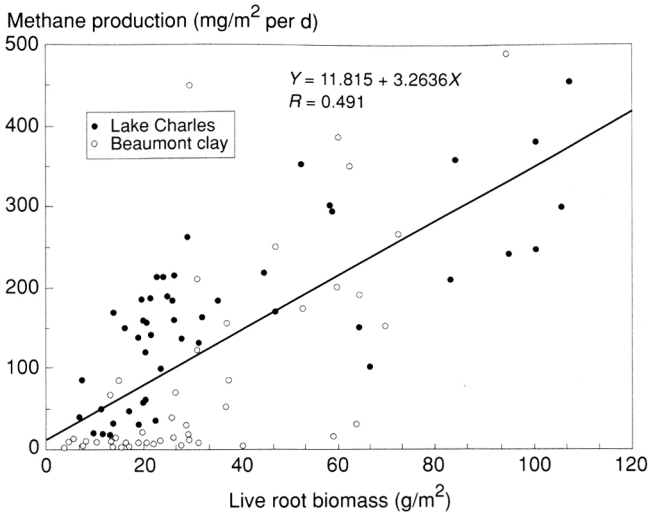
Methane production ceased when fields were drained before harvest. No methane was emitted even following prolonged incubation in the laboratory under an anaerobic nitrogen atmosphere. But when exogenous acetate was provided, methane production immediately resumed.

These results indicate that methane production and emission from flooded ricefields are dependent on plant root distribution and aboveground biomass. Soil properties and water management also affect methanogenesis. Further research relating these effects to rice cultivars and farmer practices is needed to form a basis for designing technology that would help mitigate the currently increasing levels of methane in the atmosphere. ■



2. Correlation of live root biomass with methane production from the lake Charles field (•) and the Baumont clay field (o). Data points represent measurements taken from 4 soil depths (0-10 cm) at 3 distances from plants at 4 times during the growing season. Regression line is for the combined data set.

ANNOUNCEMENTS

Tropical crop research and biotechnology symposium planned.

The new International Society for Tropical Crop Research and Development (ISTCRAD), with headquarters in Trivandrum, Kerala, India, is organizing a symposium to coincide with its formal inauguration in September 199 1.

Organizing secretary is Dr. N. K. Nayar, Department of Agricultural Botany, College of Agriculture, Kerala Agricultural University, Trivandrum 695522, India. ■

Recommendations of IRRC 1990 research discussion groups

Nearly 200 scientists from 30 countries participated in the International Rice Research Conference 27-31 August in Seoul, Korea. They discussed the research results reported in about 40 papers and posters, and identified directions for future work.

Summaries of discussion group recommendations are given below.

Direct seeded rice. A matrix was used to target problems, opportunities, and research priorities, with plant characteristics and crop management on one dimension, and agroecological zone, inputs, and direct seeding methods on the other (see table).

Participants agreed on the need to establish a universally accessible data base: where and how is direct seeding presently practiced, where is the practice increasing, what is the yield loss or benefit, and what is the time-and-cost benefit (particularly in low-input, tropical systems with unreliable technology and low opportunity cost of labor).

Features of an ultrahigh tillering plant ideotype deserving research priority include

- Quick early growth at seedling establishment.
- Tiller population/ha = tillers/plant × plant population × tiller death.
- Nitrogen use efficiency in terms of uptake and utilization and redistribution (tied to the value of the stem as a sink/source for both N and carbohydrate and to synchronous seed filling).
- Patterns of root growth and their benefit.

Rice blast disease. Research needs include

- Integrated control — developing on-farm decision aids, agroecological zoning, and management of panicle blast.
- Quantitative epidemiology, modeling, and forecasting — disease assessment methods, conditions affecting host susceptibility, interactions with other pests, sources of initial inoculum, crop losses, coupling blast models to crop models, fungicide dynamics, and disease forecasting.
- Host plant resistance and pathogen population virulence — gene development, genetics, screening methods, and durable resistance.

The group decided to form working groups for each area; members may undertake joint trials or other direct cooperation. The working groups and their coordinators are as follows:

Integrated control: Fernando Correa, CIAT-Rice Program, P.O. Box 6713, Cali, Colombia; and Arunee Surin, Rice Pathology Research Branch, Plant Pathology and Microbiology Division, Department of Agriculture, Bangkhen, Bangkok, Thailand.

Quantitative epidemiology: P. S. Teng, Plant Pathology Division, IRRI, P.O. Box 933, 1099 Manila, Philippines; and K. Manibhushanrao, Centre for

Priority/research for dry seeded rice (DSR) and wet seeded rice (WSR).

Characteristic	Tropical climate				Temperate climate	
	Low input		High input			
	DSR	WSR	DSR	WSR	DSR	WSR
Land preparation						
When to plow?	+	+				
How to control seed depth?	+					
Germination						
Timeliness	+	+				
Control of pests	+	+				
Emergence						
Fast emergence	+	+	+	+	+	+
Elongation	+	+	+	+	+	+
Cold tolerance					+	+
Submergence (tolerance for aerobic then reduced condition)	+	+	+	+	+	
Tillering[a]	+	+	+	+	+	+
Nutrition[b]	+	+	+	+	+	+
N/water control			+	+		
Weed control[c]	+	+				
Herbicides[d]	+	+	+	+	+	+
Insects and diseases[e]	+	+	+	+		

[a]Necessarily desirable to move to low tillering as we move to more sophisticated system. [b] Need to consider efficiency of N fertilizer in all direct seeding systems, particularly in relation to water management at the seedling stage of dry seeded low input rice in the tropics. Use of legume crops before rice for efficient N release after soil becomes flooded. [c] Weed control is more critical in direct seeded than transplanted rice, in all systems. Early canopy closure is desirable to combat weeds but may predispose crop to disease and result in excessive leaf growth and low harvest index. [d] Increasing environmental concern pressures use of traditional herbicides: research needed on less environmentally damaging control agents (e.g., fungi, allelopathy). [e] Pest control in dry seeded low input crop; seed harvesting pests; seedling damage. e.g., ducks.

Advanced Study in Botany, University of Madras-Guindy Campus, Madras 600025, India.

Host plant resistance: J. M. Bonman, Plant Pathology Division, IRRI, P.O. Box 933, 1099 Manila, Philippines; and K. Maruyama, National Agriculture Research Center, Yatabe, Tsukuba 305, Japan.

Improving rice grain quality. Research needs include

- Rice grain quality preferences — correlate data base on high quality rices of different countries with physicochemical properties of milled rice.
- Varietal classification — six groups based on allelic combinations at 14 isozyme loci are most useful to breeders (intergroup crosses show sterility and restriction to recombination).
- Grain quality improvement — genetic diversity for amylose content.
- Milling yield and head rice recovery — cracking resistance and tolerance for moisture absorption stress; selection for lower hull weight.
- Aromatic rices — many traditional aromatic rices belong to group 5, most improved indicas belong to group 1; identify donors of aroma for group 1.
- International standards — develop common categories for classifying rice grain quality.

International coordinating committee for rice genetic resources

The International Board for Plant Genetic Resources (IBPGR) and IRRI are organizing an international rice germplasm committee to coordinate collection and conservation of rice genetic resources.

Conservation is especially important where new varieties threaten the extinction of native varieties. Also, increasing urbanization and accelerating development are endangering the wild relatives of domestic crops that could be sources of desirable genetic material needed to improve future varieties.

IRRI and IBPGR regularly cosponsor the International Rice Germplasm Workshop to assess the status and directions of global rice germplasm conservation. The workshop also strengthens linkages among national and international scientists.

At the 10-12 May 1990 workshop at IRRI, 35 participants from 15 major rice-growing countries of Asia, Africa, and North and South America planned future field collection and developed a network approach to conservation, evaluation, and use of rice germplasm. ■

International rice genetics symposium II recommendations

Some 300 rice geneticists from 24 countries met at IRRI 14-18 May 1990, and presented 65 research papers and 75 posters. Twelve topics were covered:

- varietal differentiation and evolution
- genetic markers, linkage groups, and aneuploids
- genetics of stress tolerance
- genetics of morphological and physiological traits
- genetics of disease and insect resistance
- tissue and cell culture
- molecular genetics of cytoplasmic genomes
- molecular genetics of nuclear genomes
- RFLP analysis of rice genomes
- molecular genetics of rice proteins
- molecular genetics of disease resistance
- transformation techniques

Proceedings of *Rice genetics II* will be published by IRRI. The following recommendations were made by conference participants:

- Adopt a unified system of numbering rice chromosomes and linkage groups.
- Follow a uniform nomenclature for isozyme loci and alleles.
- Prepare a comprehensive RFLP map of rice, combining the two now available.

A small workshop to discuss problems remaining in gene nomenclature will be held in 1992. International Rice Genetics Symposium III will be scheduled in 1995. (The first symposium was held in 1985.)

During the year's symposium, members of the International Rice Genetics Cooperative that coordinates research collaboration evolved a unified system of