



## **Plant Responses to Environment Fertility : a Simple Parameterisation for SVAT Modelling**

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The ISBA-A-gs (Interactions between Soil, Biosphere, and Atmosphere, CO<sub>2</sub>-reactive) model is a soil-vegetation-atmosphere transfer (SVAT) scheme able to simulate the energy and water budget and plant growth in different climate and nutrient-supply conditions, i.e. for different levels of the environmental fertility (Calvet et al., 1998; Noilhan and Mahfouf, 1996). In ISBA-A-gs it is possible to describe specific plant response to environmental fertility by prescribing adequate values of two plasticity parameters (Calvet and Soussana, 2001). The plasticity parameters of a given plant can be obtained from the leaf specific leaf area (SLA) and the nitrogen concentration (N) of green leaves, measured in different conditions of nitrogen stress and/or atmospheric CO<sub>2</sub> concentration. The SLA and N variables have been measured for numerous plant species in past studies. So we performed a meta-analysis (compilation) of the literature that provided data able to estimate the two plasticity parameters for a large number of herbaceous and woody plants. In order to extend the validity of the concept to multi-species vegetation canopies, a N-enrichment study was performed on natural grassland in South-western France. It was possible to determine effective plasticity parameters representing the behaviour of the multi-species meadow and to validate the ISBA-A-gs simulations by using biomass and soil moisture measurements.

**Keyword :** SVAT, nitrogen, CO<sub>2</sub>, LAI, SLA, plasticity, soil moisture

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