Journal of Plant Development Sciences

(An International Monthly Peer Reviewed Journal)

Volume 15 **Number 6** **June 2023**

Content

Journal of Plant Development Sciences Vol. 15(6)

CHARACTERIZATION AND MAPPING OF GROUND WATER QUALITY IN THE BARWALA BLOCK OF THE INDIAN STATE OF HARYANA

Ram Prakash[1]*, Pankaj Kumar[1], Dinesh[1], Sanjay Kumar[2], Ankush[1], Sarita Rani[1] and Abhinav[3]

[1] Department of Soil Science, CCS Haryana Agricultural University, Hisar, India-125004
[2]Department of Soil and Water Engineering, CCS Haryana Agricultural University, Hisar,
[3]College of Agriculture, CCS Haryana Agricultural University, Hisar-125004, Haryana, India
Email: vrmapnkj007@gmail.com

Received-09.06.2023, Revised-19.06.2023, Accepted-28.06.2023

Abstract: A survey was conducted to assess the groundwater quality for irrigation purposes in different villages of the Barwala block in Panchkula district, Haryana, from 2022 to 2023. A total of 23 water samples were collected and analyzed for various hydrochemical parameters including pH, EC (electrical conductivity), and concentrations of cations (Ca^{2+}, Mg^{2+}, Na^{+}, and K^{+}) and anions (CO_3^{2-}, HCO_3^{-}, Cl^{-}, and SO_4^{2-}), using standard procedures. Irrigation indices such as SAR (sodium adsorption ratio) and RSC (residual sodium carbonate) were calculated for these samples. The pH, EC, SAR, and RSC values in the groundwater ranged from 6.75 to 7.85, 0.54 to 1.12 dSm^{-1}, 2.88 to 5.95 (mmol L^{-1})1/2, and 0.00 to 3.01 (me L^{-1}), respectively. The average ionic concentration of cations and anions showed the following trend: $Na^{+} > Mg^{2+} > Ca^{2+} > K^{+}$ for cations, and $Cl^{-} > SO_4^{2-} > HCO_3^{-} > CO_3^{2-}$ for anions. According to the guidelines provided by the All India Coordinated Research Project (AICRP) in 1989, 95.7% of the samples were classified as good quality, while 4.3% fell into the marginally alkali or alkali categories in the Barwala block of Panchkula district, Haryana. Spatial variability maps depicting the EC, SAR, and RSC values of groundwater used for irrigation were also prepared for the district.

Keywords: Anions, Barwala block, Cations, Saline water

Journal of Plant Development Sciences Vol. 15(6)

BEE FLORA OF INDIAN BEE (*APIS CERANA INDICA*) IN SURGUJA REGION OF CHHATTISGARH

Sandeep Lal*, G.P. Painkra, K.L. Painkra, Sachin Kumar Jaiswal and Dalpat Kumar

Indira Gandhi Krishi Vishwavidyalaya, Department of Entomology, Rajmohini Devi College of Agriculture and Research Station, Ambikapur 497001, Surguja (Chhattisgarh.) India
Email: rajwade841@gmail.com

Received-05.05.2023, Revised-09.06.2023, Accepted-24.06.2023

Abstract: The availability of nectar and pollen for the consumption of bees are mandatory in apiculture. Floral Calendar of a locality guides the beekeepers of *Apis cerena indica* for efficient bee management to derive maximum benefit from beekeeping. In Surguja region 3 districts *i.e.*, Surguja, Surajpur and Balrampur district, the present study was conducted at Surguja region during the year 2022 to 2023 and the result revel that the 43 Honey bee floras *i.e.*Mustard, Sunflower, Pigeon pea, Maize, Field pea,Linseed, Hemelia, Tekoma, Bottle brush, Duranta,Onion, Tomato, Brinjal, Cucumber, Chilli, Sesame, Bitterguard, Okra, Merigol, Dehalia, Barseem, Mango, Guava, Papaya, Temrind, Lime, Moringa, Litchi and Ber, Purple nut sedge, Field bind weed, Black night shade, Wild snak gourd, . Nilgiri, Arjun, Semal, Palas, Neem, Karanj, Sal, Dhawai, Red gulmohar and Yellow gulmoharwere useful to honey bees in different month of calendar year and recognized as major honey bee forage sources.The bees are necessarily important component in cropping system by pollinating wide variety of crops. These groups were the provider of pollen, nectar and both pollen and nectar.

Keywords: Apiculture, *Apis cerena indica*, Bee flora, Floral calendar, Surguja region

Journal of Plant Development Sciences Vol. 15(6)

IMPACT OF DIFFERENT CULTURE MEDIA FOR THE GROWTH OF *RHIZOCTONIA SOLANI* CAUSING BLACK SCURF OF POTATO

Amanpreet Singh Sran[1], Jasvinder Kaur Sran[2], Amandeep Kaur[1], V.S. Pahil[1] and Bahaderjeet Singh[1]*

[1]*College of Agriculture, Guru Kashi University, Talwandi Sabo, Bathinda, Punjab.*
[2]*Department of Environmental Science, Nalanda Open University, Patna, Bihar*
Email: sidhubahaderjit@yahoo.in

Received-01.06.2023, Revised-13.06.2023, Accepted-25.06.2023

Abstract: Potato is an important food crop worldwide. The black scurf disease caused by *Rhizoctonia solani* has emerged as a major problem in potato cultivation in recent years for farmers among the Punjab region. The present investigation was carried out in the Department of Plant Pathology Laboratory, Guru Kashi University, Talwandi Sabo during 2022. Studying the growth pattern of a pathogen in different culture media is a crucial aspect of understanding its behavior and characteristics. In this context, seven culture media viz., Potato dextrose agar, Sabouraud's dextrose agar, Potato dextrose yeast agar, Oat meal agar, Czapek's agar, Mushroom compost agar and Water agar medium were used to compare the growth rate of *R. solani*. Out of seven culture media tested, maximum mycelial growth was recorded in potato dextrose agar per plate while minimum mycelial growth was recorded in Water agar. Significantly maximum number of sclerotia was observed in Potato dextrose agar while minimum number of sclerotia was produced by Czapek's agar medium. Moreover, no sclerotia was produced by *R. solani*on Water agar medium.

Key words: Potato, Culture media, Black scurf, *Rhizoctonia solani*

Journal of Plant Development Sciences Vol. 15(6)

CORRELATION AND PATH COEFFICIENT ANALYSIS FOR GRAIN YIELD IN RICE (*ORYZA SATIVA* L.) GENOTYPES

Deepak Meena[1&2]*, Manoj Kumar[3], Sandhya[3], N.R. Koli[3], Yamini Tak[4] and Ashok Kumar Meena[1]

[1]*Department of Genetics and Plant Breeding, College of Agriculture Ummedganj, Kota, AU Kota, Rajasthan, India*
[2]*Department of Genetics and Plant Breeding, RCA, MPUAT, Udaipur*
[3]*Agricultural Research Station, Ummedganj, AU Kota, Rajasthan, India*
[4]*Department of Biochemistry, College of Agriculture Ummedganj, Kota, AU Kota, Rajasthan India*

Received-03.06.2023, Revised-15.06.2023, Accepted-26.06.2023

Abstract: The current study investigated the relationship between GY of rice and its related attributing characters in twenty five different rice crop genotypes. As a consequence of correlation, it was found that the PTPP showed a very strong association that is positive with GYPP, followed by TW, PL, PH, DF50% and DM at the genotypic as well as phenotypic levels, respectively, demonstrate how GY can be increased with choosing genotypes with greater amounts for these characteristics. The outcome of the analysis of the path co-efficient showed that the PTPP had the greatest direct positive impact on GYPP, followed by the TW, PL, PH, DM, and DF50%. These features should be regarded as a crucial selection criterion for maximizing crop output because they also played a significant influence in the indirect impacts for the majority of constituent traits on grain yield per plant.

Keywords: Correlation coefficient, Grain yield, Path analysis, Rice

Journal of Plant Development Sciences Vol. 15(6)

GENETIC VARIABILITY, HERITABILITY AND GENETIC ADVANCE ESTIMATES IN SOYBEAN [*GLYCINE MAX* (L.) MERRILL] GENOTYPES FOR SEED YIELD AND OTHER AGRONOMIC TRAITS

Ashna Akbar and H.P. Chaturvedi*

Department of Genetics and Plant Breeding, School of Agricultural Sciences, Nagaland University, Medziphema- 797106
Email: hpchaturvedi68@gmail.com

Received-05.06.2023, Revised-16.06.2023, Accepted-27.06.2023

Abstract: Present investigation utilized 20 soybean genotypes, including 18 from diverse Nagaland regions and 2 reference checks. Using a Randomized Complete Block Design, genotypes were sown with 50 cm row-to-row and 10 cm plant-to-plant spacing in an upland setting. Assessment occurred over consecutive 2017 and 2018 kharif seasons at experimental farm of Department of Genetics and Plant Breeding, School of Agricultural Sciences, Nagaland University, Medziphema. ANOVA revealed significant trait variations. Yearly fluctuations and genetics played crucial roles in shaping soybean traits. Examining soybean traits, notable seed yield variation was observed. Genotypes T1, T8, T9, T10, T11, and T12 exhibited promising yields for cultivation and breeding. Highest values of GCV, PCV exhibited at NC/P with PCV at 51.79% and GCV at 41.64%. NPo/C has PCV 27.9%, GCV 17.71%. NPo/P features PCV at 33.99%, GCV at 28.37%. HSW exhibits PCV reaching 23.29%, GCV at 23%. BY/P stands at PCV 32.02%, GCV 22.63%. Finally, SY/P indicates PCV of 32.89%, GCV of 22.31%. High heritability observed at traits HSW: h^2 - 97.53% (High), DFF: h^2 - 95.39% (High), DM: h^2 - 95.97% (High), PH: h^2 - 84.34% (High), PoL: h^2 - 74.99% (High), NC/P: h^2 - 64.65% (High), NPo/P: h^2 - 69.67% (High), and Oil%: h^2 - 68.01% (High). In this study, high heritability coupled with high genetic advance per cent mean observed at Days to 50% flowering, plant height, number of clusters per plant, number of pods per plant and 100 seed weight appear to be governed by additive gene action, enabling breeders to selectively enhance these traits within soybean populations.

Keywords: Soybean, Genetic variability, Heritability, Genetic gain

Journal of Plant Development Sciences Vol. 15(6)

PULPWOOD WOOD CHARACTERIZATION OF SCREENED EUCALYPTUS GENETIC RESOURCES

Vennila S.,[1] P. Radha[2]*, K.T. Parthiban[3] and K. Sivagamy[4]

[1]Forestry, Agricultural College and Research Institute, Tiruvannamalai
[2]Biochemistry, Forest College and Research Institute, Mettupalayam*
[3]Forestry, Forest College and Research Institute, Mettupalayam
[4]Agronomy, ICAR-KVK, Tiruvallur, Tirur
Email: radhubctnau@gmail.com

Received-01.06.2023, Revised-15.06.2023, Accepted-29.06.2023

Abstract: The tree farming is ecologically as well as economically more viable than traditional agriculture. Investment in tree plantations always remained relatively low in India, in spite of the fact that the existing forests cannot continue to meet our wood requirements. However, realizing the existing problem, the expenditure on afforestation has increased enormously from fifth five year plan onwards but still the results on the land are not encouraging and we have not been able to increase area as well as the forest productivity to the desired level. The misery caused to the entire nation due to unprecedented ecodegradation is enormous and warrants immediate remedial measures. To counteract the impending crisis, use of fast growing tree species managed with intensive cultural operations especially in tree farming have opened up new vistas in wood biomass production. Against this backdrop, the current study was planned to screen and identify superior genotypes of Eucalyptus for higher pulp yield. Eleven eucalyptus genotypes were subjected for pulp quality analysis. The clone EC 48 has been characterized for wood quality towards its amenability for pulp and paper industries and the results are very encouraging. The clone expressed the Pulp yield of 48%, Kappa number 19.3 and Lignin content of 23.20% which expressed superiority over the local seed sources. Similarly, this clone expressed acceptable strength properties viz., Burst index (5.0 K Pa m2 g -1), Tear (8.20 m Nm2 g -1) and tensile index (80.0 Nm g-1) which are again proved superior. Considering the pulp quality, the genotypes EC MTP 48, EC MTP 47 and EC MTP 41 proved superior and this study recommends the suitability of EC MTP 48, EC MTP 47 and EC MTP 41 for pulpwood plantation programme.

Keywords: Agriculture, Eucalyptus, Pulpwood, Genetic resources

Journal of Plant Development Sciences Vol. 15(6)

INFLUENCE OF BIO PESTICIDES ON NATURAL ENEMIES IN MUSTARD

Pawar Shubham Tarasing, P.K. Bhagat, G.P. Painkra*, K.L. Painkra and Neelam Chouksey

Indira Gandhi Krishi Vishwaviyalaya, Department of Entomology, Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (Chhattisgarh)
Email- pawarstv879@gmail.com

Received-25.05.2023, Revised-10.06.2023, Accepted-19.06.2023

Abstract: The field trial was conducted to evaluate the influence of different biopesticides against natural enemies of mustard at Research-cum-Instructional Farm of Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (Chhattisgarh), India. The overall influence of biopesticides on the population of ladybird beetle and syrphid fly after 3 and 7 days of the first and second spraying demonstrated that the untreated control recorded the highest population. The data revealed that *Beauveria bassiana* recorded less toxic to both natural enemies among the all biopesticide treatments.

Keywords: *Beauveria bassiana*, Biopesticides, Mustard, Natural enemies

Journal of Plant Development Sciences Vol. 15(6)

STUDIES ON MORPHOLOGICAL CHARACTERIZATION OF GLADIOLUS GENOTYPES UNDER SHADE NET CONDITIONS

R. Priyadharshini, S. Padmapriya* and K. Rajamani

TNAU, Coimbatore – 641003
Email: spadmapriyaa@yahoo.co.in

Received-04.06.2023, Revised-14.06.2023, Accepted-27.06.2023

Abstract: The current investigation was carried out at the Department of Floriculture and Landscape Architecture, Tamil Nadu Agricultural University, Coimbatore during 2021-2022 to evaluate the performance of Heliconia genotypes under shadenet condition. Twelve Heliconia genotypes were gathered from various geographic locations of Tamil Nadu and Kerala and characterised morphologically for growth and flowering attributes. The experiment was laid out in a Completely Randomized Design (CRD) with three replications. Five (46.66 per cent) out of twelve genotypes studied, showed quick growth, and all of the genotypes possessed open plant density, upright growth, and evergreen leaf persistence. Seven genotypes (58.33 per cent) had leaves that were noticeably green, compared to five genotypes (41.66 per cent) with moderately green leaves. Leaf blades of Six genotypes (50 per cent) had oblong shape, while six genotypes (50 per cent) had ovate shapes. All the 12 genotypes exhibited erect inflorescences, while the bract and floret colours varied differently. Among the twelve genotypes observed, the genotype G_1 (*H. psittacorum* cv. Golden Torch) exhibited earliness in flowering ((139.33 days), greater number of stalks per plant ((3.30), highest length of the flower spike (15.67 cm) and no. of bracts/ spike (4.44), While the genotype G_7 (*H. psittacorum* cv. Lady Di) recorded the highest no. of florets / bract (6.17)

Keywords: Heliconia, genotypes, morphological traits, evaluation, growth and flowering

Journal of Plant Development Sciences Vol. 15(6)

EFFICACY OF SELECTED INSECTICIDES WITH NEEM PRODUCTS AGAINST GRAM POD BORER [*HELICOVERPAARMIGERA* (HUBNER)] IN CHICKPEA [*CICERARIETINUM* (L.)]

Susundam Rameshwar* and Ashwani Kumar

Department of Entomology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj-211007 (U.P.) India
Email: susundamrameshwar@gmail.com

Received-20.05.2023, Revised-08.06.2023, Accepted-19.06.2023

Abstract: The field trial conducted at SHUATS, Prayagraj during *Rabi* 2022-23. Eight treatments were evaluated against *Helicoverpa armigera* i.e., T_1 Flubendiamide 48% SC, T_2 Emamectin benzoate 5%SG, T_3 NSKE 5%, T_4 Spinosad 45% SC, T_5 Neem oil 2%, T_6 Chlorantraniliprole 18.5% SC, T_7 Neem leaf extract 10% and T_0 untreated control. Results revealed that, among different treatments lowest population of chickpea pod borer was recorded in T_6 Chlorantraniliprole 18.5% SC (1.58). T_4 Spinosad 45SC (1.72) is found to be next best treatment followed by, T_1 Flubendiamide 48% SC (1.93), T_2 Emamectin benzoate 5% SG (2.04), T_3 NSKE 5% (2.33), T_5 Neem oil @ 2% (2.43), whereas T_7 Neem leaf extract 10% (2.48) found to be least effective against this pest. The highest yield was recorded in T_6 Chlorantraniliprole 18.5% SC (22.13q/ha) followed by T_1 Flubendiamide 48% SC (20.63q/ha), T_4 Spinosad 45% SC (20.24q/ha), T_2 Emamectin benzoate 5% SG (19.47q/ha), T_5 Neem oil 2% (18.32q/ha), T_3 Neem Seed Kernel Extract (17.82q/ha), T_7 Neem leaf extract 10 % (16.74q/ha) and T_0 Control (11.43q/ha).among all the treatments studied, the best and most economical treatment was T_6 Chlorantraniliprole 18.5% SC (1: 2.76) followed by T_1 Flubendiamide 48% SC (1: 2.75), T_4 Spinosad 45% SC (1:2.61), T_2 Emamectin benzoate

5% SG (19.47q/ha and1:2.59), T_5 Neem oil 2% (1:2.48), T_3 Neem Seed Kernel Extract (1:2.46) T_7 Neem leaf extract 10 % (1:2.27) and Control (1:1.67).

Keywords: Cost benefit ratio, Chickpea, *Helicoverpa armigera*, Insecticides, Larval population, Neem products

Journal of Plant Development Sciences Vol. 15(6)

COMPARATIVE EFFICACY AND ECONOMICS OF SELECTED CHEMICALS AND BOTANICALS AGAINST GRAM POD BORER [*HELICOVERPA ARMIGERA* (HUBNER)] ON COWPEA [*VIGNA UNGUICULATA* (L.) WALP.]

Ankisetty Yogeeswar* and Ashwanikumar

Department of Entomology, Naini Agricultural Institute,
Sam Higginbottom University of Agriculture, Technology and Sciences,
Prayagraj-211007, India
Email: eswarabhiankisetty123@gmail.com

Received-26.05.2023, Revised-07.06.2023, Accepted-19.06.2023

Abstract: During the Kharif season of 2022, the experiment titled "Comparative efficacy and economics of selected chemicals and Botanicals against gram pod borer [*Helicoverpa armigera* (Hubner)] on cowpea [Vigna unguiculata (L.) Walp.]" was carried out at the central research farm field was laid out in randomised block design (RBD) with seven treatments and an untreated control plot. The larvae population per plant was counted before spraying, and 3, 7, and 14 days later, all of the treatments tested significantly reduced pest infestation compared to the untreated control.The efficacy findings showed that treatment Chlorantraniliprole 18.5% SC (1.38) had the lowest larval population. The next most effective treatments were Spinosad 45% SC (1.58), 1/2 dose chlorantraniliprole 18.5% SC + Niscosixerplus 2ml/l(1.82),1/2dose Chlorantraniliprole18.5% SC+ Neem oil 5% (2.05), Niscosixerplus 2ml/l (2.17), Neem oil 5% (2.44), and Tobacco leaf Extract 10% (2.65). which was found to be least effective among all treatments, these treatments were found superior over untreated control recording highest larval population (3.87).The best and most cost-effective treatment was Chlorantraniliprole 18.5% SC (1:2.34) and then next effective treatments were Spinosad 45% SC (1:2.03), ½dose Chlorantraniliprole 18.5% SC + Niscosixerplus 2ml/l (1:1.80), ½ dose Chlorantraniliprole 18.5% SC + Neemoil5% (1:1.59), Niscosixerplus 2ml/l (1:1.49), Neemoil 5% (1:1.34), and Tobacco leaf Extract 10% (1:1.13), and the least C: B ratio was recorded in untreated control(1:1.04).

Keywords: Cost Benefit ratio, Cowpea, *Helicoverpa armigera*, Neem oil