

Journal of Plant Development Sciences

(An International Monthly Peer Reviewed Journal)

Volume 15

Number 9

September 2023

Content

RESEARCH ARTICLES

Exploring the allelopathic effects of aqueous leaf extracts of *Casuarina equisetifolia* L. on agricultural crops

—Milkuri Chiranjeeva Reddy, Mhaikar Priya Rajendra, Bestha Ashwitha, Tumma Bargavi, Bheemreddyalla Venkateshwar Reddy, D. Ravivarma Yerrawada Naveen, Varun Podishetti and Swamynath Shakati -----457-466

Economic analysis of the level of adoption of gap among the farmers of FPOS and contract farming

—Aruna Kumari A., Kalpana K. and Suseela K. -----467-471

Unveiling the Allelopathic effects of aqueous leaf extracts from *Melia Dubia* cav. on Agricultural crops

—Mhaikar Priya Rajendra, Milkuri Chiranjeeva Reddy, Swamynath Shakati, Bheemreddyalla Venkateshwar Reddy, Yerrawada Naveen, D. Ravivarma, Varun Podishetti, Tumma Bargavi and Bestha Ashwitha -----473-482

Antifungal effect of some latex yielding plants against *Fusarium oxysporum* F. sp. *Lycopersici*

—Shyam Singh, Hitendra Kumar Singh Mohd Ajaz, Shagun Prakash Maglik, Puja Pal and Sanju Lata -----483-489

Studies of variability, heritability and genetic advancement for field Pea (*Pisum sativum* L.) in Satna District, M.P.

—Abhshek Kumar Sahu, Ayodhya Prasad Pandey, Rajbeer Singh Gaur and Brindaban Singh -----491-496

Productivity, agro-physiological character and water use efficiency of furrow irrigated raised bed (FIRB) planted wheat as influenced by varieties and nitrogen sources under alternate furrow Irrigation method

—Jyoti, Parveen Kumar, Pawan Kumar and Pawan Kumar -----497-500

Combining ability analysis in linseed (*Linum usitatissimum* L.) for improvement of seed yield and its attributing traits in south eastern zone of Rajasthan

—R.K. Mahawar, Rajesh Kumar, Khajan Singh, Rajendra Kumar Yadav and Hanuman Singh ----501-504

SHORT COMMUNICATION

Macaranga peltata (Roxb.) Mull. Arg. – A new host plant for ERI Silkworm

—Ravi Kumara R. -----505-507

EXPLORING THE ALLELOPATHIC EFFECTS OF AQUEOUS LEAF EXTRACTS OF *CASUARINA EQUISETIFOLIA* L. ON AGRICULTURAL CROPS

Milkuri Chiranjeeva Reddy¹, Mhaiskar Priya Rajendra*¹, Bestha Ashwitha¹, Tumma Bargavi¹, Bhemreddyvala Venkateshwar Reddy¹, D. Ravivarma¹ Yerrawada Naveen¹, Varun Podishetti¹ and Swamynath Shakati¹

¹Forest College and Research Institute, Mulugu, Siddipet District, Telangana – 502 279
Email: mhaiskarpriya@gmail.com

Received-28.08.2023, Revised-17.09.2023, Accepted-28.09.2023

Abstract: Allelopathy, the interaction of secondary metabolites produced by plants, microorganisms, viruses, and fungi, can have both beneficial and detrimental effects on agricultural and biological systems. *Casuarina equisetifolia*, a versatile tree species used in agroforestry, with allelopathy effects. The laboratory experiment was conducted to test the effect of allelopathy by *Casuarina equisetifolia* aqueous leaf extracts on the germination and growth of agricultural seeds i.e., *Arachis hypogaea*, *Cicer arietinum*, *Vigna radiata* and *Zea mays* to test for suitable agroforestry system. The aqueous leaf extracts of five concentrations as five treatments: T1(25%), T2 (50%), T3(75%), T4(100%), T5(Control) prepared were tested against germination percent, relative germination percent, growth and relative allelopathic effect on the chosen agricultural seeds. The results demonstrate a substantial negative impact on these agricultural crops as the concentration of *Casuarina* leaf extract increased. All the other crop treatments exhibited reduced germination rates, root lengths, shoot lengths, and dry weights, with the control group performing relatively well. These results suggest that the leaching of allelochemicals from the leaves into the assay had an inhibitory effect on both seed germination and growth.

Keywords: Allelopathy, *Casuarina equisetifolia*, *Arachis hypogaea*, *Vigna radiata*, *Zea mays*

ECONOMIC ANALYSIS OF THE LEVEL OF ADOPTION OF GAP AMONG THE FARMERS OF FPOS AND CONTRACT FARMING

Aruna Kumari A.*¹, Kalpana K.² and Suseela K.³

¹Department of Agricultural and Horticultural Sciences, Vignan's University, Guntur, Tenali Road, Vadlamudi-522213 (Andhra Pradesh)

²Department of Management Studies, Vignan's University, Guntur, Tenali Road, Vadlamudi-522213 (Andhra Pradesh)

³Department of Agricultural Economics, Acharya N. G. Ranga Agricultural University, Guntur-522034 (Andhra Pradesh)
Email: aruna.settipalli@gmail.com

Received-04.09.2023, Revised-16.09.2023, Accepted-27.09.2023

Abstract: In the Andhra Pradesh district of NTR, a study was carried out on the adoption of Good Agricultural Practices (GAP) by chilli farmers. A sample size of 45 respondents was chosen from three villages using simple random sampling. The data indicate that the main reason for cultivating chilli in this location was the crop's suitability for the climate and soil. 53.33 percent of the FPO farmers had a high level of adoption, according to the findings, and 46.67 percent had a medium level of adoption. Among noncontract farmers, 30.00 percent had high adoption levels while 37.50 percent had low adoption. It could be inferred that 46.67 and 66.67 percent of the contract farmers and noncontract farmers had medium adoption followed by high adoption. The major reason for the non-adoption of Good Agricultural practices was their high input costs.

Key words: Adoption index, Chilli, Farmers, Good agricultural practices

UNVEILING THE ALLELOPATHIC EFFECTS OF AQUEOUS LEAF EXTRACTS FROM *MELIA DUBIA* CAV. ON AGRICULTURAL CROPS

Mhaiskar Priya Rajendra¹, Milkuri Chiranjeeva Reddy*¹, Swamynath Shakati¹,
Bheemreddyvala Venkateshwar Reddy¹, Yerrawada Naveen¹, D. Ravivarma¹, Varun
Podishetti¹, Tumma Bargavi¹ and Bestha Ashwitha¹

¹Forest College and Research Institute, Mulugu, Siddipet District, Telangana – 502 279
Email: chiranjeevamilkuri@gmail.com

Received-01.09.2023, Revised-17.09.2023, Accepted-29.09.2023

Abstract: Allelopathy is a type of interaction in which plants release allelochemicals that can have detrimental effects on the growth and development of neighboring plants. *Melia dubia* Cav., a short rotation tree species, with rapid growth that has a number of commercial and therapeutic purposes, is becoming more common in agroforestry systems. Hence, the current study is undertaken to investigate the effect of leaf extracts of *Melia dubia* Cav. on field crops such as *Arachis hypogaea* L., *Cicer arietinum* L., *Vigna radiata* L., and *Zea mays* L. Bioassay was conducted to test the allelopathic effects of aqueous leaf extracts on seed germination, growth, and biomass and relative allelopathic effect was calculated according to the standards. In this study aqueous extracts were prepared at varied concentrations [25%, 50%, 75%, 100% and Control (0)] (in w/v) and were tested on the aforesaid agricultural crops. The bioassay findings revealed that the germination percentage, shoot and root development of the tested crops significantly decreased as the concentration of the extracts increased.

Keywords Allelopathy, Bioassay, Germination, *Melia dubia*, Allelopathic effect

ANTIFUNGAL EFFECT OF SOME LATEX YIELDING PLANTS AGAINST *FUSARIUM OXYSPORUM* F. SP. *LYCOPERSICI*

Shyam Singh^{1*}, Hitendra Kumar Singh² Mohd Ajaz¹, Shagun Prakash Maglik¹, Puja Pal¹ and
Sanju Lata¹

¹Department of Botany, Meerut College, Meerut 250003 (U.P.) India
²Department of Botany, Raza P.G. College Rampur 244901 (U.P.) India

Received-03.09.2023, Revised-14.09.2023, Accepted-26.09.2023

Abstract: The latex yielding plant shows inhibition on the growth of fungal pathogen. In the present investigation, in vitro antifungal efficacy of latex from selected latex yielding plants viz., *Calotropis procera*, *Jatropha curcus*, *Argemonemaxicana*, *Opuntia dillenii*, *Ficus bengalensis* and *Ficus glomerata* against fungal pathogen *Fusarium oxysporum* f.sp. *lycopersici* is carried out here. The inhibition effects of the medicinal plants latex on test fungi (*Fusarium oxysporum*), *Jatropacurcus* latex showed maximum reduction in growth which is followed by *Ficus glomerata*, *Argemonemaxicana*, *Opuntia dillenii*, *Calotropis procera* and *Ficus bengalensis* respectively. The percent inhibition growth calculated here.

Keywords: Plant latex, Fungal pathogens, Growth inhibition, *Fusarium oxysporum* f.sp. *lycopersici*

STUDIES OF VARIABILITY, HERITABILITY AND GENETIC ADVANCEMENT FOR FIELD PEA (*PISUM SATIVUM* L.) IN SATNA DISTRICT, M.P.

Abhshek Kumar Sahu*, Ayodhya Prasad Pandey, Rajbeer Singh Gaur and Brindaban Singh

Department of Genetics and Plant Breeding, Faculty of Agriculture Science and Technology,
AKS University, Satna- 485001 (M.P.)

Received-02.09.2023, Revised-14.09.2023, Accepted-25.09.2023

Abstract: Twenty diverse cultivars of pea grown in a Completely Randomized block design (CRBD) at AKS University, Satna, during *Rabi* season on November 2022. Data were collected for ten quantitative traits and estimated for variance, genetic variability, heritability and genetic advance. The design of the experiment indicated highly significant differences for all the characters due to treatments. The analysis of variance indicated the existence of sufficient amount of variability among genotypes for all the studied characters. The maximum GCV along with PCV was observed in number of pod per cluster followed by seed yield per plant, 100 seed weight (g), number of seed per pod and number of pods per plant. Higher estimates (h^2b) >80% were observed for Seed yield per plant followed by 100 seed weight (g), plant height (cm), days to maturity, days to 50 % flowering, pod length, shelling (%) and number of seed per pod. High estimate of expected genetic advance at 5% were found for number of pod per cluster followed by seed yield per plant, 100 seed weight (g), number of seed per pod and number of pods per plant. High heritability coupled with high genetic advance indicated the predominance of additive gene action in the expression of these traits.

Keywords: Field pea, Variance, Variability, Heritability, Genetic advance

Journal of Plant Development Sciences Vol. 15(9)

PRODUCTIVITY, AGRO-PHYSIOLOGICAL CHARACTER AND WATER USE EFFICIENCY OF FURROW IRRIGATED RAISED BED (FIRB) PLANTED WHEAT AS INFLUENCED BY VARIETIES AND NITROGEN SOURCES UNDER ALTERNATE FURROW IRRIGATION METHOD

Jyoti*, Parveen Kumar, Pawan Kumar and Pawan Kumar

*Department of Agronomy, Chaudhary Charan Singh, Haryana Agricultural University,
Hisar, Haryana, India*

Email: jyotikulariya007@gmail.com

Received-01.09.2023, Revised-12.09.2023, Accepted-24.09.2023

Abstract: An experiment was carried out in split plot design (SPD) during 2021-22 at Agronomy Research Farm, CCS HAU, Hisar, Haryana with the goal of studying the impact of different varieties and nitrogen sources on productivity, agro-physiological, and water use efficiencies of FIRB planted wheat under alternate furrow irrigation method. The experiment had four varieties viz., WH 1105, HD 3086, HD 2967, and WH 1184 in the main plots and four nitrogen sources (organic and inorganic) viz.: control, 100% RDN through urea, 50% RDN through urea + 50% RDN through vermicompost, and 50% RDN through urea + 25% RDN through vermicompost + 25% RDN through farm yard manure in subplots. Among wheat varieties, HD 3086 performed better, and registered higher productivity and water use efficiency (WUE), whereas, varietal genotype had no significant effect on agro-physiological efficiency.

Keywords: Nitrogen, Productivity, Cereals, Water, Wheat

Journal of Plant Development Sciences Vol. 15(9)

COMBINING ABILITY ANALYSIS IN LINSEED (*LINUM USITATISSIMUM* L.) FOR IMPROVEMENT OF SEED YIELD AND ITS ATTRIBUTING TRAITS IN SOUTH EASTERN ZONE OF RAJASTHAN

R.K. Mahawar*, Rajesh Kumar, Khajan Singh, Rajendra Kumar Yadav and Hanuman Singh

**Department of Genetics and Plant Breeding, College of Agriculture, Ummadganj,
Agriculture University, Kota (Raj.) 324001*

Email: rajeshaukota@gmail.com

Received-03.09.2023, Revised-14.09.2023, Accepted-25.09.2023

Abstract: Twenty eight hybrids developed from eight genotypes of linseed through diallel mating design (excluding reciprocal) were evaluated in randomized block design with three replications for twelve distinct morphological characters, during *rabi* season of 2019-20, at Agriculture Research Station, Ummadganj, Kota, to estimate the general combining ability (GCA) of the parents and specific combining ability (SCA) for the development of high yielding varieties. Significant General Combining Ability (GCA) and Specific Combining Ability (SCA) effects were noted for all the traits. PA 2 was good general combiner for seed yield per plant along primary branches per plant and test weight; and KBA 3, KBA 4 and Padmani were good general combiner for oil content. In addition to above trait, KBA 3 for biological yield per plant, test

weight; KBA 4 for days to 50 per cent flowering, days to maturity, plant height and capsule per plant and Padmani for days to 50% flowering, days to maturity and plant height were also found good general combiner. Among the hybrids, RL 15582 x KBA 4 showed highest significant SCA effects in positive direction for seed yield per plant followed by RL 15583 x KBA3 and Padmani x RL 13161 These hybrids also exhibited significant desirable SCA effects for days to maturity, number of capsules per plant. In addition to above, hybrids, RL 15582 x RL 15583 exhibited highest significant SCA effects in positive direction for oil content followed by Meera x RL13161 and Padmani x KBA 4. These hybrids also exhibited significant desirable SCA effects for other related traits, indicating potential for exploiting hybrid vigour for seed yield and oil content in breeding programme to throw higher frequency of desirable segregants to develop high yielding linseed varieties.

Keywords: Combining ability, seed yield, GCA, SCA, linseed

Journal of Plant Development Sciences Vol. 15(9)

MACARANGA PELTATA (ROXB.) MULL. ARG. – A NEW HOST PLANT FOR ERI SILKWORM

Ravi Kumara R*.

Department of Sericulture Science, University of Mysore, Mysuru-570006, India
Email: ravisilkstar5@gmail.com

Received-05.09.2023, Revised-18.09.2023, Accepted-28.09.2023

Abstract: Eri silkworm (*Samia ricini* Donovan) is a domesticated and most exploited non-mulberry silkworm in India. It is polyphagous in nature and feeds on over 30 species of host plants, although Castor and Kessaru are the most important host plants. An attempt was made to rear the Eri silkworm with the leaves of the non-host plant *Macaranga peltata* (Euphorbiaceae), which is an abundantly occurring early successional woody species in the Western Ghats region of Karnataka. The Eri silkworm completed its life cycle from egg to adult within 66 days (five generations). The larval growth and development and the cocoons economic characteristics were found to be normal as Castor leaves fed worms. The average fecundity (377 ± 4.36 nos), hatchability ($83.23 \pm 1.81\%$), mature larval weight (6.45 ± 1.16 g), pupal weight ($2.40 \pm 1.01\%$ g), cocoon weight (2.88 ± 0.12 g), shell weight (0.43 ± 0.31 g) and shell percentage ($12.54 \pm 0.77\%$) showed that *Macaranga peltata* is a potential new host host to Eri silkworm for commercial rearing.

Keywords: Eri silkworm, Ericulture, Host plant