



Daisy Newsletter no. 3

As we are becoming more established, we have been asked to make a more official layout this time. More importantly, we are planning a

Workshop on “Modelling of plant growth, water and N-dynamics with Daisy”.

You are invited to present your work and to join in the discussions. The invitation can be found on page 2.

Recent PhD's where Daisy has been used

On the 31st of August 2015, *Marieke ten Hoeve* obtained her PhD-degree at Department of Plant & Environmental Science, Faculty of Sciences the University of Copenhagen. The topic was life cycle assessment (LCA) of pig slurry treatment technologies.

The life cycle assessment should estimate environmental impacts throughout the complete life cycle of the slurry management system comprising both usage of natural resources and emissions to air, soil and water bodies. Due to difficulties in finding relevant data for emissions associated with field application of pig slurry fractions and from the consequent soil processes, soil application of slurry fractions was modelled using Daisy. The model was calibrated based on soil incubation studies of different pig slurry fractions (conventional slurry, acidified slurry and separated liquid and solid fractions). Average nitrate leaching, nitrous oxide emissions and crop N uptake were calculated, as well as soil C and N changes after the 100 year time period.

10 treatment scenarios were compared, with 3 main treatment categories: slurry acidification, separation and anaerobic digestion. Slurry acidification was the preferred technology for reducing terrestrial acidification and eutrophication potential, while slurry separation performed best for freshwater eutrophication, and anaerobic digestion showed the lowest impact potential for fossil resource depletion and marine eutrophication.

In conclusion, treatment had an influence on the environmental profile of pig slurry, but the choice of an appropriate slurry treatment technology depended on many considerations, *e.g.* local policy, cost and practicality.

On 15th September, *Muhammed Jabloun* obtained a PhD degree at Department of Agroecology – Climate and Water at University of Aarhus, on the topic: Cereal crop productivity and nitrogen cycling under climate change. The submitted papers where Daisy has been used concerns the use of Daisy to describe crop yield and N leaching for a double cropping system in the North China Plain. First an extensive study of parameter sensitivity was carried out using the Morris Method, and secondly, parameter combinations were chosen using the Generalized Likelihood Uncertainty Estimation method (GLUE) and used to simulate conditions under three CO₂-emission scenarios in the future.

We hope to include the submitted articles in the Newsletter when they are published. Marieke's supervisor Sander Bruun has kindly offered to make the parameterisation part of the standard library in Daisy.

Recent articles and reports

Yoshida, H., Nielsen, M.P., Scheutz, C., Jensen, L.S., Bruun, S., Christensen, T.H. (2015). Long-Term Emission Factors for Land Application of Treated Organic Municipal Waste. Environmental Modeling & Assessment. Available on-line from 8th of August.

Kollas, C., Kersebaum, K.C., Nendel, C., Wegehenkel, M., Palosuo, T., Rötter, R., Bindi, M., Roggero, P.P., Ferrise, R., Moriondo, M., Olesen, J.E., Öztürk, I., Sharif, B., Roncossek, S., Manevski, K., Trnka, M., Hlavinka, P., Müller, C., Waha, K., Conradt, T., Hoffman, H., Wu, L., Armas-Herrera, C., Launay, M., Beaudoin, N., Constantin, J., Garcia de Cortazar-Atauri, I., Mary, B., Ripoche, D., Ruget, F., Ventrella, D., Weigel, H.-J., Manderscheid, R., Mirschel, W., Eitzinger, J., Pacholsky, A. (2015). Crop rotation modelling - a European model intercomparison. European Journal of Agronomy 70 (Oct.), 98-111.



Workshop on “Modelling of plant growth, water and N-dynamics with Daisy”.

3. December, 2015

The aim of the workshop is:

- To provide a forum for exchange of knowledge and experiences with respect to Daisy modelling,
- To discuss needs for updated guidelines and approaches on selected topics,
- To highlight new parameterisations, which could be of more general interest.

Programme:

Morning: We would like to invite presentations of 10-15 minutes duration on what participants are using Daisy for and/or what they would like to use it for, highlighting main issues and constraints. At the same time, we invite speakers to share information on new parameterisations that have become available (organic fertilizer turn over, vegetation modules or similar), or methods to estimate the required parameters, which may be useful to others.

From “Agrohydrology” the following talks are foreseen:

- Prof. Søren Hansen: Recent findings related to deep macropores,
- Kasper Jensen: Ongoing work to extend Daisy’s working area to less well-drained soils,
- Signe Rasmussen: Development of weather series for climate scenarios,
- Prof. Merete Styczen: Simulations of early sowing of winter wheat.

In the afternoon, we would like to arrange some group discussions on common issues of interest (for example the need for new guidelines on certain issues, initialization, treatment of organic pools, our ability to predict the falling protein content or other highlighted issues) as well as cooperation possibilities. You are welcome to suggest issues for common discussion when you sign up.

The workshop will be held at KU, Frederiksberg (Room no. M117-1, Thorvaldsensvej 40, staircase 2, 1st floor), and participation is without charge. The tentative time is 9.45 -15, but this will be updated when we know the exact programme.

Register by writing your name, contribution, areas of interest (with regard to Daisy), and whether you would be willing to make a short (10-15 minutes) informal presentation of your work by sending a mail to styczen@plen.ku.dk before 16th of November, 2015.