Course Contents

Module 1: Introduction to R
- Installation of R
- Importing & Exporting Data
- Data Manipulations
- Basic Programming in R
- Graphics using R

Module 2: R/Phenotypic Analysis
- Data Diagnostics
- One & Two sample tests
- Linear Models
- Linear Mixed Models

Module 3: R/QTL Analysis
- Installation of R/QTL
- Genetic linkage map construction
- Genotypic Data Diagnostics
- Single Marker Regression
- Simple Interval Mapping
- Composite Interval Mapping
- Multiple QTL Mapping

Course Details

The course will be mainly divided into three modules. First module will focus on “R software” including installation, data management in “R” environment, basic programming and graphics. Second module will be focused on phenotypic data analysis. This module will cover understanding of field/lab experimental designs (CRD, RCBD, IBs, Lattice and etc.) including data cleaning, outlier detection and various other requirements of proper statistical analysis. An introduction to linear models and their use in analysis of experimental designs will be demonstrated. Participants will also learn defining linear models for different types of experimental designs. We shall also introduce concept of mixed models and their analysis by using R software.

Third module will be focused on QTL analysis. The key idea in QTL mapping is to obtain phenotypic data from a backcross or intercross population and then identify molecular markers in the genome associated with the phenotype. Cleaning of genotypic data, single marker regression, Simple & Composite Interval Mapping & Multiple QTL Mapping will be covered using R/QTL software (http://www.rqtl.org/).

Targeted Audiences

This course is designed specifically for researchers and students from the fields of plant breeding, molecular biology, agricultural biotechnology and bioinformatics and biometrics. During the course participants will learn phenotypic and genotypic data analysis including linear and mixed models in experimental designs, generation of BLUPs, genetic linkage map construction and QTL mapping using the freely available, robust and versatile statistical computing software platform “R” (http://www.r-project.org/)

Announcement

Biometrics Unit, ICRISAT (http://www.icrisat.org/biometrics.htm) in collaboration with Professor Karl Broman from the Department of Biostatistics and Medical Informatics, University of Wisconsin School of Medicine and Public Health (http://www.biostat.wisc.edu/~kbroman) and Dr. T. Nepolean from Indian Agricultural Research Institute, New Delhi, India (www.iari.res.in) is organizing a training course on R and R/QTL.

Course fee includes lunch and coffee breaks for 4 days. We prefer you to stay at ICRISAT Housing Facilies.

ICRISAT Lodging Options (Per Day):
- Dormitories: US$ 15/₹ 750
- Flats: US$ 47/₹ 2350

Day care services can be arranged for participants who intend to bring their children below 4 years old at the cost of US$ 4 / ₹ 200 per day.

* Limited number of scholarships to cover registration fee & accommodation are also available. To apply please send your CV & justification before 30/09/2012. A committee will screen your request & inform you of the result by 15/10/2012.

For registration details please visit http://www.icrisat.org/rcourse.htm or contact Ms. B. Manjula (b.manjula@cgiar.org)

*Registration will be done on first-come basis till a max of 20 participants
Hyderabad is the capital of Andhra Pradesh (AP) and the fifth largest city in India, with an ancient civilization and culture. Attached to the city is its twin, Secunderabad, which is part of Hyderabad. The twin cities of Hyderabad and Secunderabad are separated by the Hussain Sagar, an artificial lake constructed during the time of Ibrahim Quli Qutub Shah Wali in 1562 A.D. While AP is known as the most IT savvy state in India, Hyderabad is emerging as a major center for IT exports.

Hyderabad was founded on the River Musi five miles east of Golconda, in 1591-92 by Muhammad Quli Qutub Shah. In the 16th century the city grew spontaneously to accommodate the surplus population of Golconda, which was the capital of the Qutub Shahi rulers. The city is more than 400 years old and is noted for its natural beauty, mosques and minarets, bazaars and bridges, hills and lakes. It is perched on the top of the Deccan Plateau, 1776 ft., above sea level, and sprawls over an area more than 100 sq. miles.

About ICRISAT

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid or dryland tropics has over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger and a degraded environment through better agriculture.

ICRISAT is headquartered in Hyderabad, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. It belongs to the Consortium of Centers supported by CGIAR. ICRISAT conducts research on five highly nutritious, drought-tolerant crops – chickpea, pigeonpea, pearl millet, sorghum and groundnut. It also develops sustainable management of semi-arid tropic (SAT) systems through efficient and sustainable management of natural resources, and enables policies and institutions for improving livelihoods and achieving food, nutrition and health security while protecting the environment.

Vision, mission and approach

ICRISAT envisions a prosperous, food-secure and resilient dryland tropics. To achieve this, our mission is to reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics. Our approach is through partnership-based international agricultural research-for-development that embodies Science with a Human Face.

Course Instructors

Dr. Karl Broman, Professor, Department of Biostatistics & Medical Informatics, University of Wisconsin, Madison is the developer of R/QTL, an extensible, interactive environment for mapping quantitative trait loci (QTL) in experimental crosses. He is an expert in statistical genetics. During the training he will be taking classes & labs on advanced QTL mapping.

Dr. T. Nepolean, Senior Scientist, Division of Genetics, Indian Agricultural Research Institute, New Delhi has been involved in the development of breeding and genomics tools in cereals. He is an expert in developing segregating populations, high-density linkage maps, QTLs, genome-wide association mapping and genetical genomics. He will be taking classes on genetic linkage map construction.

Dr. Abhishek Rathore, Senior Scientist (Biometrics) is leading the Biometrics Unit at ICRISAT. He is an expert in Designing and Analysis of Experimental Trials, QTL Mapping and Genetic Map Construction. During the training he will be taking classes on Basics of R, concept of experimental designs, phenotypic analysis and genetic linkage map construction.

For further details, please contact the Course Coordinator:

Dr. Abhishek Rathore, Senior Scientist (Biometrics)
ICRISAT, Patancheru, Hyderabad, Andhra Pradesh, India, 502 324
e-mail: a.rathore@cgiar.org,
+914030713413 (ph), +914030713074 (fax)
www.icrisat.org

For other training programs at ICRISAT contact:

Dr. Rosana P. Mula, Coordinator
Learning System Unit
ICRISAT, Patancheru, Hyderabad, Andhra Pradesh, India, 502 324
e-mail: LSU@cgiar.org,
+914030713317 (ph), +914030713074 (fax)
www.icrisat.org