Journal of Plant Development Sciences
(An International Monthly Refereed Research Journal)

Volume 12 Number 4 April 2020

Contents

REVIEW ARTICLE

Diara cultivation of cucurbits
—Barsha Tripathy, Samapika Dalai, Meenakshi Badu, Kalyani Pradhan, M. Sai Sindhu, B. Bhagyarekha and Sandeep Rout---------- 189-194

RESEARCH ARTICLES

Changes in the physico-chemical properties of soil in different Deodarforests of Garhwal Himalaya
—Gaurav Chand Ramola, Digvijay Rathod, Yogesh Kumar, Prajapati Dhaval, Akshit Kukreti and V.P. Khanduri---------- 195-205

Collection of medicinal plants in traditional and modern perspective
—Vinay M. Raole and Vaidehi V. Raole---------- 207-214

Long term effect of inorganic fertilizers and organic manures on nutrient uptake, and yield of rice on Inceptisol
—Kiran Rathore, Alok Tiwari and Rahul Kumar ---------- 215-222

Assessment of medicinal plants through proximate and micronutrients analysis
—Tamanna Malik, V.K. Madan and Tanya Dhanda---------- 223-229

Validation of mas derived lines for introgressed gene against blast and blb resistancein Southern Chhattisgarh
—**Prafull Kumar** ---------- 231-237

Forecasting monthly precipitation model for Dantewada, Jagdalpur and Sukma region (Chhattisgarh) using Arima model
—Anosh Graham, Avinash Yadu and Atul Galav---------- 239-245

Disease controlling potential of *Trichoderma harzianum* and *Trichoderma viride* against collar rot of chickpea
—Shweta Mishra, Devendra Nishad and R.K.S. Tiwari ---------- 247-251

Production potential and economics of intercropping in autumn planted- sugarcane under north hill zone of Chhattisgarh
—Prakash Kumar Sahu, D.K. Gupta and V.K. Singh---------- 253-256

SHORT COMMUNICATION

Existing production patterns among the maize growers
—P.K. Netam, Basanti Netam and Virendra Kumar Painkra ---------- 257-259

Journal of Plant Development Sciences Vol. 12(4)

DIARA CULTIVATION OF CUCURBITS

Barsha Tripathy[1], Samapika Dalai[1], Meenakshi Badu[2], Kalyani Pradhan[1], M. Sai Sindhu[1], B. Bhagyarekha[1] and Sandeep Rout*[3]

[1]*Department of Horticulture, Centurion University of Technology and Management, Paralakhemundi, Odisha-761211*
[2]*Sri Sri University, Cuttack, Odisha*
[3]*Department of Agronomy and Agroforestry, M. S. Swaminathan School of Agriculture, Centurion University of Technology and Management, Parlakhemundi, Odisha-761211*
Email: barshatripathy185@gmail.com

Received-05.04.2020, Revised-26.04.2020

Abstracts: In recent years, the agriculture sector is adversely affected by climate change, and the rural poor are becoming more vulnerable to unsustainable livelihoods. River areas are known as "Diara". Diara land cultivation continues to be carried out with the traditional manner. Riverbed cultivation is a type of vegetables forcing, facilitating off season production of mainly cucurbitaceous vegetables. Incomes generated by river bed vegetable growers were used primarily for meeting their household food security. On riverbed vegetable cultivation is easy with respect to land preparation, water management and other cultural practices. In north India, the cucurbits generally grown together are cucumber, bottle gourd, bitter gourd, summer squash, round melon and long melon but ridge gourd in Rajasthan, MP and UP. The major constraints of diara farming are stray animals, strong windstorms and long spell of droughts. Diara farming is a pro-poor focused program for the rural community to increase household income and to improve the food security of landless and land poor households of India.

Keywords: Climate change, Cultivation, Cucurbits, Vegetable

Journal of Plant Development Sciences Vol. 12(4)

CHANGES IN THE PHYSICO-CHEMICAL PROPERTIES OF SOIL IN DIFFERENT DEODARFORESTS OF GARHWAL HIMALAYA

Gaurav Chand Ramola[1], Digvijay Rathod[2], Yogesh Kumar*[3], Prajapati Dhaval[4], Akshit Kukreti[5] and V.P. Khanduri[6]

[1,2,4,5]*ForestResearch Institute, Dehradun(Uttarakhand)*
[6]*College of Forestry, VCSG, UUHF, RanichauriTehriGarhwal(Uttrakhand)*
[3]*Ministry of Environment Forest and Climate Change, New Delhi*

Received-09.04.2020, Revised-28.04.2020

Abstracts: The present study was undertaken in different deodar temperate forest of Uttrakhand in Garhwal Himalaya, India. The aim of the study was to evaluate the changes in the physico-chemical properties of soils in different deodar forest of Garhwal Himalaya after 15 years as previous study was carried out in 2000 in the same studied sites by Bhatt et al. The changes in physico-chemical properties of soil were assessed by laying out five 0.1 ha sample plots by recognizing GPS location of the earlier study on each location. The composite soil samples were collected from each sample plot at three different soil depths (0-10 cm, 11-20 cm and 21-30 cm). The standard method was used to analyze the soil sample. To study the Physico-chemical properties of soil various parameter viz. Soil organic carbon %, available phosphorus, available potassium, pH and moisture content % was analyzed. The outcome of the study revealed that the values of soil organic carbon %, available phosphorus, available potassium, pH and moisture content % ranged between 0.24% to 0.68 %, 7.76 to 64.21 kg/ha, 63.5 kg/ha to 406.6 kg/ha, 5.07 to 5.87, 14.72 % to 41.99 % respectively. In the present re-visitation study, the huge changes was seen in the physico-chemical properties of soil mainly in Organic Carbon %, soil pH and moisture content % as they all decreases due steep topographic condition, slow decomposition rate whereas there was increase in the available Phosphorus. These changes are more likely attributable to the combined effect of growth and use of soil nutrients by the trees in respective sites.

Keywords: Decomposition, Deodar, Garhwal Himalaya, Nutrient changes, Physico-chemical properties

Journal of Plant Development Sciences Vol. 12(4)

COLLECTION OF MEDICINAL PLANTS IN TRADITIONAL AND MODERN PERSPECTIVE

Vinay M. Raole*[1] and Vaidehi V. Raole[2]

[1]*Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India*
[2]*Department of Sharir Kriya, Parul Institute of Ayurveda, Parul University, Limda, Waghodia Vadodara*
Email: vinaysar@rediffmail.com; vraole3@gmail.com

Received-04.04.2020, Revised-25.04.2020

Abstract: In the recent past surveys of medicinal plants and plant products all over the globe is increased. Use of medicinal plants and its products is going on since the beginning of human civilization. Traditional knowledge is very important for sustainability of natural wealth including medicinal plants. Medicinal plants form the major natural resources base of the Indian indigenous health care tradition. Conservation of these plants can be learnt from specific local knowledge and transmission of facts, skills and strategies, concern for well-being of future generations. Due to global popularity of Ayurveda there is enhanced demand of herbal drugs which is exerting enormous pressure on natural assets. Healing plants form the major natural resources base of the Indian indigenous health care system. In the medicinal plants, the secondary metabolites or active principle are made available through biosynthetic pathway and proper harvesting techniques. The science behind ancient Ayurvedic harvesting techniques was narrated in various earlier treaties and commentaries. To achieve good therapeutic result it is mandatory to collect the drug plants in a modern collection procedure and is also proven by modern scientific methods. In Ayurvedic literature, drug collection has been mentioned according to different parts of the plant in respective seasons and basis of therapeutic uses. According to modern botanical and pharmaceutical science, drugs possess highest prospects during its collection period. The soil condition, climatic factors, temperature, rain fall, duration of light exposure, altitude, collection from wild area, and methods of collection, processing and storage have impact on the secondary metabolites of the plant ultimately which affect the therapeutic efficiency of the drug. General guidelines for drug plants, plant parts as per botanical field collection, safety issues and recommendations for collection practices, and future scope of procedure has been given.

Keywords: Ayurvedic, Medicinal plants, Modern, Traditional

Journal of Plant Development Sciences Vol. 12(4)

LONG TERM EFFECT OF INORGANIC FERTILIZERS AND ORGANIC MANURES ON NUTRIENT UPTAKE, AND YIELD OF RICE ON INCEPTISOL

Kiran Rathore[1], Alok Tiwari[2]and Rahul Kumar*[3]

Department of Soil Science & Agricultural Chemistry, College of Agriculture, Raipur[1,2]
College of Agriculture, Bharatpur(Raj)[3]
Email: rathorekiran030@gmail.com

Received-02.04.2020, Revised-23.04.2020

Abstracts: The experiment was conducted during the kharif season at research farm, Indira Gandhi Krishi Viswavidyalaya, Raipur to investigate the long term effect of Inorganic fertilizer and organic manures on nutrient uptake and yield or rice. The soil was sandy loan and locally known as matasi, Low in nitrogen, medium in P and K. the experiment was laid in RBD and replicated three times with eleven treatment T_1 -No Fertilizer, No Organic manure (Control),T_2 -50% Recommended NPK (40:30:20), T_3-75% Recommended NPK,T_4-100% Recommended NPK (80:60:40),T_5-50% Recommended NPK +50%N through Farm yard manure,T_6 -75% Recommended NPK +25%N through Farm yard manure,T_7-50% Recommended NPK +50%N through rice residue,T_8-75% Recommended NPK +25%N through rice residue,T_9-50% Recommended NPK +50%N through Green manure,T_{10}-75% Recommended NPK +25%N through Green manure,T_{11}-Conventional Farmer' Practice (50:30:20). A medium duration high yielding rice variety Mahamaya was taken as test crop. The results revealed that combination application of inorganic fertilizer and organic manure i.e. integrated of fertilizer and manure improve chemical propertied of soil. The macro nutrient uptake yield and attributing parameter and grain yield of rice were found superior in different organic and inorganic treatment combination at 25, 50 % and along with Green manuring and / FYM as compared to 50 % or 75% RDF to rice crop

Keyword: Rice, Nutrient uptake,Nutrient content, Organic, Inorganic fertilizer

Journal of Plant Development Sciences Vol. 12(4)

ASSESSMENT OF MEDICINAL PLANTS THROUGH PROXIMATE AND MICRONUTRIENTS ANALYSIS

Tamanna Malik*, V.K. Madan[2] and Tanya Dhanda[1]

[1]Department of Chemistry, Chaudhary Charan Singh Haryana Agricultural University;
[2]MAP Section, Department of Genetics and Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University; vikku60@gmail.com
Email: maliktamanna1996@gmail.com

Received-10.04.2020, Revised-28.04.2020

Abstracts: The leaves, roots, bark and fruits of medicinal plants have various health-promoting effects on human and animals. These materials may be suitable singly or in combination as therapeutic agents and are important raw materials for manufacturing traditional and modern medicines. Indigenous medicinal plants have been playing a significant role in the economy of our country. Proximate compositions of seeds, aerial parts and roots of amla (*Emblica officinalis*), Bahera (*Terminalia belerica)* and Harad (*Terminalia chebula*) of indigenous origin were determined. The mineral contents [Iron (Fe), Copper (Cu), Zinc (Zn) and Manganese (Mn)] from the fruit pulp of these plants were determined. The moisture content (%), crude fat (%), ash (%), crude protein (%), crude fibre (%) and total carbohydrates (%) were evaluated in the proximate composition. It was found that the overall proximate composition in seeds was highest when compared to aerial parts and roots. Therefore, fruits of Amla, Bahera and Harad have good nutritional value and hold their potential for nutraceutical development.

Keywords: Medicinal plants, Micronutrients, Modern, Traditional

Journal of Plant Development Sciences Vol. 12(4)

VALIDATION OF MAS DERIVED LINES FOR INTROGRESSED GENE AGAINST BLAST AND BLB RESISTANCEIN SOUTHERN CHHATTISGARH

Prafull Kumar*

S.G. College of Agriculture and research Station, Jagdalpur, IGKV, Raipur, Chhattisgarh
Email: prafull397@gmail.com

Received-07.04.2020, Revised-29.04.2020

Abstract: The experiment was carried out at SGCARS, Jagdalpur, IGKV Raipur, Chhattisgarh to validate Marker Assisted Selection (MAS) derived genotypes, from ICAR-IIRR, Hyderabad, against blast and bacterial leaf blight resistance and access recurrent parent recovery. BPT 5204 (Samba Mahsuri) the recurrent parent 01 (RP 1) for the four test genotype recorded average plot yield of 4.00 kg/ha placing second in the experiment. When the recurrent parent 02 (Improved Sambha Mahsuri) was taken into account, genotype RP-Patho-1-2-15 recorded higher plot yield (4.23 kg). RP-Patho-1-2-15 and RP-Patho-3-56-11 were similar to the recurrent parent with heading spanof 78 and 79 DAS accordingly while RP-Patho-3-73-6 was six days in advance (70 days) to the recurrent parent (76 days). The entire test Near Isogenic Lines (NILs) with a plant height of 79-85 cm were similar to the recurrent parent (82 cm). Blast and bacterial leaf blight resistance gene carrying genotypes RP-Patho-2-18-5 and RP-Patho-2-16-4gave plot grain yield 3.77kg, which out yielded recurrent parent 02 but lesser than recurrent parent 01.Incidence of blast reported in Tetep (1-2%), C 101 LAC (8-10%)and average (5-8%) in all NILs.Blast resistance genes *Pi 1* carrying genotypes RP-Patho-1-2-15 and RP-Patho-1-6-5, the infestation the comparatively higher (Score 6) than those with *Pi 54* (RP-Patho-3-56-11 and RP-Patho-3-73-6, RP-Patho-3-56-11 and RP-Patho-3-73-6 (Score 4). However, dual genetic resistance background i.e. blast and bacterial blight resistance genes *Xa 21+ Pi-54*, provided excellent resistance even in hot spot centre for the disease. There was noincidence of Bacterial Leaf Blight (BLB)in all the isogenic line including donor and recurrent parents which may because of plant defence system or incompatible environmental condition for disease prevalence.

Keywords: NILs, Marker Assisted Selection, Recurrent parent, Blast, Bacterial Leaf Blight

Journal of Plant Development Sciences Vol. 12(4)

FORECASTING MONTHLY PRECIPITATION MODEL FOR DANTEWADA, JAGDALPUR AND SUKMA REGION (CHHATTISGARH) USING ARIMA MODEL

Anosh Graham*[1], Avinash Yadu[2] and Atul Galav[3]

[1,3]*Department of Environmental Sciences and NRM, College of Forestry, Sam Higginbottom University of Agriculture, Technology & Sciences Allahabad-211007, Uttar Pradesh, India*
[2]*Department of Agrometeorology, Indra Gandhi Krishi Vishwavidyalaya, Raipur-492012, Chhattisgarh (India)*

Received-05.04.2020, Revised-27.04.2020

Abstract: Earlier forecasting was based on observing weather patterns. Latter-days weather forecasting involves a combination of computer models, observations and knowledge of tends and patterns. This paper describes the Box-Jenkins time series seasonal ARIMA (Auto Regression Integrated Moving Average) approach for prediction of rainfall on monthly scales. ARIMA model of Dantewada (0, 0, 1) (0, 1, 1), Jagdalpur (0, 0, 0) (1, 1, 1), Sukma (0, 0, 1) (1, 1, 1) for rainfall was identified the best model to forecast rainfall for next 5 years with confidence level of 95 percent by analyzing last 30 year's data (1989-20018). Previous years data is used to formulate the seasonal ARIMA model and in determination of model parameters. The performance evaluations of the adopted models are carried out on the basis of correlation coefficient (R^2) and root mean square error (RMSE). The study conducted at three cities Dantewada, Jagdalpur & Sukma, Chhattisgarh (India). The results indicate that the ARIMA model provide consistent and satisfactory predictions for rainfall parameters on monthly scale.

Keywords: Rainfall, ARIMA, Correlation Coefficient (R^2), Root Mean Square Error (RMSE)

Journal of Plant Development Sciences Vol. 12(4)

DISEASE CONTROLLING POTENTIAL OF *TRICHODERMA HARZIANUM* AND *TRICHODERMA VIRIDE* AGAINST COLLAR ROT OF CHICKPEA

Shweta Mishra*, Devendra Nishad and R.K.S. Tiwari

Department of Plant Pathology, Indira Gandhi Krishi Viswavidyalaya Raipur (492001) Chhattisgarh
Email: shwetamishra563@gmail.com

Received-06.04.2020, Revised-25.04.2020

Abstracts: Disease controlling potential of *Trichoderma* strains are evaluated in vivo against collar rot in chickpea. Ten *Trichoderma strains (*T1,T2,T3,T4,T5,T6,T7,T18,T28) were taken among which nine were *Trichoderma harzianum* and one *Trichoderma viride* (T18) .All strains of *Trichoderma harzianum / Trichoderma viride* was superior over control for disease controlling parameters *i. e* mortality percentage , no. of pods per / plant ,yield (quintal/hectare), yield (g/plot),Test weight. Plant population / plot were counted from each plot after 25 days of sowing *Trichoderma* strains T18 and T28 were more effective showing higher degree of parasitism on *Sclerotium rolfsii* under field against collar rot in chickpea.

Keywords: Chickpea, *Sclerotium rolfsii ,Trichoderma harzianum, Trichoderma viride*

Journal of Plant Development Sciences Vol. 12(4)

PRODUCTION POTENTIAL AND ECONOMICS OF INTERCROPPING IN AUTUMN PLANTED- SUGARCANE UNDER NORTH HILL ZONE OF CHHATTISGARH

Prakash Kumar Sahu, D.K. Gupta* and V.K. Singh

Department of Agronomy, RMD College of Agriculture and Research Station, Ambikapur

(C.G.)- 497001

Received-03.04.2020, Revised-25.04.2020

Abstract: A field experiment was conducted during autumn season of 2017-18 at Instructional-cum-research farm RMD CARS, Ambikapur to evaluate the most profitable crops grown as intercrops with winter planted sugarcane under thirteen treatments formulated with intercropping *i.e.* sugarcane sole, sugarcane + onion (1:3), sugarcane + onion (1:4), sugarcane + potato (1:1), sugarcane + potato (1:2) , sugarcane + sweetcorn (1:1), sugarcane + sweetcorn (1:2), sugarcane + wheat (1:2), sugarcane + wheat (1:3), sugarcane + frenchbean (1:2), sugarcane + frenchbean (1:3), sugarcane + mustard (1:1) and sugarcane + mustard (1:2) in randomized block design. Based on the one year study, onion (1:3) intercropping was selected as most remunerative in autumn/winter cane with the highest no. of millable cane (93.69 x 10^3 ha^{-1}), millable cane length (309.26 cm), cane weight (2.72 kg $cane^{-1}$), cane yield (255.41 t ha^{-1}), cane equivalent yield (295.95 t ha^{-1}) and net return and B:C ratio (Rs. 799244 ha^{-1} and 9.08) among all the intercropping systems. Sugarcane + onion (1:4) and sugarcane + potato (1:1) intercropping were also found comparable with sugarcane + onion (1:3). Whereas, lowest no. of millable cane (44.55 x 10^3 ha^{-1}), millable cane length (258.33 cm), cane weight (1.61 kg $cane^{-1}$), cane yield (71.79 t ha^{-1}), cane equivalent yield (89.58 t ha^{-1}) and net return and B:C ratio (Rs. 189227 $ha^{-1}$and 2.38) recorded under sugarcane + wheat (1:3) intercropping system among the intercrops.

Keywords: Production potential, Economics, Sugarcane, Intercropping, Cane equivalent yield

Journal of Plant Development Sciences Vol. 12(4)

EXISTING PRODUCTION PATTERNS AMONG THE MAIZE GROWERS

P.K. Netam*, Basanti Netam and Virendra Kumar Painkra

[1]*Department of Agricultural Extension CARS,Kanker, IGKV, Raipur, Chhattisgarh*
[2]*Department of Senior Agriculture Development Officer, Dhamtari,Chhattisgarh*
[3]*Department of Agricultural Extension CoA, IGKV, Raipur, Chhattisgarh*
Email: pknetam49@gmail.com

Received-01.04.2020, Revised-22.04.2020

Abstracts: This investigation was carried out in three district of Bastar plateau of Chhattisgarh State to assess the level of existing production pattern among the respondents. 270 farmers were considering as respondents for this study. Respondents were interviewed through personal interview. Collected data were analyzed with the help of suitable statistical methods. The analysis of the results showed that major crop prevailed in *Kharif* season among different respondents was rice followed by maize, while predominant crop in *Rabi* season was maize covering 64.44 percent area.

Keywords: Production pattern, Area, Productivity, Economic assessment