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Commodity of the past, today, and the future
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AGRONOMI

SESSIONS I | SESSIONS II | SESSIONS III
SESSIONS IV | SESSIONS V | SESSIONS VI
SESSIONS VII

SESSION III

- Phenopalm: A Phenological Model For Oil Palm at Tree Scale.

Phenopalm: A Phenological Model For Oil Palm at Tree Scale.

Emmanuelle Lamade, Setiyo Indra Eko, Sinaga Khairuddin, Permana Rudi, Listia Eka

PHENOPALM is a simulation model of phenological development of oil palm (leaf emission rate, inflorescence cycles, anthesis, maturation rate and harvesting bunches, pruning leaves) at tree scale. From two important phenological observations set of data, one from Ivory Cost (Research Station of La Mé) on LM2t x DA10D, the second one from North Sumatra (Marihat Research Station) on Deli X La Me material as well as on Deli x Yangambi, a kern module has been elaborated by using MODPHEN (object-oriented programming in Delphi 7.0 environment) which generates for each oil palm tree units composed by one leaf (including leaflets, rachis and petiole), and its respective inflorescence axils. Incrementation is achieved by a thermic time in ° days. This « kernel » is completed by a daily carbon balance between carbon supply and demand from development and needs of all growing organs. A simple carbon supply module (MOD-SIMPALM) allows the estimation of daily ratio supply/demand and the calculation of an internal trophic level (Ic) which conducts each step of the phenological development and influences inflorescence sexualisation, abortion. In the latest version of PHENOPALM, a water balance module (MOD-WATERPALM) is completing the software as well as competition effect between individual palm trees for light and nitrogen absorption (MOD-N-LIGHTPALM). The software is running over a period of 8000 days, has been parameterized for 15 different oil palm trees for all materials studied which have different sensitivities for photoperiod and temperature. The model is able to give at tree scale, yield, inflorescence cycles (F, M, A) as well as the prediction of each phonological events date (date of each rank 1, anthesis, maturation and harvest).

Proposal IOPC 2006 Bali . Interactive Poster

"PHENOPALM" : a phenological model for oil palm at tree scale".

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Summary

Phenopalm is a simulation model of phenological development of oil palm (leaf emission rate, inflorescence cycles, anthesis, maturation rate and harvesting bunches, prunning leaves...) at tree scale. From two important phenological observations set of data, one from Ivory Cost (Research Station of La Mé) on LM2t x DA10D, the second one from North Sumatra (Marihat Research Station) on Del XLa Me material as wellas on Deli xYagambi , a **kern** module has been elaborated, **MODPHEN** (oriented-object programming in Delphi 7.0 environment) which generate for each oil palm tree units composed by one leaf (including leafets, rachis and petiola), and its respective inflorescence axilled. Incrementation is achieved by a thermic time in ° days. This « kernel » is completed by a daily carbone balance between carbon supply and demand from development and needs of all growing organs. A simple carbon supply module (**MODSIMPALM**) allows to estimate daily the ratio **supply/demand** and to calculate an **internal trophic level (IT)** which conducts each steps of the phenological development and influences inflorescence sexualisation , aborption. In the last version of PHENOPALM, a water balance module (**MODWATERPALM**) is completing the software as well as competition effect between individual palm trees for light and nitrogen absorption (**N-LIGHTPALM**). The software is running over a period of 8000 days, has been parametrised for 15 different oil palm trees for all materials studied which have different sensitivities for photoperiod and temperature. The model is able to give at tree scale, yield, inflorescence cycles (F, M, A) as well as the prediction of each phonological events date (date of each rank 1, anthesis, maturation and harvest).

Key words : oil palm, phenology, model object-oriented, carbon balance, water balance, nitrogen competition, light competition, tree scale

AG/13 PHENOPALM

"a phenological model for oil palm at tree scale".

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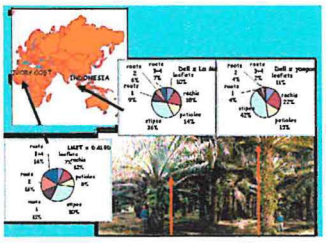
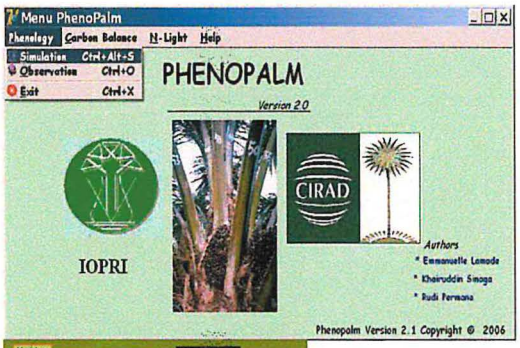
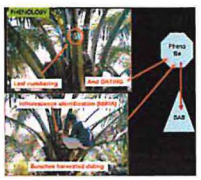
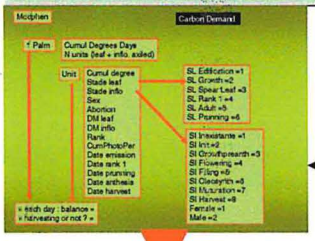
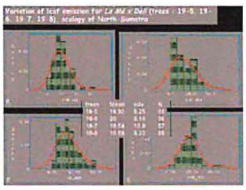


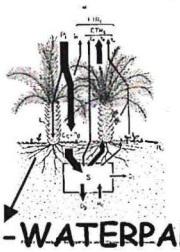


MODPHEN

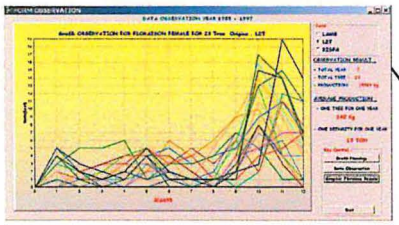


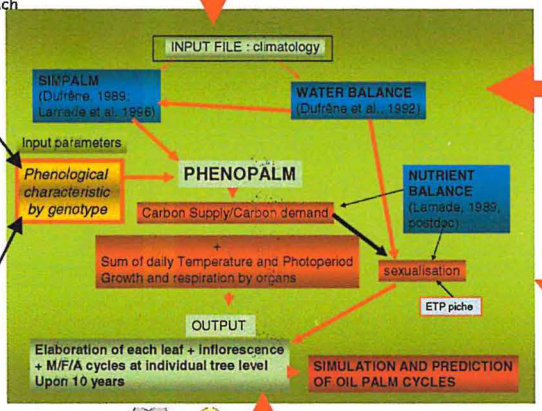


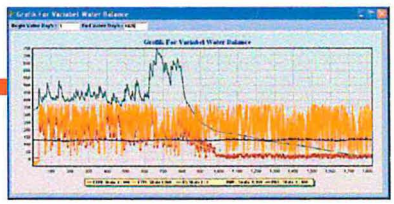


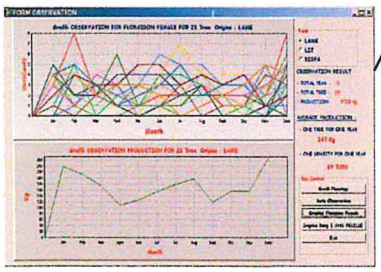


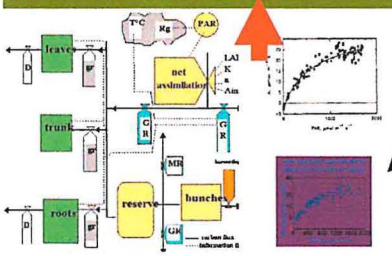
MOD-WATERPALM



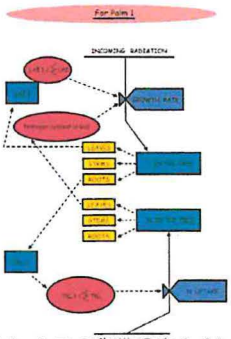




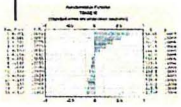


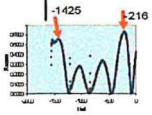


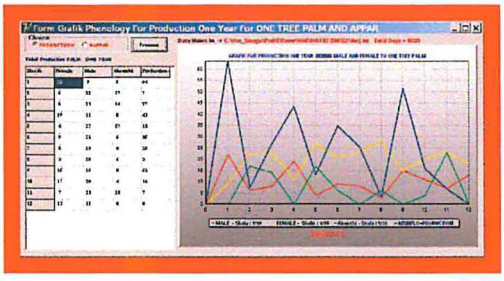
MOD-SIMPALM



MOD-N-LIGHTPALM







Conclusion

The development of PHENOPALM is still on the way of new developments towards an important platform as WaNulCAS (ICRAF, Bogor) with at the same time the elaboration of an important data base involving meteorological data and production in constrasting ecologies all around the oil palm distribution.PHENOPALM will be accessible quickly on a specific website http://www.phenopalm-IOPRI-CIRAD.com.