

Guru Kashi University
Talwandi Sabo
Doctorate of Philosophy

Research Methodology (581101)

Credit: 4

L T P
4 0 0

Objective :

To impart knowledge in conducting Agricultural Research Trials and analysis for interpretation of the results.

UNIT I

Field experimental designs, RBD, CRD, split plot etc.

UNIT II

Correlation and regression, Genetic components estimation.

UNIT III

Biometrical methods in Quantitative genetics.

Field experimental designs for Agricultural Research. Concept of correlation, Regression and path coefficient. Heritability and Genetic Advance. Partitioning of variation into genetic, environment components. Correlation mean analysis. Genotype environment interaction. Stability parameters. Line Tester analysis. Concept of gca and sca. North Carolina I,II and III etc. Hardy Weinberg law in populations. Forces disturbing Hardy Weinberg equilibrium. Field experimental designs, RBD, CRD, split plot etc. Correlation and regression, Genetic components estimation. Biometrical methods in Quantitative genetics.

Suggested Readings

1. "Introduction to Biometrical Genetics", by Kenneth Mather and John L. Jinks, Pub. Springer.
2. "Biometrical Genetics by Mather K and J.L Jinks " Biometrical Journal, Vol 15(5) p 364-365, 1973.
3. "Biometrical Methods in Quantitative Genetics Analysis" by R.K. Singh, Kalyani Publishers (1985) 318 p.

**Guru Kashi University
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Doctorate of Philosophy**

Computer Applications in Research (180102)

Credit: 2

**L T P
1 0 2**

Common for all branches except Hindi, Punjabi, English, History and Religious Study.

Unit 1

Generating Charts/Graphs in Microsoft Excel, Power Point Presentation, Web search, Use of Internet and www. Using search like Google etc.

Unit 2:

SPSS concepts and its use for Statistical Analysis.

Unit 3:

MatLab and its use for Statistical Analysis.

Unit 4:

Introduction to the use of LaTeX, Mendeley, Anti-Plagiarism Softwares .

References:-

- 1) Office 2007 in Simple Steps, Kogent Solutions, (Wiley Publishers).
- 2) MS-Office 2007 Training Guide, S. Jain (BPB Publications).
- 3) Bansal , R. K. and others 'MATLAB and its applications in Engg. Second Edition , Pearson Education, Delhi.
- 4) Sabine handan & Brian S. Everitt, " A Handbook of Statistical Analysis using SPSS", Chapman & Hall / CRC Publication, USA.

**Guru Kashi University
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**Advances in Vegetable, Breeding, Protected Cultivation and Abiotic Stress Management
(581102)**

Credit: 4

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Vegetable Production

Objective :

To keep abreast with latest developments and trends in production technology of vegetable crops.

Theory

Present status and prospects of vegetable cultivation; nutritional and medicinal values; climate and soil as critical factors in vegetable production; choice of varieties; nursery management; modern concepts in water and weed management; physiological basis of growth, yield and quality as influenced by chemicals and growth regulators; role of organic manures, inorganic fertilizers, micronutrients and biofertilizers; response of genotypes to low and high nutrient management, nutritional deficiencies, disorders and correction methods; different cropping systems; mulching; containerized culture for year round vegetable production; crop modeling, organic gardening; vegetable production for pigments, export and processing of: Tomato, brinjal, chilli, sweet pepper, potato, Cucurbits, cabbage, cauliflower, knol-khol, Bhendi, onion, peas and beans, amaranthus, drumstick, Carrot, beet root and radish, Sweet potato, tapioca, elephant foot yam and taro.

Suggested Readings

1. Bose TK & Som NG. 1986. Vegetable Crops of India. Naya Prokash. Bose TK, Kabir J, Maity TK, Parthasarathy VA & Som MG. 2003.
2. Vegetable Crops. Vols. I-III. Naya Udyog.
3. Brewster JL. 1994. Onions and other Vegetable Alliums. CABI. FFTC. Improved Vegetable Production in Asia. Book Series No. 36.
4. Ghosh SP, Ramanujam T, Jos JS, Moorthy SN & Nair RG. 1988. Tuber Crops. Oxford & IBH. Gopalakrishnan TR. 2007. Vegetable Crops. New India Publishing Agency.
5. Kallo G & Singh K. (Ed.). 2001. Emerging Scenario in Vegetable Research and Development. Research Periodicals & Book Publ. House.
6. Kurup GT, Palanisami MS, Potty VP, Padmaja G, Kabeerathuma S & Pallai SV. 1996. Tropical Tuber Crops, Problems, Prospects and Future Strategies. Oxford & IBH.

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7. Sin MT & Onwueme IC. 1978. The Tropical Tuber Crops. John Wiley & Sons.
8. Singh NP, Bhardwaj AK, Kumar A & Singh KM. 2004. Modern Technology on Vegetable Production. International Book Distr. Co.
9. Singh PK, Dasgupta SK & Tripathi SK. 2006. Hybrid Vegetable Development. International Book Distr. Co

Vegetable Breeding

Objective:

To update knowledge on the recent research trends in the field of breeding of vegetable crops with special emphasis on tropical, subtropical and temperate crops grown in India.

Theory

Evolution, distribution, cytogenetics, genetic resources, genetic divergence, types of pollination and fertilization mechanisms, sterility and incompatibility, anthesis and pollination, hybridization, inter-varietal, interspecific and inter-generic hybridization, heterosis breeding, inheritance pattern of traits, qualitative and quantitative, plant type concept and selection indices, genetics of spontaneous and induced mutations, problems and achievements of mutation breeding, ploidy breeding and its achievements, in vitro breeding; breeding techniques for improving quality and processing characters; breeding for stresses, mechanism and genetics of resistance, breeding for salt, drought; low and high temperature; toxicity and water logging resistance, breeding for pest, disease, nematode and multiple resistance of; Tomato, brinjal, chilli, sweet pepper, potato, Cucurbits, Cabbage, cauliflower, knol-khol, Bhendi, onion, peas, beans, amaranthus, drumstick, Carrot, beet, radish, Sweet potato, tapioca, elephant foot yam and taro.

Suggested Readings

1. Acta Horticulture. Conference on Recent Advance in Vegetable Crops. Vol. 127.
2. Chadha KL, Ravindran PN & Sahijram L. 2000. Biotechnology in Horticultural and Plantation Crops. Malhotra Publ. House.
3. Chadha KL. 2001. Hand Book of Horticulture. ICAR.
4. Dhillon BS, Tyagi RK, Saxena S & Randhawa GJ. 2005. Plant Genetic Resources: Horticultural Crops. Narosa Publ. House.
5. Janick JJ. 1986. Horticultural Science. 4th Ed. WH Freeman & Co
6. Kaloo G & Singh K. 2001. Emerging Scenario in Vegetable Research and Development. Research Periodicals and Book Publ. House.

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7. Kaloo G. 1994. Vegetable Breeding. Vols. I-III. Vedams eBooks.
8. Peter KV & Pradeep Kumar T. 2008. Genetics and Breeding of Vegetables. (Revised Ed.). ICAR.
9. Ram HH. 2001. Vegetable Breeding. Kalyani.

Protected Cultivation Of Vegetable

Objective

To impart latest knowledge in growing of vegetable crops under protected environmental condition.

Theory

Importance and scope of protected cultivation of vegetable crops; principles used in protected cultivation, energy management, low cost structures; training methods; engineering aspects. Regulatory structures used in protected structures; types of greenhouse/polyhouse/nethouse, hot beds, cold frames, effect of environmental factors, viz. temperature, light, CO₂ and humidity on growth of different vegetables, manipulation of CO₂, light and temperature for vegetable production, fertigation. Nursery raising in protected structures like poly-tunnels, types of benches and containers, different media for growing nursery under cover. Regulation of flowering and fruiting in vegetable crops, technology for raising tomato, sweet pepper, cucumber and other vegetables in protected structures, training and staking in protected crops, varieties and hybrids for growing vegetables in protected structures. Problem of growing vegetables in protected structures and their remedies, insect and disease management in protected structures; soil-less culture, use of protected structures for seed production protected cultivation of Tomato, capsicum, cucumber, melons and lettuce.

Suggested Readings

1. Anonymous 2003. Proc. All India Seminar on Potential and Prospects for Protective Cultivation. Organised by Institute of Engineers, Ahmednagar. Dec.12-13, 2003.
2. Chandra S & SomV. 2000. Cultivating Vegetables in Green House. Indian Horticulture 45: 17-18.
3. Prasad S & Kumar U. 2005. Greenhouse Management for Horticultural Crops. 2nd Ed. Agrobios.
4. Tiwari GN. 2003. Green House Technology for Controlled Environment. Narosa Publ. House.

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Abiotic Stress Management

Objective

To update knowledge on the recent research trends in the field of breeding of vegetable crops with special emphasis on tropical, subtropical and temperate crops grown in India.

Theory

Environmental stress and its types, soil parameters including pH, classification of vegetable crops based on susceptibility and tolerance to various types of stress; root stock, use of wild species, use of antitranspirants. Mechanism and measurements of tolerance to drought, water logging, soil salinity, frost and heat stress in vegetable crops. Soil-plant-water relations under different stress conditions in vegetable crops production and their management practices. Techniques of vegetable growing under water deficit, brackish water, water logging, soil salinity and soil sodicity condition. Techniques of vegetable growing under high and low temperature conditions, soil salinity, brackish water, use of chemicals in alleviation of different stresses.

Suggested Readings

1. Dwivedi P & Dwivedi RS. 2005. Physiology of Abiotic stress in Plants. Agrobios.
2. Lerner HR (Ed.). 1999. Plant Responses to Environmental Stresses. Marcel Decker.
3. Maloo SR. 2003. Abiotic Stresses and Crop Productivity. Agrotech Publ. Academy.

Batch-2017 onwards

**Guru Kashi University
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Seminar (581103)

Credit: 2

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