

## **Estimating the productivity of chipping operations**

**By Raffaele Spinelli and Natascia Magagnotti – CNR/IVALSA, S.Michele a/Adige, Italy**

Due to a booming bioenergy sector, chipping has become increasingly popular all across Europe. Many operators have equipped for the purpose, but the large variety of working conditions found in the European forests makes it difficult to correctly estimate the productivity of each specific operation, leading to inappropriate price setting. Underestimating chipping cost will eventually result in a financial loss for the operator, whereas an overestimate will make the operator much less competitive. In 2001, CNR released a freeware capable of returning reliable estimates of chipping productivity and cost, on the basis of user-entered input data. The programme contained a set of predictive equations derived from the results of 102 field trials, conducted with 30 different machines, under a range of working conditions. Since then CNR has continued to work on the subject, with the goal of updating and refining the model. Such work has included 40 validation tests and a separate study on the delay time typical of different chipping operation layouts. The result is a new calculation model, more accurate and easier to use than the previous version, which is being released in 2008 and showcased at the Formec.08 Conference. The model returns an overall chipping cost, once the user has entered specific information on working conditions and costing hypotheses. It allows operators to balance options, according to their own operational and economic environments. Users can enter alternative choices and check the economic results of each alternative under the user's own working conditions. Users can supply several inputs to the model, the most important being the average piece size they expect to treat, and the power of their chipper. Other inputs include equipment purchase prices, depreciation periods, labor rates and other cost assumptions. In order to facilitate comparison with other estimates and to achieve methodological transparency, the equations are assembled into a simple *Microsoft Excel* workbook, and the costs are calculated with standard costing methods currently used in Forest and Agricultural Engineering. We believe that such a model can assist European foresters in keeping ahead with the growing biomass sector, thus helping them to seize an important business opportunity