The extensibility of the parental component simplified the modification of the algorithms in the design of simulation models. Model reuse is limited by framework-dependence, and third-parties interested in modifying an available model are forced to rewrite it from the beginning. The proliferation of models sharing large part of the algorithms removes resources for model improvement, for the development of new models, and for the extension of their application domains.

Component-oriented models: a step forward

- Component design promotes reusability by limiting dependencies, by specifying interfaces and by encapsulating algorithms in discrete software units.
- The capability of extending the component allows model updates and comparison.

The sugarcane model Canegro was re-implemented following component oriented paradigm to achieve:

- Framework-independence
- Highly granular architecture: each process is made up of discrete, independent model units (i.e., strategies)
- Extensibility and reusability: third-parties can extend the component by adding alternative strategies or reuse them in other solutions
- Transparency: ontology of variables and parameters is declared. The strategies implement a public, semantically rich interface

FROM CANEGRO TO ARUNGro: A STRAIGHTFORWARD WAY

- Giant reed (Arundo donax L.) is a promising energy crop which shares several morpho-physiological traits with sugarcane.
- The Canegro component was re-used for the definition of an explanatory giant reed model (i.e., ArunGro). Some processes needed the formalization of new algorithms to correctly simulate the dynamics of this crop.
- The extensibility of the parental component simplified the modification of individual parts of the model, achieved through the addition of alternative strategies.