



Consultancy and Advisory Services

Consultancy/Advisory Services Provided

Dr. Arun K. Joshi, Professor, Genetics and Plant Breeding, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi was advised on analysis of data pertaining to an experiment conducted for mapping of resistance to spot blotch disease caused by *Bipolaris sorokiniana* in spring wheat. The experiment was conducted to evaluate the resistance to spot blotch of 139 single seed descent (SSD) derived Recombinant Inbred Lines (RILs, F_8) of the cross between two wheat genotypes 'Yangmai 6' (Chinese cultivar of unknown origin, resistance to spot blotch) and 'Sonalika' (popular variety in Eastern India during 1970s and 1980s susceptible to spot blotch) in a RCB design in 3 replications for 3 years 2003-04 (F_6 -generation), 2004-05 (F_7 -generation) and 2005-06 (F_{7-8} -generation) at the Agricultural Research Farm of Banaras Hindu University, Varanasi. Each line was sown in single row of 3m under normal irrigated conditions. Row to row and plant to plant distance was 25 cm and 5 cm respectively. Based on the

number of days to maturity of the RILs observed in the F_5 generation, differential sowings were carried out in the F_6 , F_7 and F_{7-8} generations to synchronize the growth stages between progeny rows, thereby attempting to nullify the growth stage \times disease severity interaction. The data on disease severity(%) of each row was recorded at 3 different crop growth stages (beginning of anthesis to half complete, anthesis complete, late milking). This data was converted to area under disease progress curve (AUDPC). The data on days to maturity were also observed. The data were analyzed for each year separately and combined analysis of data was performed using year having a random effect both without and with days to maturity as covariate. As 139 lines were divided into three groups, therefore, the differences between group effects, RILs nested within groups and groups \times year interactions were also studied.

Dr. Vedna Kumari, Associate Professor (Plant Breeding), Department of Plant Breeding and Genetics, CSKHPKV,



Palampur, Himachal Pradesh was the advised on the use an α -design with parameters $v = 48$, $b = 18$, $r = 3$, $k = 8$, $AE = 0.9603$, $DE = 0.9813$, $\hat{a}(0,1,2)$ for evaluation of 48 rice varieties. Here, v denotes the number of varieties, b number of blocks, r replication number, k block size and $\hat{a}(\#, \#, \#)$ different concurrences of the varieties. The block contents of the design are

Replication I

Block 1	1	7	13	19	25	31	37	43
Block 2	2	8	14	20	26	32	38	44
Block 3	3	9	15	21	27	33	39	45
Block 4	4	10	16	22	28	34	40	46
Block 5	5	11	17	23	29	35	41	47
Block 6	6	12	18	24	30	36	42	48

Replication II

Block 1	1	8	17	23	28	32	39	48
Block 2	2	9	18	24	29	33	40	43
Block 3	3	10	13	19	30	34	41	44
Block 4	4	11	14	20	25	35	42	45
Block 5	5	12	15	21	26	36	37	46
Block 6	6	7	16	22	27	31	38	47

Replication III

Block 1	1	12	16	20	29	33	41	46
Block 2	2	7	17	21	30	34	42	47
Block 3	3	8	18	22	25	35	37	48
Block 4	4	9	13	23	26	36	38	43
Block 5	5	10	14	24	27	31	39	44
Block 6	6	11	15	19	28	32	40	45

Dr. NVPR Ganga Rao, Legume Breeder (Chickpea & Pigeonpea), ICRISAT-Nairobi, Kenya was provided the randomized layout of Augmented Randomized Block design for evaluation of 115 genotypes of chickpea for drought and other yield related traits to be planted along with 6 checks in 9 blocks (7 blocks of size 19 and 2 blocks of size 18).

Sh. Wakchaure Goraksha Chimaji, Ph.D. (Agricultural Engineering), student of PG School of IARI, New Delhi was advised on the analysis of data pertaining to the experiment conducted to study densification of biomass briquetting plant for fuel. The experiment was conducted with three biomass materials (mustard stalks, wood waste and mixed waste), three binders (molasses, distiller's dry gain, press mud from sugar solution), each of the binders were used with 4 concentrations (5%, 10%, 15% and 20%). There were a total of 36 treatment combinations. The experiment was conducted in a laboratory with 3 replications. Randomization, however, was done for 36

treatment combinations in each replication separately. Therefore, it was suggested that the data may be analyzed as per procedure of factorial randomized complete block design with three factors at 3, 3 and 4 levels respectively. The experimenter also studied the effect of three pressure levels (1258.52 kg/cm², 1200 kg/cm², 1145.49 kg/cm²) on briquette formation. As it is difficult to change the pressure levels, therefore, separate experiments were conducted using three pressures as artificially created environments. To study the effect of pressure levels and its interaction with biomass materials, binders and their concentration, groups of experiments analysis was performed using pressure as artificially created environments.

Dr. CA Nimbalkar from National Agricultural Research Project (Plain Zone), Mahatma Phule Krishi Vidyapeeth, Rahuri was advised on the analysis of data pertaining to the experiment conducted to compare performance of tomato, capsicum and broccoli under shednet cultivation and open field cultivation of three crops.

Sh. Amit Kumar Dixit from School of Biochemistry, Devi Ahilya University, Indore was advised on the analysis of data pertaining to an experiment conducted to study the effect of different doses of x-radiation on 3 genotypes of maize. The experiment was conducted in a factorial completely randomized design with two factors (genotype at 3 levels and radiation at 4 levels). The data were collected on total carotene content.

Dr. Neelima Chaube from PDKV, Akola was advised on computations of transition probability matrices and use of Markov Chain Process. She was also advised on Principal Component Analysis.

Dr. NL Joshi, Principal Scientist, CAZRI, Jodhpur was advised to use cluster analysis for the grain yield data of pearl millet.

Dr. H.S. Ginwal from Forest Research Institute, Dehradun was advised on computation of genotypic variance components and genotypic correlations from unbalanced data.

Provided statistical consultancy to Directorate of Wheat Research, Karnal for analysis of varietal trials (IVT-I, IVT-II) and resource management trials planned under All India Coordinated Research Project on Wheat and Barley during 2007-08. Besides, analysis of nearly 1000 trials was carried out location-wise and agro-climatic zone-wise as per the design adopted. The pooled analysis was also carried out at national level. The results were prepared in suitable format for inclusion in their reports.

Dr. Sachin Sudhakar More, Scientist, AICRP on cropping system, Marathwada University has been advised for individual analysis as well as Combined Analysis of Data collected for 5 years using a split plot design on Soybean crop.

Biometric consultancy services were provided to the scientists of head quarter of International Centre of Agricultural Research in Dry Areas (ICARDA), Aleppo, Syria during 27 April, 2008 to 26 July, 2008.

A brief description of the advisory consultancy provided to ICARDA scientists is:

Provided statistical support in the analysis of data from Biodiversity & Integrated Gene Management Program; Integrated Water and Land Management Program and Social, Economic & Policy Research Program and Diversification & Sustainable Intensification of Production Systems Program.

During consultancy period an International training programme was conducted on Agricultural Information Management, Experimental Design and Data Analysis during 29 June -17 July 2008 at ICARDA, Aleppo, Syria. The course was sponsored by Japan International Co-operation Agency (JICA). There were 16 participants, including four from ICARDA and two female participants, from Afghanistan and Syria. The first week of the course was devoted to Information Exchange Management and next two weeks on Experimental Design and Data Analysis. The trainees were trained in Concepts and Importance of Statistics in Agricultural Research, Designing of Agricultural Experiments and Analysis of Experimental Data and Use of Statistical Packages for the Analysis of Data. The participants were also exposed to Experimental Design Resources on Web such as Design Resources Server (www.iasri.res.in/design). The participants also had practice of using the ICARDA Online BioComputing facilities.



A view of International training programme on 'Agricultural Information Management, Experimental Design and Data Analysis'

A special feature of the training was the online component. The basic concepts of Statistics and Design of Experiments were made available to the participants through CG Online learning resources (<http://learning.cgiar.org/moodle>)

Conducted one day Training Programme for 7 participants of the training programme on Lentil Breeding from India, Bangladesh and Syria.

Dr. AK Mangal was provided guidance concerning the estimation procedure for certain parameters relating to the "DST Project on Animal Diseases and Veterinary Care Systems" of Centre for Economic and Social Research, Delhi, on 28 April 2008.

Technical guidance was provided to the officers of National Dairy Development Board (NDDB), Anand, Gujarat.

Consultancy services have been provided to National Council of Applied Economic Research (NCAER), New Delhi related to statistical analysis of survey data.

The statistical consultancy was provided for the analysis of data generated from Farmers' Participatory Research trials for Conservation Agriculture conducted under the ADB Project on Enhancing Farmers' Income and Livelihoods through Integrated Crop and Resource Management in the Rice-Wheat System in South Asia of Rice Wheat Consortium for Indo Gangetic Plains, convening centre International Rice Research Institute. The data from the trials conducted in Bangladesh, Pakistan, Nepal and India (Balua and Modipuram Centres) were statistically analyzed using linear mixed effects model by taking farmer effects or field effects as random and Resource Conservation Technologies (RCTs, henceforth called as treatments) effects as fixed. All possible pair-wise treatment comparisons were made on the adjusted treatment means using a SAS Macro. Since RCTs help in saving on fuel and other inputs, while comparing treatments, therefore, it was advised to perform comparisons of grain yield, costs, irrigation water volume and returns over variable cost as to take into account the resource conservation. A treatment that gives high returns over variable cost and does not reduce grain yield may be taken as the best. RCTs may have interaction with crop varieties, years, soil types, and land levelling, etc. Therefore, to identify sub-sets of treatments to be recommended for specific crop varieties, years, soil types, and land levelling etc. site regression biplot technique has been used. They were also advised on using uniform terminology for the treatments and other parameters and prepare the data files in a common format including units in MS-EXCEL.

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