5th International Crop Science Congress
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# ICSC 2008

## 5th International Crop Science Congress & Exhibition

# Abstracts

*Recognizing Past Achievements,*
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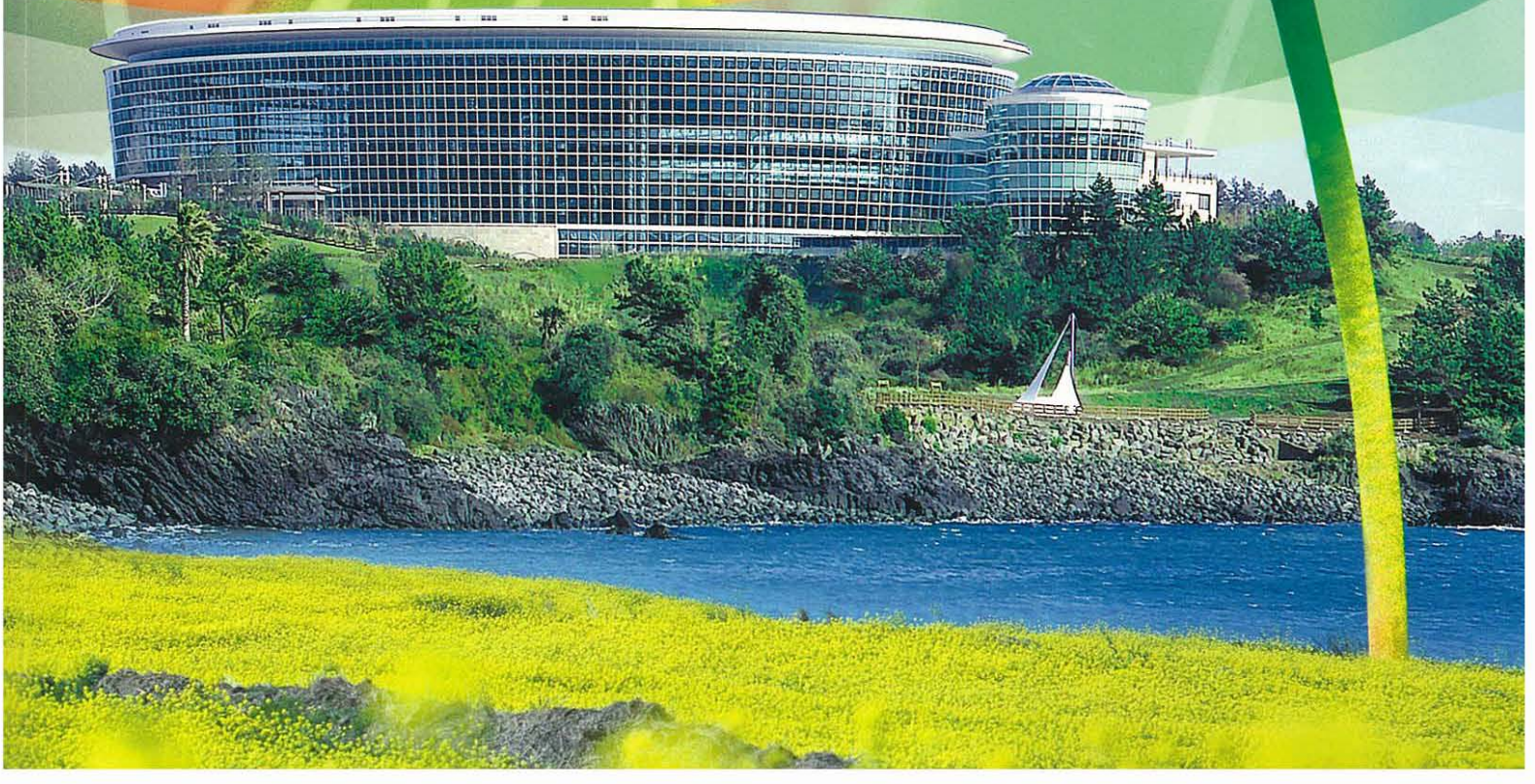

renewable energies; Ecological pest control and biopesticides; Organic farming; Genetically modified organisms (GMOs) in cropping systems; Environmental impact on soil, water, air and biodiversity; Risk assessment for food, ecotoxicology; Decision support systems and companion modelling; Social and economical issues of agricultural changes; Innovation in farming systems; Pollutants in agrosystems. More information is available on the ASD website. Authors wishing to submit a review article should contact the Editor-in-Chief. A book entitled "Sustainable Agriculture" including major review articles will be issued end 2008.
Corresponding author: Eric Lichtfouse, Eric.Lichtfouse@dijon.inra.fr

## CS3-S3, P19

### Decision of the Optimal Field and Ecotype of Soybean Adapted in the Middle Part of the Korean Peninsula by Using a Digital Climate Model, Mapsoy 3.0b

Young su Lee[1*], Sung kee Kim[2], Young cheol Cho[1]
[1]Northern Branch of Gyeonggi Province Agricultural Research &, Gyeonggi-Do Agricultural Research & Extension Services, Gyeonggi-Do Yeoncheon-Gun Yeoncheon-Up chatan 4-Ri 89-3, Republic of Korea
[2]Northern Branch of Gyeonggi Province Agricultural Research &, Northern Branch of Gyeonggi Province Agricultural Research &, Gyeonggi-Do Yeoncheon-Gun Yeoncheon-Up chatan 4-Ri 89-3, Republic of Korea

This study was conducted to predict the optimal field and ecotype of soybean by using MAPSOY 3.0b, a digital climate models using spatial data and soybean growth model. This system was based on the characteristics of land and climate, growth and development parameters of CROPGRO-soybean model derived from long-term field observation. We already developed MAPSOY 3.0 in 2006 and we made up for MAPSOY 3.0b by complementing the climate parameters of that and expanding the applicable area including 342 field unit. This model grades 9 degrees per each field unit based on the yield potential and the yield stability according to soybean's ecotype. Through the field experiment, we could observe differences in the growth and yield of soybean depending on the degrees from which MAPSOY 3.0b had graded. We concluded that this model will be useful for estimating the land productivities and decision of optimal soybean cropping system per each field unit for growing soybean cultivars in the middle part of the Korean peninsula.
Corresponding author: Young su Lee, yslee75@gg.go.kr

## CS3-S3, P20

### Early Assessment of Pest Dynamics on New Crop Varieties: A Modelling Approach Applied to Banana-Nematode Systems

Philippe Tixier[1*], Frederic Salmon[2], Patrick Queneherve[3]
[1]UPR26, CIRAD, PRAM - BP 214, France
[2]UPR75, CIRAD, PRAM - BP 214, France
[3]UMR RPB, IRD, PRAM - BP 214, France

Breeders develop an increasing number of new crop varieties with potentially interesting characteristics in regards to their resistance or tolerance to pests. Nevertheless, the long-term assessment often requires heavy multi-local in-field measurements. Furthermore, the interactions between two or more pest many limit the relevance of field results on the long-term. Here, we present a methodology that use cropping system model to evaluate both the long-term evolution of the pest dynamics and the overall sustainability of the cropping systems based on include new varieties. We illustrate our method with the case of the new synthetic banana hybrid FB920 (Musa spp., AAA group) - plant-parasitic nematodes complex. FB920 was designed to be resistant to the Sigatoka Disease and Black Leaf Streak Disease, caused respectively by Mycosphaerella musicola and Mycosphaerella fijiensis. Herein, we used the SIMBA model (a model to simulate phenology, growth, and plant-parasitic nematode/banana interactions) to examine the population dynamics of plant-parasitic nematodes in cropping systems with this new synthetic hybrid FB920 in various initial conditions. We used short term experiments to calibrate the SIMBA model to account for the growth and the development of the FB920 variety and to simulate the dynamics of the burrowing nematode (Radopholus similis) and the spiral nematode (Helicotylenchus multicinctus). Results from simulations show that in the long term the spiral nematode populations can overtake the burrowing nematode populations and that nematodes populations are smaller than in Cavendish banana fields.
Corresponding author: Philippe Tixier, tixier@cirad.fr

## CS3-S3, P21

### Mega3 a Software for Molecular Data Analysis

fatemeh amini[1*], aghafakhr mirlohi[2], fahimeh amini[3]
[1]plant breeding, isfahan university of technology, Iran-Isfahan-8167933461, Iran
[2]plant breeding, isfahan university of technology, Isfahan university of technology, Iran
[3]teaching, Isfahan teaching organization, Iran, Isfahan, Iran

With its theoretical basis firmly established in molecular evolutionary and population genetics, the comparative DNA and protein sequence analysis plays a central role in reconstructing the evolutionary histories of species and multigene families, estimating rates of molecular evolution, and inferring the nature and extent of selective forces shaping the evolution of genes. The scope of these investigations has now expanded greatly owing to the development of high-throughput sequencing techniques and novel statistical and computational methods. These methods require easy-to-use computer programs. One such effort has been to produce Molecular Evolutionary Genetics Analysis (MEGA) software, with its focus on facilitating the exploration and analysis of the DNA and protein sequence variation from an evolutionary perspective. Currently in its third major release, MEGA3 contains facilities for automatic and manual sequence alignment, web-based mining of databases, inference of the phylogenetic trees, estimation of evolutionary distances and testing evolutionary hypotheses.
Corresponding author: fatemeh amini, fate_amini@yahoo.com

## CS3-S3, P22

### Modelling Chilling Injury in Temperate Rice Using Csm-Ceres-Rice

Jagadish Timsina[1*], Upendra Singh[2], Doug Godwin[3], Elizabeth Hunphreys[1], Kshirod Jena[4]
[1]CESD, IRRI, IRRI, Los Banos, Philippines
[2]Soil Fertility, IFDC, Muscle Shoals, Alabama, U.S.A.
[3]Land and Water, CSIRO, 3Alton Park, MS2, Dubbo, NSW, Australia
[4]Plant Breeding, IRRI-Korea, 209 Seodun-Dong, Republic of Korea

Rice in temperate environments suffers cold damage during reproductive stage. Growth and development of rice is more affected by floodwater or soil surface temperature than ambient temperature as the developing panicle is close to soil or floodwater surface. Simulation of the effect of low air temperature on rice requires simulating the temperature experienced by the panicle and consequent effect on spikelet sterility and yield. Floodwater temperature and chilling injury routines were developed and incorporated into CERES-Rice, and was tested against several data sets from southern NSW, Australia. Simulated daily mean flood water temperatures were 5-10% higher than the measured data in shallow and deep water. In shallow water, simulated minimum temperatures matched measured data quite well; however model overestimated daily minimum temperature in deep water at Yanco. Conversely, daily maximum temperatures in deep water were simulated well except for some overestimations. The model simulated grain yield satisfactorily across four data sets, except for a late planted crop at Deniliquin. Simulated grain yield response to shallow and deep water was within 10-20% of measured data for early planting, but agreement was poor for late planting. Sensitivity analysis suggested greater cold damage with pre-flood N than PI N, consistent with observations from many field experiments. Simulations suggest fairly reliable predictions of yield loss in temperate rice due to cold injury in southern NSW but would require refinements of floodwater temperature and chilling injury routines and validations using independent data sets from areas where temperatures remain a major abiotic stress for
Corresponding author: Jagadish Timsina, j.timsina@cgiar.org

## CS3-S3, P24

### Apsim-Wheat Module: Parameterization, Evaluation and Utilization as Decision Support System

Muhammad Asim[1*], Muhammad Aslam[2], Asghari Bano[3]
[1]Wheat Programme, Crop Sciences Institute, National Agricultural Research Centre, Park Road, Pakistan
[2]Minor Crops, MINFAL, Ministry of Food, Agriculture and Livestock, Pakistan
[3]Plant Sciences, Biological Sciences, Quaid-I-Azam University, Islamabad, Pakistan

A study was conducted overtime (2001-2007) at National Agricultural Research Centre (NARC), Islamabad through a series of experiments to parameterize, evaluate and utilize Agricultural Production Systems Simulator (APSIM). The study comprised of six genotypes (Wafaq-2001, Chakwal-97, NR-55, NR-232, NR-234 and Margalla-99) planted at four planting times, started from mid of October and extended until the end of December. These four planting times were symbolized as Planting Windows (PWs) denoted as PW1, PW2, PW3 and PW4. The improved/modified cultivar coefficients in wheat module accurately regulated the phasic development of these genotypes which lead to goodness-of-fit between simulated and measured data regarding the occurrence of anthesis and maturity. This improvement in model's ability also improved the simulation capabilities of the model regarding biomass accumulation across planting windows and yield. APSIM was then used as a tool for selecting optimum planting time and cultivar in conjunction with the knowledge of seasonal climate forecasting, using El Niño Southern Oscillation (ENSO)/Southern Oscillation Index (SOI) phases. The simulation analysis regarding partitioning of wheat yield, averaged across PWs, using SOI phases showed that planting after mid November (PW3 and PW4) was vulnerable to climatic fluctuations governed by SOI phase in July. The investigations also revealed an increased yield of about 1 t/ha with the SOI phase 3 during July. Since in this area almost 60% rain was received during summer