

Development of D-value prediction tool for harvest time optimisation

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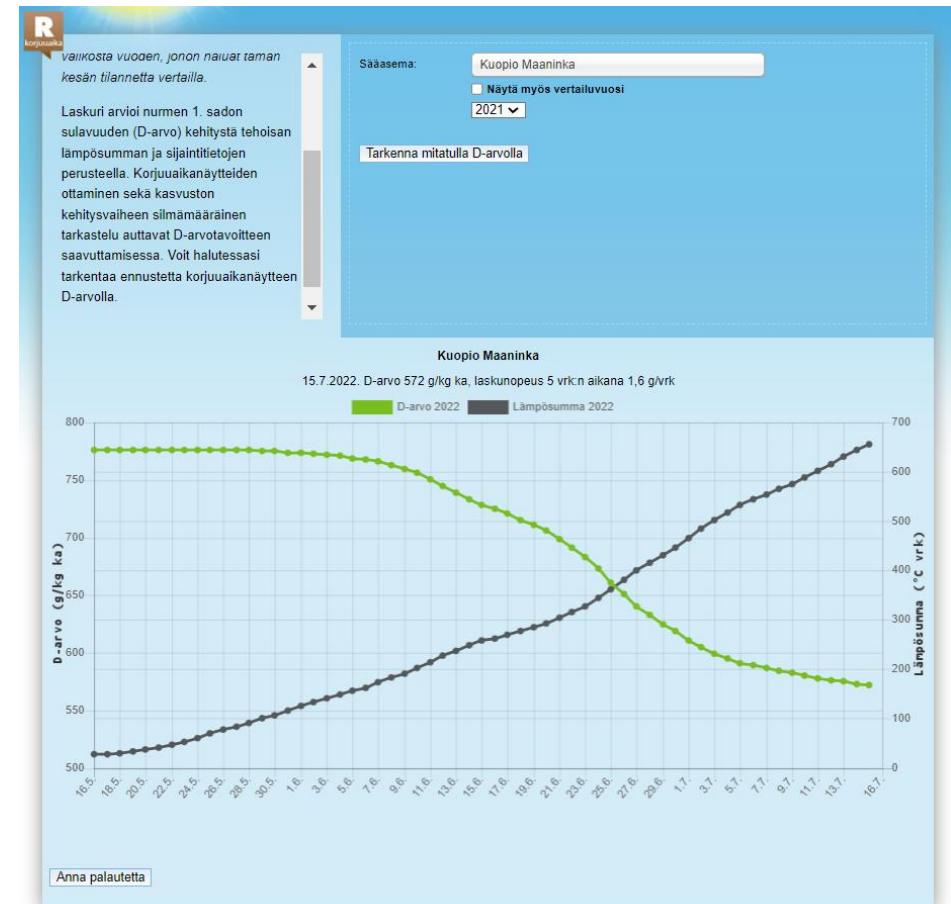
Why?

- Long day length and abundance of light in spring leads to fast growth rate and rapid decline in digestibility (D-value, g kg⁻¹ DM) → optimal harvest time can be missed in just few days → tools are needed to predict when optimal time is reached
- The first version of grass growth model "Artturi" was released on internet over 20 years ago (Rinne *et al.* 2001) – since then many updates
- Latest (old) version of the model available at karpe.fi (laskurit / 1. sadon D-arvoennuste)
 - This version works as a base for the new version that is under construction

The old version of D-value prediction model

Functionality:

- Calculates and graphs an estimate for spring growth D-value up to the current day
 - Based on effective temperature sum and location
 - Equations currently only for pure grass (no grass legumes)
- Previous years can be shown for comparison
- Estimate can be corrected with measured D-value (level correction)
- Shows 5 day mean decrease rate of D-value
- Weatherdata: FMI open data (station observations)

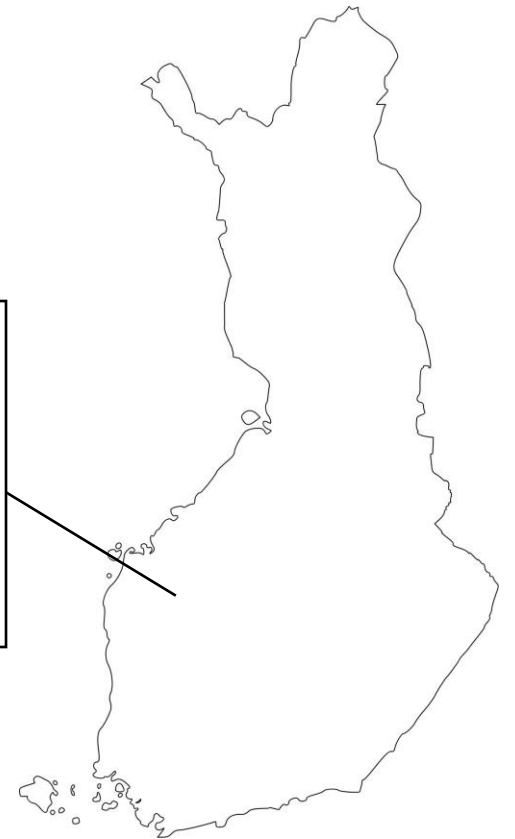
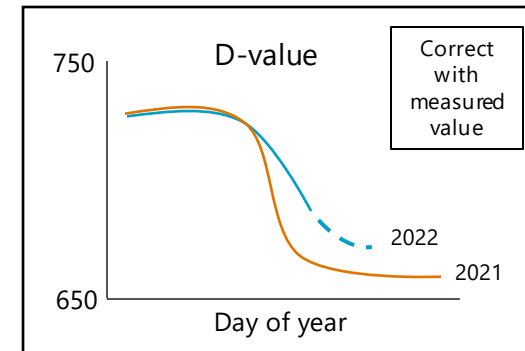


Equations available at [Hyrkäs et al. 2018](#) ("Grass growth models for estimating digestibility and dry matter yield of forage grasses in Finland") – based on 109 time series from 61 sites around Finland

New version of D-value prediction model

Updates at 1st step:

- Weather data changed to gridded data (1 x 1km) with 5 day forecast
- Calculation of D-value estimates until current day and with 5 day forecast
- New UI under construction
 - Also map-based visualisation
 - Easier location selection
 - Mobile-friendlier approach
 - Will be published on Luke's website



Plans for further development

- Integration of data from follow-up sites for correcting the estimates (to take into account regional variability due to factors not included in model)
 - Data can be lab-analysed samples (e.g. Valio Artturi® korjuuaikapalvelu), remote sensed data (drones, satellites) and/or proximal sensor data
 - Measurement of D-value during variety testing could be used for including genetic variability into models
- Inclusion of model-based yield estimates to the same UI (needs better crop model before reliable)
- Dry matter yield and D-value predictions for the 2nd and 3rd cut (not very useful and reliable in current version)
- More comprehensive use of weather data for assessing “optimal harvest time” – e.g. silage pre wilting indices and hay drying indices
- Improved flexibility and adaptability of the model to customers’ systems
 - Integration and embedding should be possible to existing decision support systems etc.

Thank you!

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