Monitoring vegetative phenology in subalpine grasslands

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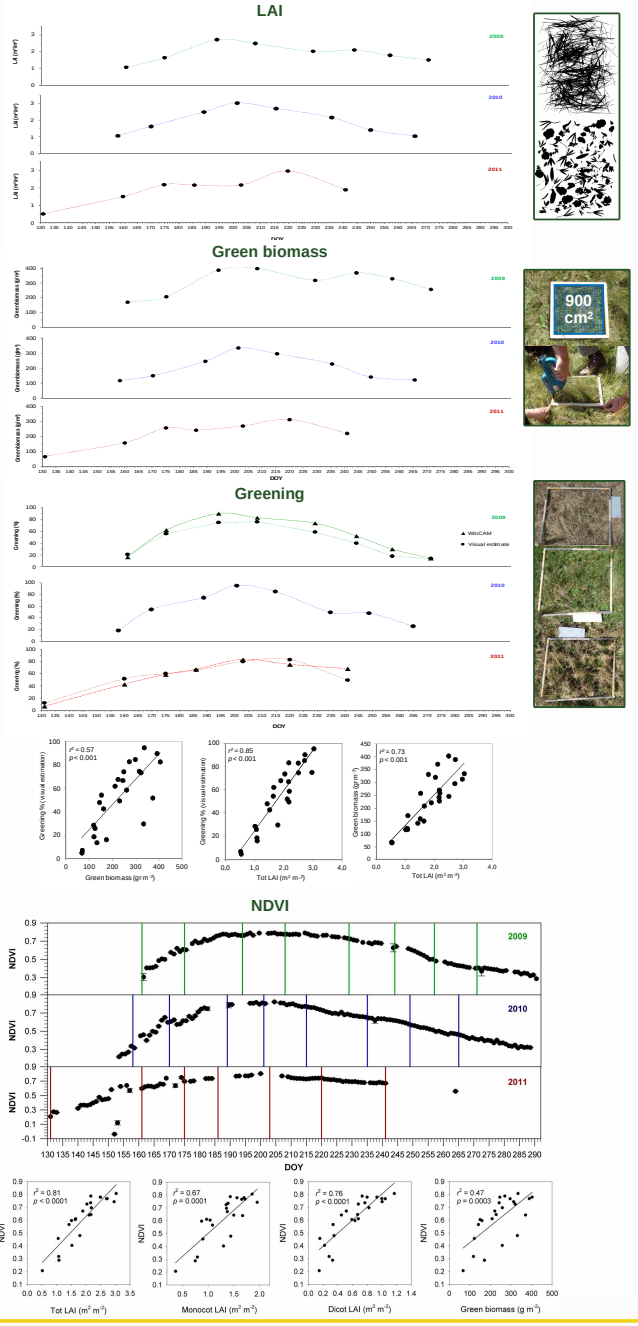
Observations on vegetative phenology in a subalpine *Nardus stricta* pasture at Torgnon were carried out during the 2009-2011 growing seasons from snow melt to senescence. LAI, green biomass and percentage of greening of vegetation, measured using visual estimates and digital image analysis, were monitored every two weeks on 12 samples. Data was compared with NDVI seasonal patterns in order to detect the development of the vegetation and to understand the significance and applicability of different methods.



LAI, green biomass, greening and NDVI concur in showing a similar trend during the growing season. In years 2009 and 2010 the curves show a rapid increase after snow melting and reach maximum values around DOY 200 (20 July), decreasing slowly afterwards.

When compared with the two previous years, in 2011 snow melting took place 45 days earlier and the development of spring growth was much slower. In year 2011 the curves reach maximum values around DOY 220 (8 August).

Visual estimates and digital image analysis show very similar curves. Greening percentages, measured using both methods, are highly correlated to LAI, as well as green biomass.
NDVI is highly correlated to LAI but the correlation with green biomass is lower.

Concordance between detailed analysis on vegetation and NDVI suggests that different methods can be applied in different situations. Digital image analysis seems to be a very promising, rapid, non-expensive and objective method that can also be applied in non intensive study areas.

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