika Hansen, Muhammad Adil Rashid, og Magdalena Vinkler Schwartzkopff. 2024-preprint. "Modelling the Impacts of Cover Crops on Soil N Dynamics and C Stocks – Calibration of Aboveground and Belowground Crop Data and Their Use in Scenario Analysis". https://doi.org/10.2139/ssrn.4912172.

Manevski, Kiril, Sanna Steenfeldt, Anne Louise Frydendahl Hellwing, Heidi Mai-Lis Andersen, og Uffe Jørgensen. 2024-preprint. "Nitrate Leaching and Nitrogen Balances for Integrated Willow-Poultry Organic Systems in Denmark". https://doi.org/10.2139/ssrn.4903417.