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## Simulation of alfalfa production with EPIC

L. Chun<sup>1</sup>, X. Xin<sup>2</sup>, H. Tang<sup>2</sup>

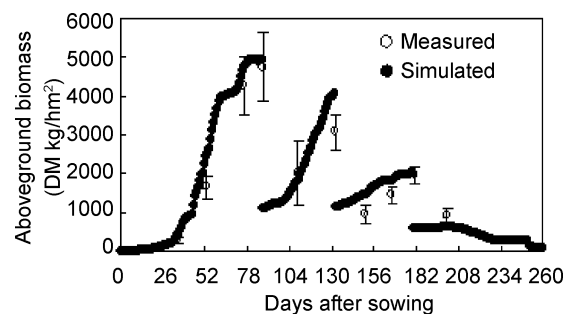
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**Key words:** alfalfa, simulation, Erosion Productivity Impact Calculator (EIPC) model, mowing

**Introduction** The mowing is an important step in alfalfa (*Medicago sativa* L.) production. For a model simulating alfalfa production, the precise simulation of the cutting course is important for the validation. In this study, we tested the performance of EPIC (Gassman, *et al.*, 2004), a process crop model, in simulation of alfalfa production under cutting courses.

**Materials and methods** The site was a farm in Shunyi, Beijing, China. EPIC model version is 3050. The cultivar CW400 sowed on Apr 15, 2005. The aboveground biomass was sampled in random in 1 m<sup>2</sup> with 5 replications on May 20, Jun 7, Jun 30, Jul 12, Aug 2, Aug 25, Sep 13, Sep 29, Oct 13 and Nov 2 respectively. Alfalfa was cut 5 cm above the ground and the residues were harvested in Jul 12, Aug 25 and Oct 13 respectively. For each harvest, the samples were determined on a dry weight basis. The data of weather, soil, plant physiology and tillage schedule in this experiment were required as input for EPIC model.

**Results** The simulation of the daily aboveground biomass by EPIC model with 3 time cuttings was a similar trend to the measured values (Figure 1). The simulated values of aboveground biomass at the sample time were closely related to the measured values ( $r^2=0.9178$ ,  $P>0.25$ ). The differences between simulated and measured aboveground biomass and cut yield were more than 29.47% on Aug 25 (Table 1). The differences of residues in three cuttings were more than 29.57%.



**Figure 1** The simulated and measured of aboveground biomass in alfalfa production.

**Table 1** The difference  $[(\text{Simulated}-\text{Measured}) \times 100/\text{Measured}]$  between the simulated and measured of aboveground biomass, yield and residue of alfalfa at cutting (%).

	Aboveground biomass	Yield	Residue
Jul 12	3.15	5.33	-29.57
Aug 25	31.39	29.47	51.38
Oct 13	1.60	9.73	-39.07

**Conclusions** This study showed that EPIC was able to simulate the aboveground biomass in alfalfa production, confirming the results of former study (Chung, *et al.*, 2001). However, the simulation of the aboveground biomass and yield at cutting courses did not agree well with the measured values, suggesting that the model needs to be improved for simulating alfalfa production with cutting courses.

### References

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