

A Dynamic 3D Structural Model of Rice Based on Morphogenesis Development*

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Abstract: Gaining a high productivity of rice in the actual rice field under some controlled condition is very costly and time consuming. In addition, there are several under expected situations such as the disease, weather, and wild fire that can cause the damage to the production. To overcome these problems, prior to the actual growing process, a mathematical simulation of rice growth under various pre-specified parameters must be developed.

This paper proposed a 3D dynamic structural model of rice, *Oryza sativa L.*, which is developed based on botanical knowledge and observed data in the field. The developed model is based on the rice growth stages proposed by IRRI (International Rice Research Institute). We considered each part of the model as a unit of the growth characteristics, and combined each unit together using the physical linked model. Growth data were collected from two types of experiment. Thai Pathum Thani 1 (PTT90071-93-8-1-1) was grown in pots under outdoor conditions during June to September, 2005, and Thai jasmine rice (KDML 105) was cultivated in rice field during paddy rice season at Loei province, north-east of Thailand. We used neural networks to approximate the growth model, and applied the model to 3D model of rice life cycle for the reality appearance.

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