

Journal of Plant Development Sciences

(An International Monthly Refereed Research Journal)

Volume 12

Number 2

February 2020

Contents

REVIEW ARTICLE

- Multifarious scope of agro-forestry
—Vijay Upadhyay, Abhishek Raj, Neelu Jain and Brijesh Kumar Meena----- 59-63

RESEARCH ARTICLES

- Do backward integration boost the technology adoption by Chilli farmers? The evidence from Andhra Pradesh, India
—R. Asha and K. Umadevi----- 65-72
- Impact of tillage practices on physico-chemical and functional diversity in pearl millet-wheat cropping system
—Dhinu Yadav, Leela Wati, Dharam Bir Yadav and Ashok Kumar ----- 73-80
- Comparative economic analysis of rice in kharif and rabi season in Guntur district of Andhra Pradesh
—Pradeep Kumar Patidar, R. Lakshmi Priyanka, N. Khan and Dharmendra ----- 81-85
- Growth parameters and soil fertility status as influenced by nitrogen source in wheat
—Fazal Rabi, Meena Sewhag, Shweta, Parveen Kumar, Amit Kumar and Uma Devi ----- 87-92
- Varietal performance of broccoli (*Brassica Oleracea* var. *Italica*) under northern hill zone of Chhattisgarh
—P.C. Chaurasiya and Sarswati Pandey----- 93-97
- Optimization of different propagating technique and time period to enhance higher success rate in propagation of low chill peach cv. Shan-e-Punjab
—Rajat Sharma, P.N. Singh, D.C. Dimri, Shweta Uniyal, Vishal Nirgude and Manpreet Singh -----99-103
- Effect of integrated crop management practices on growth, seed yield and economics of lentil (*Lens culinaris* Medick.)
—S.K. Sharma, Rakesh Kumar and Parveen Kumar ----- 105-109
- Effect of treatment imposed on total soluble protein content in wheat leaves infected by brown rust (*Puccinia recodita* F.sp. *Tritici rob. ex. Desm.*) at Kanpur and Iari regional station Wellington (T.N.).
—Akash Tomar, Ved Ratan, Javed Bahar Khan, Dushiyant Kumar, Devesh Nagar and Sonika Pandey ----- 111-114
- Studies on the different species of insect pollinators/visitors visiting buckwheat flowers
—Jogindar Singh Manhare and G.P. Painkra----- 115-118

SHORT COMMUNICATION

- Survey of wheat crop for the prevailing brown rust (*Puccinia recodita* F.sp. *Tritici rob. ex. Desm.*) in different region of Uttar Pradesh
—Akash Tomar, Ved Ratan, Javed Bahar Khan, Dushiyant Kumar and Devesh Nagar ----- 119-121

MULTIFARIOUS SCOPE OF AGRO-FORESTRY

Vijay Upadhyay, Abhishek Raj*, Neelu Jain and Brijesh Kumar Meena

Faculty of Agriculture and Veterinary Science, Mewar University, Chittorgarh-Rajsthan-312901

Email: ranger0392@gmail.com

Received-08.02.2020, Revised-26.02.2020

Abstract: Agroforestry is an ecologically sustainable land use system that maintains increase total yield by combining food crops (annuals) with tree crops (perennials) and/or livestock on the same unit of land. A large hectare is available in the form of boundaries, bunds, wastelands where this system can be adopted. Farmers retain tree of *acacia nilotica*, *acacia catechu*, *Dalbergia sissoo*, *Mangifera indica*, *Zizyphus mauritiana* and *Gmelina arborea* etc in farm land. Agroforestry-the deliberate combination of woody perennials on the same piece of land with agricultural crops and/or animals, plays a crucial role in climate change mitigation especially due to its tree component. Trees accumulate CO₂ (which is the most predominant GHG) in their biomass. Agroforestry not only helps in climate change mitigation but also climate change adaptation. It is an established fact that despite our present effort at climate changes mitigation (GHG reduction), there is a more pressing need to cope with the impact of climate change (adaptation). For instance, the trees in agroforests provide shade for both companion crops and the farmer against the rising temperatures, and also shelter the crops against the harmful effect of raging storms. The presence of trees on the farms ensures income diversification through the provision of additional resources like fruits, nuts, timber, vegetables, fodder, etc. People should be aware about the scope and benefits of Agroforestry and they should participate in implementation and development of Agroforestry in India. Therefore, agroforestry system is economically and ecologically sound practices with enhancement of overall farm productivity, soil enrichment through litter fall, maintaining environmental services such as climate change mitigation (carbon sequestration), phytoremediation, watershed protection and biodiversity conservation.

Keywords: Agroforestry, Biodiversity, Bund, Climate change, Phytoremediation

DO BACKWARD INTEGRATION BOOST THE TECHNOLOGY ADOPTION BY CHILLI FARMERS? THE EVIDENCE FROM ANDHRA PRADESH, INDIA

R. Asha* and K. Umadevi¹

Agricultural Economics, Acharya N. G. Ranga Agricultural University Agriculture College, Bapatla

¹Agricultural Economics, Institutional Development Plan, ANGRAU, Lam, Guntur

Email: asha.rallapalli06@gmail.com

Received-12.02.2020, Revised-27.02.2020

Abstract: The study intends to analyse the impact of backward integration on technology adaptation by chilli farmers. A sample of 128 farmers has been selected purposively from four mandals of Prakasam district in Andhra Pradesh. Technology adoption index, probit regression and poisson model with endogenous regression model used to analyse the impact backward integration on technologies adoption by chilli farmers. The findings show that majority (46.87%) of the chilli farmers who are following backward integration are adopting maximum technologies with technology adoption index 80-90 and the farmers who are not following backward integration (73.43%) are adopting less than four technologies with adoption index <50. The extension service (0.11) and backward integration (0.53) had a positive significant at 10 per cent and 5 per cent levels effect on adoption of technologies.

Keywords: Backward integration, Chilli farming, Technology adoption index, Probit regression, Poisson model

IMPACT OF TILLAGE PRACTICES ON PHYSICO-CHEMICAL AND FUNCTIONAL DIVERSITY IN PEARL MILLET-WHEAT CROPPING SYSTEM

Dhinu Yadav*, Leela Wati¹, Dharam Bir Yadav² and Ashok Kumar³

Department of Microbiology, CCS Haryana Agricultural University, Hisar
¹*Department of Microbiology, CCS Haryana Agricultural University, Hisar*
²*Department of Agronomy, CCS Haryana Agricultural University, Hisar*
³*Department of Agronomy, CCS Haryana Agricultural University, Hisar*
Email: dhinuyadav737@gmail.com

Received-20.01.2020, Revised-17.02.2020

Abstract: Conservation agriculture based tillage practices mainly zero-tillage (ZT) considered as major component of sustainable agriculture that involves reducing the tillage operations retaining at least 30% of plant parts/crop-residues at the soil surface and including crop-rotation in the existing cropping system. More research is needed for better understanding of tillage effects on soil physico-chemical and microbiological properties. Thus, the impact of two tillage systems: no-tillage (NT) and conventional tillage (CT) with different crop-rotations *i.e.* Conventional Tillage Wheat-Conventional Tillage Pearl millet (CTW-CTPM), Conventional Tillage Wheat-Zero Tillage Pearl millet (CTW-ZTPM), Zero Tillage Wheat-Conventional Tillage Pearl millet (ZTW-CTPM) and Zero Tillage Wheat-Zero Tillage Pearl millet (ZTW-ZTPM) on physico-chemical and functional diversity of soil was evaluated in the present investigation at CCSHAU, Regional Research Station (RRS) at Bawal during 2014 year. After harvesting of wheat in 2017, triplicate soil samples from undisturbed and disturbed soil were obtained from two different depths (0-15 cm and 15-30 cm), for determination of CaCO₃, Total N, P and K content and Functional diversity of microbes. Physico-chemical properties and functional diversity were recorded relatively higher under ZTW-ZTPM system at surface (0-15 cm) layer. SOC was recorded higher at surface layer under ZTW-ZTPM (0.29 %) as compared to CTW-CTPM (0.26 %) and the respective values at subsurface layer were 0.25 and 0.23%. In nutshell, NT treatments promoted better physico-chemical and functional diversity of the soil relative to the CT treatment.

Keywords: Functional diversity, Nutrient release pattern, Tillage systems

Journal of Plant Development Sciences Vol. 12(2)

COMPARATIVE ECONOMIC ANALYSIS OF RICE IN KHARIF AND RABI SEASON IN GUNTUR DISTRICT OF ANDHRA PRADESH

Pradeep Kumar Patidar*, R. Lakshmi Priyanka, N. Khan and Dharmendra

JNKVV, College of Agriculture Rewa (M.P.)

Received-06.02.2020, Revised-24.02.2020

Abstract: Rice (*Oryza sativa*) is the second highest produced grain in the world after maize. World rice acreage is 161.1 m ha with world production volume of milled rice is 484.1mt during 2016-2017. The present investigation was conducted in Guntur District of A.P. The study found that cost of cultivation of Kharif rice showed that on an average cost of cultivation per hectare of Kharif rice crop on overall basis was found to be cost A1 that was paid out cost Rs.31473.56 followed by Rs.32977.99 (cost B1), Rs.54791.26 (cost B2), Rs.35961.33 (cost C1), Rs.57774.59 (cost C2) and Rs.63552.43 (cost C3) respectively. While the cost of cultivation of Rabi rice showed that on an average cost of cultivation per hectare of Rabi rice crop was found to be Rs.28891.72 (cost A1) followed by Rs.30396.15 (cost B1), Rs.55213.45 (cost B2), Rs.32989.82 (cost C1), Rs.57807.17 (cost C2) and Rs.63588.10 (cost C3). The average yield in Kharif and rabi season were found to be 66.22 quintal and 73.20 quintal per hectare of total grain yield and 23.98 quintal and 25.73 per hectare of by-product yield. Data revealed that in kharif and rabi season the rice growers realized on an average of 1:2.05 and 1:2.30 as B.C. ratio in rice production in Guntur district of Andhra Pradesh.

Keywords: Cost, Production, Income, Profitability, Rice

Journal of Plant Development Sciences Vol. 12(2)

GROWTH PARAMETERS AND SOIL FERTILITY STATUS AS INFLUENCED BY NITROGEN SOURCE IN WHEAT

Fazal Rabi, Meena Sewhag, Shweta, Parveen Kumar, Amit Kumar* and Uma Devi

*Department of Agronomy,
CCS Haryana Agricultural University, Hisar, Haryana, India*

Received-07.02.2020, Revised-27.02.2020

Abstract: In order to study morphological response of wheat to different nitrogen sources a field experiment was conducted during the *rabi* season of 2017-2018 at the Agronomy Research Farm of Chaudhary Charan Singh Haryana Agricultural University, Hisar. The soil of the experimental field is slightly alkaline in reaction, sandy loam in texture, low in organic carbon and nitrogen, medium in available phosphorus and potassium. The experiment was laid out in Randomized Block Design replicated thrice with ten treatments viz. T₁ (Control), T₂ (Vermicompost @ 6 t ha⁻¹), T₃ (Azotobacter + Vermicompost @ 6 t ha⁻¹), T₄ (30 kg N ha⁻¹ + Vermicompost @ 3 t ha⁻¹), T₅ (40 kg N ha⁻¹ + Vermicompost @ 2 t ha⁻¹), T₆ (50 kg N ha⁻¹ + Vermicompost @ 1 t ha⁻¹), T₇ (30 kg N ha⁻¹ + Azotobacter + Vermicompost @ 3 t ha⁻¹), T₈ (40 kg N ha⁻¹ + Azotobacter + Vermicompost @ 2 t ha⁻¹), T₉ (50 kg N ha⁻¹ + Azotobacter + Vermicompost @ 1 t ha⁻¹) and T₁₀ (60 kg N ha⁻¹). The results of the experiment indicated that no variations in plant population at 15 DAS and N, P and K status of soil after harvesting of wheat crop was observed due to application of various combinations of nitrogen fertilizer, vermicompost and *Azotobacter*. Among various treatments of nitrogen fertilizer, vermicompost and *Azotobacter* T₁₀ was at par with T₈ and T₉ for plant height at all the stages of crop growth. Treatment T₁₀ at all the stages of crop growth resulted in highest dry matter accumulation. Treatment T₁₀ (100 % RDN) being at par with treatment T₉ and T₈ required significantly higher number of days to attain physiological maturity than all other treatments. Treatment T₁₀ resulted in highest grain yield which was at par with treatments T₈ and T₉ and significantly higher than all other treatments. Straw yield obtained with treatment T₁₀, was significantly higher than all other treatments except T₉. Highest biological yield was recorded with treatment T₁₀ which was at par with treatments T₈ and T₉.

Keywords: Growth parameters, Nitrogen, Soil, Wheat

Journal of Plant Development Sciences Vol. 12(2)

VARIETAL PERFORMANCE OF BROCCOLI (*BRASSICA OLERACEA* VAR. *ITALICA*) UNDER NORTHERN HILL ZONE OF CHHATTISGARH

P.C. Chaurasiya* and Sarswati Pandey¹

¹RMDCARS, Ambikapur, IGKV-College of Agriculture & Research Station, Mahasamund (C.G.)

Email: pcchaurasiaigkv@gmail.com

Received-05.02.2020, Revised-26.02.2020

Abstract: Broccoli (*Brassica oleracea* var. *italica*. L.) is one of the most prominent vegetable grown all over the world and is an important fancy and highly nutritive exotic vegetable. Vegetables play a very important role in our daily diet. As an unconventional vegetable "Broccoli" is yet to gain the desired popularity in our country. It is very rich source of various anti-cancer agents as well as Vitamin C and dietary fibre. However, considerable attention is being given on the production technology of Broccoli which is rich in nutrient content and greater yield potential. But yet, no systematic work has been done on evaluation and commercialization of high value nutrient rich this Cole crops. Therefore, the present study were carried out at Potato & Temperate Fruit Research Station, Mainpat, Surguja, Chhattisgarh under Indira Gandhi Krishi Vishwavidyalaya during the year 2017-2018 in *Rabi* season with objectives to varietal performance of Broccoli and to standardize the production technology of sprouting broccoli in northern hill zone of Chhattisgarh. Cultivation of these value added vegetables can boost the income of farmers due to very high market price and export demand. The investigations were followed in Randomized Block Design with three replications. Nine varieties of Broccoli viz. Palam Samridhi, Green Giant, Green Speed, KTS-1, Puspa, Palam Haritika, Priya, Aiswarya and Prema were evaluated for best performance. In general, the performances of this crop with different varieties proved that there is good scope to grow broccoli vegetable due to prevailing suitable agro-climatic condition as well as the gaining importance as potential vegetable for export. Among all the varieties of Broccoli Palam Samridhi was found superior, which gave higher yield (184.5q/ha) followed by Green Speed (173.74q/ha), Green Giant (156.23q/ha) and Palam Haritika (144.84q/ha) respectively in combination with best head formation.

Keywords: Performance, Broccoli, Varieties, Quality and yield

Journal of Plant Development Sciences Vol. 12(2)

OPTIMIZATION OF DIFFERENT PROPAGATING TECHNIQUE AND TIME PERIOD TO ENHANCE HIGHER SUCCESS RATE IN PROPAGATION OF LOW CHILL PEACH CV. SHAN-E-PUNJAB

Rajat Sharma*, P.N. Singh, D.C. Dimri, Shweta Uniyal, Vishal Nirgude and Manpreet Singh

*Department of Horticulture, College of Agriculture, G.B. Pant University of Agriculture and
Technology, Pantnagar 263 145, Uttarakhand
Email: rajathorti10@gmail.com*

Received-07.02.2020, Revised-26.02.2020

Abstract: An experiment was conducted to study the propagation of low-chill peaches in *Tarai* region of Uttarakhand. Three different methods of propagation viz., chip budding, T-budding and tongue grafting were practiced during period of experiment. Growth parameters and economic study was made in peach cv. Shan-e-Punjab. The results of the experiment revealed that treatment tongue grafting practiced on 20th January was found superior for almost all the parameter studied except for days taken for sprouting initiation, which was least (6.00 days) with grafting on 20th February. The parameters such as graft diameter, number of branches, plant height, saleable plants, number of leaves, leaf area, number of primary and secondary roots, fresh weight of roots and shoots and root to shoot ratio were found to be maximum in case of tongue grafting followed by chip budding. However, economics of experiment as benefit cost ratio was found higher (2.08) in chip budded plant as compared to tongue grafting (1.78) and T-budding (0.81).

Keywords: Peach, Propagation, Tongue grafting, T-budding, Chip budding

Journal of Plant Development Sciences Vol. 12(2)

EFFECT OF INTEGRATED CROP MANAGEMENT PRACTICES ON GROWTH, SEED YIELD AND ECONOMICS OF LENTIL (*LENS CULINARIS* MEDICK.)

S.K. Sharma*, Rakesh Kumar and Parveen Kumar

*Department of Agronomy, Chaudhary Charan Singh Haryana Agricultural University,
Hisar-125004, Haryana, India
Email: sksharma67@rediffmail.com*

Received-02.02.2020, Revised-21.02.2020

Abstract: A field experiment was carried out during rabi season of 2013-14 to 2015-16 at Research Farm of Pulse Section, Hisar, to study the effect of different crop management practices on growth, yield and economics of lentil. Different treatments were included in the experiment viz. control, NM (Nutrient Management): RDF (20:40 kg NP ha⁻¹), WM (Weed Management): Pendimethalin @ 1.0 kg ha⁻¹ + one hand weeding at 30 DAS), PM (Pest Management): spray of quinalphos 25 EC one litre per ha in 250-300 litres of water as and when required, NM + WM, NM + PM, WM + PM, NM + WM + PM laid out in randomized block design and replicated thrice. Results revealed that significantly higher plant height, number of branches plant⁻¹, number of pods plant⁻¹, number of seeds pod⁻¹, seed and straw yield were achieved in treatment having integration of NM + WM + PM being at par with that of integration of NM + WM over rest of the treatments. Integration of NM + WM + PM recorded lower weeds dry weight (31.1 kg ha⁻¹) and higher weed control efficiency (94.18%) compared to all other treatments. The practice of integration of NM + WM + PM also produced higher net returns (Rs13190/ha) and BC ratio (1.53) compared to other crop management practices.

Keywords: BC ratio, Lentil, Nutrient management, Pest management, Seed yield, Weed management, Yield attributes

Journal of Plant Development Sciences Vol. 12(2)

EFFECT OF TREATMENT IMPOSED ON TOTAL SOLUBLE PROTEIN CONTENT IN WHEAT LEAVES INFECTED BY BROWN RUST (*PUCCINIA RECODITA* F.SP. TRITICI ROB. EX. DESM.) AT KANPUR AND IARI REGIONAL STATION WELLINGTON (T.N.).

**Akash Tomar*, Ved Ratan , Javed Bahar Khan, Dushiyant Kumar, Devesh Nagar
and Sonika Pandey**

*Department of Plant Pathology, Chandra Shekhar Azad University of Agriculture & Technology
Kanpur 208002 (U.P.) India
Email: atakshay343@gmail.com*

Received-03.02.2020, Revised-23.02.2020

Abstract: In India, wheat (*Triticum aestivum* L.) is a staple food. Rust caused by *Puccinia Recondita* f. sp. *tritici* Rob. ex. Desm. (Brown rust) is the most destructive and one of the most common diseases of wheat worldwide. It probably results in higher total annual losses worldwide because of its more frequent and widely distributed diseases of wheat in India and elsewhere that affects its yield potential. Although, chemical control of these diseases is known but is not economic and environmental friendly to be used on a large scale. . The chemical changes in leaves due to infection of brown rust protein quantification were done by Lowry method. The soluble protein contents in treatment T₁₆ (Soil treatment with Mycorrhiza (VAM) @ 5 gm / plot + Soil treatment with *Trichoderma harzianum* @ 5 gm / plot + Three spray with Propiconazole @ 25 EC 0.1 %) treated leaves were 0.37 mg/ml, followed by T₁ (0.32 mg/ml) and T₃ (0.28 mg/ml) which is the highest among all the treatments.

Keywords: Soluble protein, Treatment, Brown rust, Wheat

Journal of Plant Development Sciences Vol. 12(2)

STUDIES ON THE DIFFERENT SPECIES OF INSECT POLLINATORS/VISITORS VISITING BUCKWHEAT FLOWERS

Jogindar Singh Manhare* and G.P. Painkra

*Department of Entomology, IGKV, RajMohini Devi College of Agriculture
Research Station, Ambikapur, Surguja 497001 Chhattisgarh, India
Email: manharejogindar@gmail.com

Received-03.02.2020, Revised-23.02.2020

Abstract: Studies on the succession of various species of insect pollinators/visitor visiting on buckwheat flowers was undertaken at Research cum Instructional Farm of RMD CARS, Ajirma, Ambikapur (C.G.) of Indira Gandhi Krishi Vishwavidyalaya Raipur during year 2016-2017. Total 10 species of insect pollinators/ visitors were found visiting on buckwheat flowers. Amongst the pollinators/visitors, *Apis cerana indica* appeared first on buckwheat flower followed by *Apis florea*, *Danaus chrysippus*, *Eristalis* sp., *Apis dorsata*, *Musca domestica*, *Dysdercus cingulatus*, *Amata passelis*, *Chrysomya bezziana*, *Coccinella septumpunctata* and *Vespa cincta*. They were found visiting on buckwheat flower throughout the blooming period.

Keywords: Buckwheat, Succession of insect pollinator/visitors

Journal of Plant Development Sciences Vol. 12(2)

SURVEY OF WHEAT CROP FOR THE PREVAILING BROWN RUST (PUCCINIA RECONDITA F.SP. TRITICI ROB. EX. DESM.) IN DIFFERENT REGION OF UTTAR PRADESH

Akash Tomar*, Ved Ratan , Javed Bahar Khan, Dushyant Kumar and Devesh Nagar

Department of Plant Pathology, Chandra Shekhar Azad University of Agriculture & Technology
Kanpur 208002 (U.P.) India
Email: atakshay343@gmail.com

Received-03.02.2020, Revised-25.02.2020

Abstract: Uttar Pradesh is considered to be hot spot area for the development of leaf rust complex. Thus, this study was carried out to investigate the distribution and intensity of wheat leaf rust, and to detect the virulence spectrum of *Puccinia recondita* f. sp. *tritici* Rob. ex. Desm during cropping season 2012-13. Survey programme were conducted in different wheat growing area of Uttar Pradesh and covers four regions basically Eastern U.P., Central U.P., Bundelkhand region and Western U.P. region. The data was collected on the basis of Global Cereal Rust Monitoring Form provided by BGRI (borlaug global rust initiative). In East U.P. region, district Lakhimpurkhiri brown rust traces were observed in village Katania (8-10 plants, severity upto 20S) on the cv. Sonalika. However in Paliakalannon brown rust were observed on date. At Golagokharnath leaf rust were recorded on cv. Lalbahadur with severity 10S. In the village Akbarpur of Kanpur Dehat

(Central U.P. region) brown rust were observed on variety C-306, LOK1 at the disease severity of 30S. the brown rust were observed in farmer field Uin village in district Lucknow on variety Agra local, HD 2189 , rust severity from 20S -80S were recorded. Area near Unnao at village Atarsa brown rust observed on variety HD 3095, and farmer local varieties, severity 20S- 40S were recorded. In Jhansi, the district of Bundelkhand region only trace of Brown rust were observed in Agra local , C-306 and lok1 at farmer field villages Badanpur , Babina and Amarpur. Survey at Lalitpur area, variety Agra local, Lalbhatur and Lok 1 shows 30S-40S severity. Area near Banda district shows 40S-60S severity at farmer local variety. Survey during West U.P.region in the district Meerut, Muzaffarnagar, and Bijnor brown rust found in very low severity with very low incidence. In district Meerut, village Mihiwa, Mator and Kashampur shows 10S-20S severity on variety PBW 343, PBW 550, W -75. In district Muzaffarnagar variety PBW343, PBW 550 and PBW 373 shows 20S- 40S severity in village Hashampur, Bhuma, Ghatayan. In district Bijnor, village Kasopur, Khaikheda, and Salimpur shows symptoms of brown rust of wheat with severity 10S -20S. Key words: Brown rust, Puccinia recondita f. sp. tritici, Uttar Pradesh, Disease severity, Disease incidence.

Keywords: Survey, Crop, Brown rust, Wheat