



**NATIONAL YOUTH SCIENCE CONFERENCE FOR
SUSTAINABLE DEVELOPMENT**

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Scientific Abstracts

TamilNadu Scientific Research Organisation
Pudukkottai, TamilNadu

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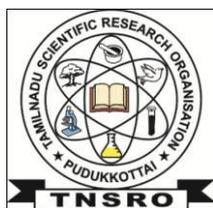
TamilNadu Scientific Research Organisation

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NYSCSD 2020

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PREFACE

Science, technology, and innovation have instrumental and intrinsic value for society. They are key drivers of economic performance and social well-being. But they are also important for deeper reasons: a scientific temper, with its spirit of enquiry, the primacy accorded to facts and evidence, the ability to challenge the status quo, the adherence to norms of discourse and the elevation of doubt and openness. Innovations in science and technology are integral to the long-term growth and dynamism of any nation. The pursuit of science also creates a spirit of enquiry and discourse which are critical to modern, open, democratic societies. Historically, India can point to many contributions to global scientific knowledge and technological achievement. However, India under-spends on research and development (R&D), even relative to its level of development. A doubling of R&D spending is necessary and much of the increase should come from the private sector and universities.

India ranks third among the most attractive investment destinations for technology transactions in the world. Modern India has had a strong focus on science and technology, realising that it is a key element of economic growth. India is among the topmost countries in the world in the field of scientific research, positioned as one of the top five nations in the field of space exploration. The country has regularly undertaken space missions, including missions to the moon and the famed Polar Satellite Launch Vehicle (PSLV). India ranks 6th position for scientific publications and ranks at 10th for patents which included only resident applications. The total number of patent applications filed by scientists and inventors in India increased to 61,788 in FY19 (up to Dec 18) from 47,857 in FY18. India ranks 13th position at the Nature Index in 2017, based on counts of high-quality research outputs in natural sciences. India improved its rank on the Global Innovation Index for the second year consecutively. From being ranked at the 81st position in 2015, India improved its ranking to 66th in 2016 and further to 60th in 2017. The Government of India is extensively promoting research parks technology business incubators (TBIs) and (RPs) which would promote the innovative ideas till they become commercial ventures. India is world's third largest technology startup hub with incorporation of 1,000 new companies in 2017. The engineering R&D and product development market in India is forecasted to grow at a CAGR of 20.55 per cent to reach US\$ 45 billion by 2020 from US\$ 28 billion in FY18. India is aggressively working towards establishing itself as a leader in industrialisation and technological development. Significant developments in the nuclear energy sector are likely as India looks to expand its nuclear capacity. Moreover, nanotechnology is expected to transform the Indian pharmaceutical industry. The agriculture sector is also likely to undergo a major revamp, with the government investing heavily for the technology-driven Green Revolution. Government of India, through the Science, Technology and Innovation (STI) Policy-2013, among other things, aspires to position India among the world's top five scientific powers.

The sciences can provide this understanding through increased research into the underlying ecological processes and through the application of modern, effective and efficient tools that are now available, such as remote-sensing devices, robotic monitoring instruments and computing and modeling capabilities. The sciences are playing an important role in linking the fundamental significance of the Earth system as life support to appropriate strategies for development which build on its continued functioning. The sciences should continue to play an increasing role in providing for an improvement in the efficiency of resource utilization and in finding new development practices, resources, and alternatives. There is a need for the sciences constantly to reassess and promote less intensive trends in resource utilization, including less intensive utilization of energy in industry, agriculture, and transportation. Thus, the sciences are increasingly being understood as an essential component in the search for feasible pathways towards sustainable development.

This conference focuses on the role and the use of the sciences in supporting the prudent management of the sustainable development for the daily survival and future development of humanity (such as food and nutrition, Health and Medicare, Environment and Biodiversity, Energy security etc.). Scientists are improving their understanding in emerging areas such as climatic change, growth in rates of resource consumption, demographic trends, and environmental degradation.

The conference is mainly focused and disseminates information on **all Science disciplines in the observation day of National Science Day 2020.**

Theme: Science for Sustainable Development (Food, Health, Environment, Energy and Employment security)

It gives immense pleasure to note that our institution has got the Privilege to host this National Conference with the support of institutional assistance from the **Pushkaram College of Agricultural Sciences, Pudukkottai and GTN Arts college, Dindigul.**

The abstracts received show the overwhelming response and the importance of this conference. We hope that this National conference will inspire and guide the students and young faculty for their further research activities. The Student will have an opportunity to exchange their ideas and interact with the delegates to update their knowledge and blossoms out in the field of biotechnology entrepreneurship and innovation.

S. Vijikumar

Organising Chairman

Director, Tamil Nadu Scientific Research Organisation

Pudukkottai

About our Organisation

TamilNadu Scientific Research Organization (TNSRO) is a registered non-governmental voluntary organization under Indian trust act on 31.10.1997 by Dr.S.Vijikumar and his volunteers. The institution is working for the motto of application of science and technology for rural prosperity at Pudukkottai dist since 1997. Together with various organizations, we are organizing so many programmes related to the subjects among the rural target groups. We have successfully completed several Govt sponsored programmes and few programmes by our own contribution. Most of the awareness camps were held in remote villages at Arimalam block and Pudukkottai. Besides we are working to promote Health & Sanitation, Environmental conservation, Medicinal plants research, Biodiversity conservation, Science popularization, Knowledge revolution, Sustainable Agriculture and Rural Development, Disaster risk management, EDP training and Research. And also we are imparting national and international level observation days. Our formerly hon'ble president of India Dr.APJ.Abdul Kalam has appreciated our institution for the efforts and services on 2003.our organization has received Best Institution Award (2008 and 2010) for Biodiversity Conservation Activities from Regional resource agency, Ministry of Environment and Forests, Govt. of India and 2011 our organisation has got an State Prize Award for Environmental conservation and Education activities from Department of Environment, Govt of TamilNadu.

About our society

We are glad to inform you that Tamil Nadu Scientific Research Organization (TNSRO) is working for the promotion of society by transferring science & technology since 1997. We are very keen in appreciating and recognizing the contribution of every one of you. We are contributing our charter of Bose Science Society (BSS) for popularization and promotion of scientific research. Also the society was authorized by Vigyan Prasar, DST, Govt.of India, NewDelhi.Vide unique authorization no: V.2919001 since 1999.new number VP-TN0090/27.10.2017.

Our Bose Science Society (BSS) encourages the scientific community peoples such as research scholars, faculty members and students to do the research and training in training in their respective fields (All science fields). BSS motivates the Students and young researchers to publish and present their research work since 1999. Every year, Bose Science Society provides awards to the Best Researchers, Scientists and Students (for registered members) for their innovative research work.

Bose Science Society has two wings, for faculties (Professional Wing) and students (Students Wing). Our society has been organizing seminar, Conferences, Workshop, Training and Awareness programmes to the scientific community. All over the country, we have multidisciplinary faculties in all fields of science.

Applications are invited from students (UG & PG (all science disciplines)) to join as a member in Bose Science Society (Student's wing). You are requested to send your

application Along with the HoD / principal's forwarding letter to us by mail or post, our official mail ID: bsstnsro@gmail.com

Objectives of the Society

- To cultivate and promote General Science and its branches of science
- To disseminate the knowledge of Science and its applications, through meetings, trainings, camps, discussions and publications
- To promote conservation activities of natural resources.
- To foster high standards in the teaching and education of Science.
- To work in close other association with learned societies and organizations having similar objectives.
- To create public awareness about the importance of science and eradicate superstitions.
- To arrange students and scientist interaction programme.
- To conduct nature camps, sky watching, simple science projects from waste products, telescope making, origami, solid waste management etc.
- To carry out students' research and to perform all other acts, matters, and things that may assist in, or be conducive to, or be necessary for the fulfillment of objectives and purposes of the Society
- The Society has been organize seminars symposia, conferences, meeting etc. enable members of BSS and others to interact and disseminate knowledge on all field of science.
- To provide memberships, fellowships and awards to individuals for his scientific contributions in all science disciplines.
- To publish newsletters, books for popularization of the science.

Contact us

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TENTATIVE PROGRAMME SCHEDULE

Time	Programme	Facilitators
9.30 a.m	Registration	
9.45 a.m	Inaugural Ceremony	
	Inviting Guest on Stage	
	Lighting Kuthuvilakku	
	Thamizhthai vazhthu	By Students
	Welcome Address	Dr.K.Kumarasamy Academic Director & Adviser Pushkarakm College of Agriculture Sciences
	Thematic Introduction	Dr.S.Vijikumar Director,TNSRO &President ,Bose Science Society, Pudukkottai
	Felicitation address	Dr.E.S.Karthy Managing Director, AWE care Analytical & Research Laboratories, Erode.
		Mr.A.Gomathi Shankar Managing Director , Roland Foundation , Pudukkottai
		R.Vinodh Rajkumar Director – Prabhanjeet Fitness Research Institute OPC Pvt Ltd, Bangalore, K.A, India
	Special address	Dr.N.Varadarajulu Naidu Director of Research, Acharya N.G Ranga Agricultural University, Administrative Office, Lam, Guntur – 522 034, Andhra Pradesh, India
		Dr.G.Rama Rao Principal Scientist & Head, Dept of Crop Physiology, RARS Lam Guntur, ANGRAU,AP
		Dr.S.Alagumanian Head & Assistant Professor, PG & Research Department of Botany, H.H.The Rajah’s College, Pudukkottai, T.N
		Dr. P. Perumal Scientist (Senior Scale), Division of Animal Science, ICAR- Central Island Agricultural Research Institute,Port Blair, Andaman and Nicobar Islands, India.
		Dr.R.Rajkumar Senior Scientist, MSSRF, VRC, Pudukkottai
		Dr. Parimalan Rangan Scientist, Division of Genomic Resources, ICAR-NBPGR, PUSA, Campus,New Delhi

		Dr.P.Sivakumar Assistant Professor (Biotechnology) AC & RI,TNAU,Eachangkottai,Thanjavur, T.N
	Chairperson Presidential Address	Rtn.Dr.K.Rethinam MJF Chairman, Pushkarakm College of Agriculture Sciences
	Co Chairperson Address	Mr.R.Durai Director, Pushkarakm College of Agriculture Sciences
	Chief Guest and Inaugural Address	Professor Dr. Susai Rajendran Research Director, Corrosion Research Centre St. Antony's College of Arts and Sciences For Women, Thamarapadi, Dindigul
10.45 a.m	Tea Break	
11.00 a.m	Scientific Session I	By Participants
1.00 p.m	Lunch Break	
2.00 p.m	Scientific Session II	By Participants
3.00 p.m	<i>Bose Science Society 10th Annual Award Presentation and Valedictory Ceremony</i>	
	<i>Conference Report Presentation</i>	Secretary,Bose Science Society,Pudukkottai
	<i>Valedictory Address</i>	Dr. M. ANAND Assistant Professor, Department of Marine and Coastal Studies, School of Energy, Environment and Natural Resources, Madurai Kamaraj University, Madurai, -625021, Tamil Nadu, India.
	<i>Vote of Thanks</i>	Mr.K.Ramanathan Secretary,Bose Science Society,Pudukkottai
5.00 p.m	National Anthem	

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IN VITRO SCREENING OF RICE LAND RACES DERIVED CALLUS FOR NaCl STRESS TOLERANCE

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ABSTRACT

Rice is an important cereal that provides 50–80% of daily calorie intake for more than 3 billion people. Rice plants are sensitive to salt stress, particularly at the seedling and reproductive stages. In Asia, rice is grown in 136 million ha. Apart from biotic stresses causing reduction in rice production, abiotic stress *viz.*, soil salinity is one of the major environmental factor that leads to significant reduction in rice productivity worldwide, especially in irrigated lands. Many parts of the world are imposed with a salt environment due to various reasons. Hence, developing a genotype tolerant to these conditions plays a major role in the process of feeding the growing population. Nearly around one lakh hectare is affected by coastal salinity in Tamil Nadu (Roshniet *al.*, 2019). In Tamil Nadu, only few rice varieties were cultivated in salt affected soils in coastal and inland area, which was originally developed by Tamil Nadu Agricultural University. Tamil Nadu has rich resource of indigenous rice genotypes with abiotic stress tolerance, and several of them traditionally cultivated for a long period. The present study was conducted to *in vitro* screening of NaCl stress tolerance of traditional land races which are originally cultivated in different parts of Tamil Nadu. In this experiment, 25 land races were used for embryogenic callus induction in MS medium containing 2,4-D 3 mg/l and 0.1 mg/l Kinetin. The calli from well responded varieties were treated with different concentration of NaCl (1%, 2%, 3%, 4% and 5%). They were incubated and observed for callus growth and cell proliferation. Among the tested land races, Kuzhi Vedichan and Kallurnadai Kar are moderately tolerant to NaCl stress, while Poongar, Kochin samba and Kattuyannan are susceptible to NaCl stress under *in vitro* conditions.

Key words: Rice, grow, environment, variety, experiment.

PROMISSING SESAME GENOTYPES IN MULTILOCATION TRIAL

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Regional Agricultural Research Station

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ABSTRACT

Nine pre release sesame genotypes were evaluated under multilocation trial at Regional Agricultural Research Station , Tirupati during Kharif and Rabi 2018-19 against the check YLM 66 for their performance to seed yield and component traits. The pre release genotypes Viz; YLM 136, YLM 142, YLM 146 and YLM 147 have recorded significantly higher seed yield over the check YLM 66 in both the seasons. The genotypes YLM 139 and YLM 141 were found superior to YLM 66 only in Rabi season. All the high yielding genotypes also have recorded more number of capsules per plant. The high yielding genotypes may be further tested in on- farm trials for their consistency performance to seed yield before recommending them for general cultivation.

Key words: genotype, yield, plant, cultivation

INFLUENCE OF BIOPRIMING ON SEED QUALITY PARAMETERS OF COTTON***R. Sridevi, S. Indhuja, R. Jeyachandra, S. Nandhabalan and T. Srikrishna**Department of Agriculture, School of Agriculture and Biosciences,
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ABSTRACT

Studies were carried out in cotton seeds to identify suitable biopriming treatment for enhancing germination and vigour of cotton, to evaluate the physiological changes in bioprimed seeds and to evaluate the biochemical changes in bioprimed seeds of cotton. To identify suitable seed priming technique, seed to solution ratio and duration of priming was standardised. The standardization of seed priming technique revealed that the invigorative effect and imbibition rate of cotton was higher with seed to solution ratio of 1:2. Among the soaking durations, the imbibition rate and physiological seed quality characters were superior with 8 h of soaking followed by drying back to original moisture content. Cotton seeds were primed with various priming agents *viz.*, water, biofertilizer *Phosphobacteria* and biocontrol agent *Pseudomonas fluorescens* 2, 4 and 6 %. Among the priming treatments, seeds primed with *Pseudomonas fluorescens* 6 % outperformed other treatments by recording earlier germination, higher germination percent, longest root and shoot length, maximum dry matter production and vigour index. Based on the results of standardization experiment the best two treatments *viz.*, seed priming with *Pseudomonas fluorescens* 6 % and *Phosphobacteria* 6 % along with hydroprimed and non primed seeds were evaluated for physiological and biochemical changes. Physiological seed quality characters along with seed metabolic efficiency and biochemical changes of α -amylase content and dehydrogenase activity were higher in seed priming with *Pseudomonas fluorescens* 6 % compared to non primed seeds.

Key words: bioprimed, seed, biofertilizer, *Pseudomonas fluorescens*, germination

**NEW NOVEL CHEMICAL AND BIOLOGICAL METHOD OF CHITOSAN
EXTRACTION FROM FRESH WATER CRABS AND PRAWN SHELL WASTE
USING GULF OF MANNAR MARINE WATER**

Dr. Mamangam Subaraja

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ABSTRACT

Chitosan is a polysaccharide and non-toxic in nature. Nowadays it has innumerable in use like food, biomedicine, pharmaceutical processes, agricultural etc; this promotes excellent biological properties such as biodegradation in human body, anti bacterial and personal care product to the environment sector. These new methods propose both biological and chemical methods for fast, easy, low cost, laboratory scale production. Efficient chitosan (CS) is extracted from the process of crustacean of shell. Which are involved in three steps are demineralization (DM), deproteinization(DP) and decolonization(DC). This innovative technology involves isolation, purification and standardization of the production and process of chitosan from crustacean shells from Gulf of Mannar marine water. In addition, Biotechnological process in organic acid producing bacteria from Gulf of Mannar marine sediment water in a short-time. The characterizations of Cs were done by IR, Raman, XRD and UV, ssNMR, SEM and element analysis. The contents like moisture, ash, protein, fat, minerals were calculated from Curd crustacean shell and yield of CS was 22% of the dried shell weight. The enzymatic and chemical technologies were proposed from fresh water crabs and prawn shell waste by using sea water into chitosan product in commercial values and it could be minimizing the degeneration of Neuro-2a (N2a) cells.

Key words: Neuro-2a (N2a) cells, degeneration, chitosan, fresh water crabs and prawn shell

**IMMUNO-PROTECTIVE MECHANISM OF CINNAMALDEHYDE AGAINST
APHANOMYCES INVADANS IN *CHANNA STRIATUS*****Ramasamy Harikrishnan^{1*}, Gunapathy Devi², Elumalai Gokul³**¹Department of Zoology, Pachaiyappa's College for Men, Kanchipuram 631 501, T.N, India.²Department of Zoology, Nehru Memorial College, Puthanampatti 621 007, Tamil Nadu, India.³Department of Animal Science, Bharathidasan University, Tiruchirapalli, 620 024, Tamil Nadu, India.

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ABSTRACT

Cinnamaldehyde (CM) is one of major natural bio-active constituents present in the bark and essential oil of cinnamon trees which is commonly used in the food industry for its strong anti-bacterial, anti-oxidant, anti-fungal, anti-ulcer, anti-diabetic, anti-inflammatory, and immune stimulant properties. In the present study, investigate dietary CM enrichment to involve innate immune system and modulation of cytokine genes in *Channa striatus* against *Aphanomyces invadans*. The white blood cells (WBC), total protein (TP), albumin (AB), and globulin (GB) levels, complement or SOD activity, and lymphokine production in serum were significant in un-challenged and challenged groups when fed with 5 mg kg⁻¹ of CM diet after 4th week while other CM doses diet only after 6th week. The lysozyme activity was significant in both groups fed with all doses of CM diets whereas phagocytic activity significant in both groups fed with 5 mg kg⁻¹CM diet after 6th week. The IgM production was start in both groups fed with 5 mg kg⁻¹CM diet on 2nd week while 5 and 10 mg kg⁻¹ CM doses diets start on 4th week. The CXCR3 α expression was significant in both groups fed with 10 mg kg⁻¹and healthy group fed with 15 mg kg⁻¹ diet on 4th week. The C1qC expression was significant in both groups fed with 10 and 15 mg kg⁻¹diets while the MHC-I expression in all diets on 6th week. These results suggested that the innate immunity and cytokine genes expression were significantly modulate in *C. striatus* fed with when 5 mg kg⁻¹ of CM diet earlier than with other doses diets against *A. invadans* infection.

Keywords: *Aphanomyces invadans*; *Channa striatus*; Cinnamaldehyde; Cytokine genes; Innate immune response

FLAXSEED OIL MODULATES ENDOCRINOLOGICAL PROFILES AND SCROTAL BIOMETRIC ATTRIBUTES IN MITHUN

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ABSTRACT

Mithun (*Bos frontalis*) is a unique domestic free range bovine species of North Eastern Hilly (NEH) regions of India. Effect of feed supplementation of Flaxseed oil (FSO) on endocrinological profiles & scrotal and testicular biometrics in different seasons was studied in mithun. The experimental animals were divided into two groups, Gr I: Control (n=3) and Gr II: Treatment (n=3; Flaxseed oil @ 150 mL/ day). FSO was supplemented through oral drench in the morning hours just before concentrate feeding. Endocrinological profiles such as follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone, cortisol and thyroxin and scrotal circumference (SC) & testicular biometrics were measured in both groups in different seasons. Blood FSH, LH, testosterone and thyroxin concentration were significantly ($p < 0.05$) increased and cortisol concentration was significantly ($p < 0.05$) decreased in FSO supplemented group than in unsupplemented control group. Similarly, SC and testicular biometrics were increased significantly ($p < 0.05$) in supplemented than unsupplemented group for different seasons and significantly ($p < 0.05$) higher in winter and spring than in summer season in the experimental groups. It can be concluded from the study that supplementation of FSO can effectively be utilized to improve the scrotal and testicular attributes and endocrinological profiles and fertility status of the mithun bull.

Key words: Mithun, endocrinological, animals, hormone

SLOW RELEASE EXOGENOUS MELATONIN ON SEXUAL BEHAVIOUR SCORES AND ANTIOXIDANT AND OXIDATIVE STRESS PROFILES IN MITHUN BULLS

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ABSTRACT

A study was designed to assess the effect of slow release subcutaneous exogenous melatonin (MT) implant on sexual behaviour scores, antioxidant and oxidative stress profiles in mithun in different seasons. Experimental animals were divided into two groups, Gr I: Control (n=6) and Gr II: Treatment (n=6; MT implant @ 18mg/50 kg B. Wt). Seasons were grouped into winter, spring, summer and autumn based on temperature humidity index and sunshine hours. Antioxidants such as total antioxidant, catalase, glutathione, glutathione reductase and superoxide dismutase and oxidative profile (malondialdehyde; MDA) were estimated during different seasons for MT treated and control groups. Results revealed that sexual behaviour scores and antioxidant profiles were significantly higher and oxidative profile was significantly lower in MT treated than in untreated control group. Similarly antioxidant profiles were significantly higher and oxidative profile was significantly lower in spring & winter than in summer season. Sexual behaviour scores were significantly higher in spring & winter than in summer season. It can be concluded from the study that slow-release exogenous melatonin implantation and spring and winter seasons has significantly ($p < 0.05$) greater beneficial effects on improvement of the antioxidant profiles, minimization of oxidative stress in mithun bulls.

Key words: mithun, behaviour, antioxidants, season.

PLANTS: ELECTRICITY GENERATOR

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ABSTRACT

In a recent era of modernity, a lot of trends have been set in Science and Technology. Progress towards green and autonomous energy sources includes harnessing living system and biological tissues. Sustainable energy sources, which are pollution free and environment friendly, are one of the key challenges of world's future society. For that number of emerging trends has been established but they are specific in their nature to fix the emerging or previous issues. Electricity generates green by plants via photosynthesis associated with electrochemically active micro-organisms converts' metabolic energy by CO₂, proton and electrons. Recently discovered that the cuticle-cellular tissue bi-layer in higher plant leaves functions as integrated tribo-electric generator conductor couple capable of converting mechanical stimuli into electricity. Electricity generates by a biomimetic tree having small strips of specialized plastic inside the leaf stalks release an electrical charge when bent by moving air. Such processes are known as piezoelectric effects. Artificial plants containing piezoelectric elements may harvest wind energy sufficient to contribute to a carbon-neutral energy economy. In this way, day and night electricity can sustainably be produced from biomass without harvesting the plant. Furthermore, the systems' concept is principally clean, renewable and sustainable. These technologies might be implemented in several ways, ranging from local small scale electricity providers to large scale electricity wetlands & islands, high-tech electricity & food supplying greenhouses and novel bio-refineries.

Keywords: Trees, electricity, tribo-electric, biomimetic, piezoelectric and electrochemically

ROLE OF FRUIT CROPS IN HUMAN HEALTH AND FOOD SECURITY

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ABSTRACT

India ranked second in fruit production after china. Due to varied climatic conditions from north to south and east to west almost all tropical, sub tropical and temperate fruits crops under cultivation. Fruits are also called protective food because it has rich source of vitamins, minerals, proteins and carbohydrates etc, According to Indian Council of Medical Research, New Delhi, 75-100 gm per capita per day consumption is essential for balanced diet. At present due to huge population of country the required quantity are not consumed by countrymen due to this malnutrition and adverse effect on human health is seen especially in tribal belt of the country and due to lack of vitamins and other nutrients there is increased in diseases like night blindness, scurvey. to overcome from this major human health and food security there is only one solution is to grow more fruits organically for better healthy and wealthy India.

Key words: Fruits, human health, food security, malnutrition

DESIGN AND DEVELOPMENT OF PHYTOCHEMICAL DATABASE OF INDIAN MEDICINAL PLANTS

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ABSTRACT

The traditionally used medicinal plants used in Ayurveda are a rich source of biologically active phytochemicals. Such phytochemicals can be used by pharmaceutical industry for development of drug with relatively less side effects. This study presents IMPDB database with curated bioactive phytochemicals from medicinal plants of Ayurveda to support the discovery of novel pharmacologically active compounds. The database expected to facilitate rapid Computer Aided Drug Designing with ready to use phytochemical for various diseases based on the ancient knowledge of Ayurveda. The web retrieval system of the IMPDB facilitate retrieval of phytochemical based on disease of interest and phytochemicals from traditionally used medicinal plants along with their molecular properties Toxicity, ADMET, Ligand efficiency properties and 3D visualization of phytochemicals can be obtained. Drug filter added to the web retrieval system facilitate virtual screening of phytochemicals based on RO5. Further the 3D structure of phytochemicals can be downloaded in SDF, MOL and PDB format for further CADD works.

Database URL: <http://www.impdb.org.in/index.php>

Keywords: Database, Phytochemical, Medicinal Plants, Ayurveda

INFLUENCE OF SILICON SOLUBILIZERS ON BLAST TOLERANCE IN RICE (*Oryza sativa* L.)

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ABSTRACT

An present investigation entitled “Influence of silicon solubilizers on blast tolerance, growth, development and yield in Rice (*Oryza sativa* L) Genotypes” was conducted at DRR farm (Indian Institute of Rice Research), Rajendra nagar, Hyderabad, Telangana conducted in two parts Viz ; Experiment I was laid out during *Kharif* 2014 and 2015 in split plot design and replicated thrice with three main treatments control (T₀), silixol @ 0.2% (T₁), imidazole @ 0.05 % (T₂) and eight sub treatments DRRH 3 (V₁), PA 6129 (V₂), PA 6201 (V₃), PA 6444 (V₄), PHB 71 (V₅), BPT 5204 (V₆), CO 39 (V₇) and HR 12 (V₈). Experiment II on artificial blast screening nursery experiment was conducted in *Rabi* 2014-2015, using blast susceptible genotype HR 12. Blast disease pressure was created by artificial inoculation. Pre infectinal and post infectinal spray of silicon solubilizers along with carbendazim were imposed.

Highest incidence of blast disease in the field experiment (Experiment I) was observed in control which was 29.63 % followed by silixol @ 0.2 % treatment (23.61 %). The least Percentage disease index (PDI) was recorded in Imidazole treatment @ 0.05% (23.15 %). Among the genotypes HR 12 recorded highest PDI followed by CO 39 during both years of testing and lowest PDI was recorded for PA 6129, PHB 71 and PA 6201. Results of experiment II indicated that both the post infectinal and pre infectinal spray of different dosages of silicon solubilizers on HR 12 showed least PDI in carbendazim @ 0.2 % followed by silixol treatment @0.5 % and Imidazole @ 0.2 % treatment and highest PDI observed in control. Increased dosage of silicon solubilizers decreased the PDI for blast.

Key words: silicon, rice, treatment, pressure, blast

STUDY ON CORROSION RESISTANCE PERFORMANCE OF LESSER GALANGAL EXTRACT ON MILD STEEL IN 1M HCL SOLUTION

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ABSTRACT

In this study, the inhibition behaviour of leaves of Lesser Galangal Extract (LGE) on Mild steel Corrosion in 1M HCl solution were studied by Weight loss method, Potentiodynamic Polarization Study, Electrochemical Impedance Spectroscopy (EIS), FT-IR Spectroscopy, Scanning Electron Microscopy. The results of weight loss method show that the Inhibition Efficiency is increased when the LGE concentration is increased. Potentiodynamic Polarization Study showed that the LGE act as a mixed-type of inhibitor. However, in the presence of LGE, EIS parameters such as the charge transfer resistance (R_{ct}) is increased and the double layer capacitance (C_{dl}) value is decreased, indicating that protective film is formed on the metal surface. The analysis of FT-IR and SEM also supported the formation of protective film over the metal surface. Based on the results obtained, a suitable mechanism of corrosion inhibition is presented.

Keywords: Lesser Galangal Extract (LGE), Mild steel, 1M HCl solution, Weight loss method.

IMPACTS OF FARMERS TRAINING ON QUALITY SEED PRODUCTION IN PULSES AND DEMONSTRATION OF PERFORMANCE ON LATEST RELEASED BLACK GRAM VARIETIES IN CAUVERY DELTA ZONE

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ABSTRACT

Blackgram is predominantly cultivated pulse crop in India, particularly in Tamil Nadu where black gram is an integral part of everyday dishes. The traditional variety of blackgram is reported to be highly susceptible to yellow mosaic virus which is transmitted by white fly. From National Pulses Research Centre, Vamban blackgram varieties viz., Vamban 4, Vamban 6 and Vamban 8 were evolved and released which were resistant to Yellow Mosaic Virus (YMV) in the recent past and for recent rice fallow suitable variety is ADT6 from Tamil Nadu Rice Research Institute, Aduthurai, and KKM1 from Agricultural College and Research Institute, Killikulam. Cauvery delta districts such as Thanjavur, Thiruvarur and Nagapattinam were chosen as target area for the training to promote and popularize cultivation of the newly released varieties of blackgram among the farmers so as to enable them to realize the benefits of new varieties on account of higher productivity and more nutrients. This training was sponsored by Tamil Nadu State Council for Science and Technology (TNSCST). The objective of the training is to improve the farmers' capacity to produce, process, and store and use good blackgram seed and was conducted for three days. This was imparted with fifty participants (forty farmers and farmer-groups, seven unemployed youth and three farm women) with eight number of technical sessions, two field trips, two hand on training (Seed treatment & hard seed removal) and eight demonstrations. Most of the farmers attended the trainings were formed farmer's cluster and produce quality seeds for their own use and two of the unemployed youth started up their own entrepreneurship in seed company.

Key words: Blackgram, pulse, TNSCST, Vamban, farmer, YMV

BIOENERGY FOR THE BETTER TOMORROW

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ABSTRACT

Energy obtain from biological sources is called bioenergy. The sources of bioenergy are biomass present in plants and microorganisms. Bioenergy is utilized in the form of Biofuel, Biogas, and Biodiesel that are major requirements for today. Production of bioenergy may enhanced by cultivation of petroplants, NANOCLEAN, r-DNA technology applications and photobioreactor

Key words: bioenergy, biomass, plants, microorganisms

IMPACT OF CLIMATIC FACTORS IN INDIAN AGRICULTURAL GDP

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ABSTRACT

The total market value of final goods and services produced in a country during a year is called gross domestic product. The present study gives an overall picture about the Indian Agricultural GDP. This study assumes the Indian agricultural gross domestic was fully influenced by the climate factors. This study reveals that, the agricultural gross domestic product (agricultural production and productivity) may influenced by the climatic factors. Timely sowing, drought resistance crops, judicious nutrient and farm management leads to increasing agricultural production.

Key words: Climate, product, agricultural, management

SYMPATHOVAGAL IMBALANCE IN PREHYPERTENSION

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ABSTRACT

Hypertension is one of the leading causes for premature death, globally. It increases the risk of cardiovascular diseases. Individuals with Prehypertension (Pre HTN) are apparently healthy individuals with increased blood pressure. Autonomic function tests will help us to know the extent of autonomic neural dysfunction and help to plan early interventions. To evaluate autonomic function test using Heart rate variability (HRV) and QTc among pre HTN and normal individuals. This cross sectional study was conducted as part of the health check up program carried on all the students studying at Sri Manakula Vinayagar Institution. 558 students were recruited and divided into two groups: Normal and pre HTN. Linear and non-linear analysis of HRV and QTc were evaluated and compared. All time and frequency domain measures showed significant difference among the two groups. The time domain measures namely; mean RR, SDNN, RMSSD, pNN50 and frequency domain measures namely; TP and HF (nu) reported a significant decrease and frequency domain measures LF (nu) and LF/HF ratio reported a significant increase in the preHTN group compared to normal. QTc was significantly increased in pre HTN group but within the normal limits. Autonomic function assessment with HRV and QTc are simple discernible tools to detect the early autonomic changes, making them potential prognostic and diagnostic markers. Targeting at the precursor stage where drug therapy is not recommended, would be of great boon to the society to retard or inhibit the development of HTN.

Key words: Pre hypertension, Autonomic Function, QTc

RELEVANCE OF INEXPENSIVE NON-INVASIVE DIAGNOSTIC TOOLS FOR AN EQUITABLE PUBLIC HEALTH

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There has been no scarcity for theoretical frameworks to curb health disparities or to deliver efficient public health. Yet, it is possible to see people differing quite a lot in their health-seeking behavior. In one end of spectrum, sports men and women tirelessly work for an additional few centimeters of increase in their jump or to reduce their sprinting time to just few milliseconds to create a world record. In the other end of the spectrum, large number of non-athletic individuals have no clue or have no time to examine if their path to seek health or health restoration is ideal or not. Non-athletic groups are aimlessly engaging in supervised or non-supervised exercises without even generating minimum essential baseline fitness data about their body composition, joint flexibility, muscular strength, posture and cardiorespiratory endurance to objectively measure the outcomes of their exercise participation. During fitness evaluations using anthropometry, irrecoverable amount of thigh muscle atrophy was repeatedly found in many individuals who underwent surgical repair of knee (especially Anterior Cruciate Ligament repair) and all those individuals admitted that they were never informed about this challenging post-operative complication at the hospital. Substandard physical efficiency of individuals who were declared as clinical normal (normal blood pressure, normal blood glucose level) and athletic level efficiency of individuals who were declared as clinically abnormal (Hypertensive, Diabetic) are not uncommon findings in fitness evaluations. Surprisingly, we can find individuals in the society who have been consuming medicines for a disorder for several decades that was diagnosed long ago and they never had visited the same Physician or any other Physicians for subsequent consultations to know the current status of that disorder. Unilateral reliance on resting state physiologic values without testing the functional capabilities of individuals has become an intimidating medical or health-seeking philosophy. Quite obviously, the biomechanical dysfunctions linked to aged adults could be seen among the individuals during the early adulthood or even during childhood also. Quackery in the field of health and fitness remains tenacious. Endless quantities of information regarding solutions for medical ailments are existing, to an extent people get confused in opting the best or avail all at the same time or even disregard the advice of the most experienced health care specialist. Very often, by the time people realize the incorrect choices they had made before meeting the most experienced health care professional, various parameters of their health would have deteriorated to an almost irreversible condition. To overcome all these challenges, we need to examine the overlooked fundamentals like anthropometry with suitable empirical evidences to understand their scopes to deliver legitimate and equitable public health.

Key words: Public health, Non-invasive diagnosis, Anthropometry, Kinanthropometry, Goniometry, Somatotype, Body composition, Health disparity, Human Development Index, Compression of Morbidity.

AN ORALLY ADMINISTERED MICROENCAPSULATED UREASE-ZIRCONIUM PHOSPHATE SYSTEM FOR THE REMOVAL OF UREA IN UREMIA

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Diabetes is the most common cause of Kidney failure, also called end-stage renal disease (ESRD). It is the last stage of chronic kidney disease. During which the kidneys fail, it means they have stopped working well enough to survive without dialysis or a kidney transplant. In worldwide, approximately half a million patients are being supported by haemodialysis. Dialysis is the conventional treatment for chronic renal failure. It is complicated, expensive and time consuming and thus alternate treatments have long been sought. A urea removal system is the only step required to complete this approach. The potential of combining a microencapsulated enzyme urease with zirconium phosphate oral sorbent to remove urea in uremia. Urease converts urea to ammonium ions which are then adsorbed on to zirconium phosphate. This combination would be most effective in the intestinal tract. The capacity of zirconium phosphate is probably not enough to effect the removal of enough urea to completely replace dialysis in patients with no renal function. However, this system could potentially delay the onset of dialysis therapy in patients who still have some renal function, either alone or in combination with haemoperfusion ultrafiltration, or reduce dialysis treatment times. The immobilized urease purified from the seeds of *Cajanus Cajan L.* and *Glycine max* shown to be superior on several counts, and hence is useful and finds a wider application in the field of therapeutics and diagnostics involving estimation and removal of urea.

Keywords: Renal failure, Urease, Zirconium Phosphate, microencapsulation

DISTRIBUTION OF ACTINOMYCETES IN VARIOUS AGROECOSYSTEMS

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Actinomycetes are filamentous Gram positive bacteria, characterized by a complex life cycle and widely distributed in both terrestrial and aquatic ecosystems, mainly in soil, where they play an essential role in decomposing complex mixtures of polymers in dead plants, animals and fungal materials. They are less dominant than bacteria and more predominant than fungi. Their number varies widely in different soil types and ranges from 10^8 cfu g⁻¹ to 10^5 cfu g⁻¹. Therefore, evaluation of their distribution is important in understanding their ecological role. Soil samples were taken from different soil ecosystems (Wet land, rain-fed and irrigated garden land) of Tamilnadu. The number of actinomycetes as well as pH value and organic carbon (OC) varied with soil ecosystems. The population of actinomycetes decreased from 3.2×10^6 cfu g⁻¹ in irrigated garden land soil to 8×10^5 cfu g⁻¹ and 4×10^5 cfu g⁻¹ in rain-fed and wet land soil respectively. The population of actinomycetes was negatively correlated with pH but it was significantly dependent ($p < 0.05$) on soil organic carbon and soil moisture conditions. A significantly higher population was observed under irrigated garden land conditions compared to other soil ecosystems.

Keywords: Actinomycetes, rain-fed, ecosystem, organic carbon

HAZARDS DUE TO DEFICIENCY OF ESSENTIAL MINERALS IN BOTTLED DRINKING WATER

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ABSTRACT

Water is the Elixir of Life. Water is an Universal solvent. Water is the most precious of all resources in the Earth. In order to avoid polluted water, people drink bottled water. There are chemical contaminants too in Bottled Drinking water. Materials used in filtering and processing may contribute asbestos. The Organic compounds such as toluene, cyclohexane, dichloromethane, pentane, benzene, phthalate esters, and others with tumor inducing properties may leach from plastic packaging, polystyrene cap liners, or unknown sources. From the results it is found that the calcium level is alarmingly low in all the six bottled mineral waters taken for analysis. The result further testifies that the diseases such as Osteoporosis, Cancer, Heart disease, Allergies, Chronic arthritis, Headache, Common Cold/ Flu, Infections, Infertility, Low P^H, Acidic saliva/ urine etc are caused by the deficiency of calcium in the bottled mineral water. This paper has focused mainly on the ill effects on the human body due to the low level presence of calcium in the bottled mineral water. It is concluded that the calcium levels present in all the six samples was found to be very low and will lead to many health hazards to human beings.

Key Words: Hazards, Minerals, Pollution, Calcium

SEED QUALITY UPGRADATION TECHNIQUES IN PROSO MILLET**K. P. Ragupathi***, **K. Sujatha ****, **V. Paramasivam**** and **A. Sabir Ahamed*****Ph.D Scholar, **Professor, Department of Seed Science and Technology
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ABSTRACT

A successful crop production relies on the use of good quality seeds which can improve the yield by 20 percent. Proso millet is one of the most widely cultivated minor millet owing to its high nutritional value, earliness and better yielding character so it is called as “Crop for poor or Famine food”. Seed production under variable environmental conditions may result in differences in seed size, weight and density, which ultimately affect the germination as well as subsequent plant vigour and production. Seed size and seed density is one of the important factors deciding the seed quality. Post-harvest management techniques like grading can homogenize the seed lot resulting in uniform germination with higher planting value. Determination of optimum sieve size is important for getting better quality seeds. The present study was focused to identify the effect of size grading and density grading in proso millet cv. CO (PV) 5. The pre-cleaned seeds were size graded with BSS 10x10, 12x12 and 14x14 square wire mesh sieves. The seeds retained in each sieves were subjected to various seed quality parameters estimation along with the control. Among the different experiments, size grading of proso millet seeds with BSS 12 x 12 wire mesh sieve registered the maximum seed recovery (72.4 %) of good quality seeds with 1000 seed weight (4.83 g). The seed quality parameters *viz.*, germination (94 %), root length (14.03 cm) and shoot length (11.67 cm) and dry matter production (0.045 g/10 seedlings) and vigour index (2416) were also maximum with BSS 12 x 12 wire mesh sieve. In density grading by specific gravity separator the grade I, grade II and rejects were obtained and among that grade I seeds registered the maximum seed recovery (79.4 %) of good quality seeds with higher 1000 seed weight (5.13 g). The seed quality parameters *viz.*, germination (92 %), root length (14.01 cm) and shoot length (11.48 cm) and dry matter production (0.042 g/10 seedlings) and vigour index (2346) were also maximum in grade I seeds.

Keywords: Famine food, BSS, Grading, Wire mesh sieve, Specific gravity separator

MICROBIAL BIOPLASTICS FOR CLEANER ENVIRONMENT

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ABSTRACT

The microbial bioplastics are truly biodegradable plastics, which can be completely biodegraded within a period of 1 year. These bioplastics are produced from different groups of Polyhydroxyalkanoates (PHAs) viz., polyhydroxy butyric acid (PHB) and polyhydroxybutyrate, polyhydroxyvalerate (PHV), poly-3-hydroxybutyrate-co-valerate (PHBV). These PHA based plastics are having the physical and chemical properties very similar to conventional plastics made from polyesters, polyethylene and polypropylene. These bioplastics can be used in a wide range of applications like food packaging, medical implants and agriculture. In the presence of excessive carbon sources, several natural microorganisms such as *Alcaligenes* spp., *Pseudomonas* spp. and a number of filamentous genera viz., *Nocardia* spp. produce PHA granules intercellularly as 80% of their body weight through fermentation. The *phaC* gene is responsible for the synthesis and accumulation of PHA in microorganisms. The PHA polymer is purified by breaking of the cell wall and then harvested through an aqueous based extraction method with organic solvents. After that, the PHA biopolymer is purified and converted into the form of lattices for plastic manufacturing. Through genetic engineering, scientists developed several genetically modified plants for producing PHA from the *phaC* gene. Switchgrass, *Panicum virgatum*, has used as a host received for producing PHA through genetic engineering (McLaughlin and Kszos, 2005). Later, scientists developed genetically modified maize for producing PHA and the plants also being cultivated effectively as a crop of plastic. Recently, a European-based bioscience engineering company, Metabolix®, has successfully launched a biobased PHA production program through optimization of multi-gene expression techniques in crops like switchgrass, camelina and sugarcane (Bernard, 2014).

Key words: bioplastics, PHA, PHB, PHV, polymer, microorganisms, gene

MULBERRY SILKWORM COCOON TRAITS AS INFLUNCED BY *Bm*NPV INFECTION

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ABSTRACT

Silkworm is an economically important insect and is reared for silk cocoons. The diseases in silkworm are the major constraint in silk cocoon production as the diseases cause mortality in silkworm. Since they cause substantial financial loss to the industry and the farming community of the country, their prevention and control assumes utmost importance. Silkworms are affected by various types of diseases caused by protozoa, fungi, bacteria and viruses. Among the disease, viral diseases of silkworm pose a serious problem in sericulture industry which needs to be checked to the maximum possible level. Therefore, an effort was made systematically to screen different improved breeds and hybrids of mulberry silkworms for cocoon traits to *Bm*NPV infection. The effective rate of rearing was significantly maximum in breed PM × CSR₂ (62.50 %), which was on par with that of MH1 × CSR₂ (61.11 %)). Similarly, the effective rate of rearing varied from 88.00 per cent in breed CSR₂ × CSR₄ to 93.00 per cent in PM × CSR₂ of uninfected batches. Among the viral dilutions, the effective rate of rearing differed significantly in improved breeds and hybrids. The effective rate of rearing was significantly maximum in control batch (90.16 %) followed by 10⁻⁶ PIBs (40.76 %) and 10⁻³ PIBs concentration (37.04 %). The cocoon, pupal and shell weights were found to be non-significant except shell ratio in improved breeds and hybrids of silkworm. The shell ratio was significantly maximum in breed CSR₂ (22.64%). It was significantly minimum in breed PM × CSR₂ (18.60%). Among the PIBs concentrations tested, the cocoon (1.30 g), shell (0.271g) and pupal weights (0.92 g) and shell ratio (20.64%) were significantly maximum at viral dilution of 10⁻⁶ PIBs followed by 10⁻³ PIBs (1.17g, 0.216g, 0.86g, 18.60 per cent, respectively) compared to the control (1.75g, 0.39g, 1.29g and 22.03 per cent, respectively). Among the interactions, the cocoon, shell and pupal weights and shell ratio were found to be non-significant.

Key words: Silkworm, diseases, protozoa, fungi, bacteria, viruses, hybrid

THE EFFECT OF ORGANIC AMENDMENTS AND IRRIGATION WATER ON CHEMICAL PROPERTIES OF SOIL

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ABSTRACT

The use of wastewater for irrigation is increasingly being considered as a technical solution to minimize soil degradation and to restore nutrient contents of soils. The present investigation studies the effects of biomanure and vermicompost at different rates of addition and with two irrigation waters. The aim was to quantify potential improvements in soil quality. A study was conducted to use the treated paperboard mill effluent and well water in combination with amendments, *viz.*, Biomanure (BM), Vermicompost (VC), Farmyard manure (FYM) and Fly ash (FA) to assess their impact on exchangeable cations in soils. The results revealed that the treatment combination biomanure @ 5 t ha⁻¹ + vermicompost @ 3.5 t ha⁻¹ + fly ash @ 5 t ha⁻¹ + 100 % NPK along with effluent irrigation increased the soil exchangeable cations *viz.*, exchangeable calcium, exchangeable magnesium and exchangeable potassium. The treated wastewater irrigation is expected to gain increased importance, requiring careful considerations involving the adequate balance between nutritional inputs via irrigation and optimal plant productivity requirements.

Keywords: Treated paperboard mill effluent, amendments, soil exchangeable cations

ASSESSMENT OF ANTIOXIDANT ACTIVITY OF CAROTENOID PIGMENT FROM YEAST AND ITS COMMERCIAL EXPLOITATION.**Manimala. M. R.A* and Murugesan. R**

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Corresponding Author E-mail: maniararchana20@gmail.com**ABSTRACT**

Natural pigments have great interest with in the market now a day's particularly microbial pigments. The various microorganisms such as *Micrococcus*, *Bacillus*, *Rhodotorula*, *Monascus*, *Phaffia*, *Sarcina* and *Achromobacter* have the capability to produce different pigments. These pigments have number of beneficial properties like anti-cancerous, immunosuppressive, antibiotic, anti-proliferative, potent antimicrobial agents, and bio-degradability. Microbial pigments have broad area of application mainly in food, dairy, printing, textile and pharmaceutical industries etc. In the present study antioxidant assays *viz.*, Nitric oxide radical scavenging activity, Lipid peroxidation activity, and Chelating ability on ferrous ions assays were carried out with the carotenoid pigment extracted from yeast *Rhodotorula mucilaginosa*. The maximum antioxidation characteristics of carotenoid by Nitric oxide radical scavenging activity, Lipid peroxidation activity, and Chelating ability on ferrous (58.44, 37.15, and 59.73%, respectively) were achieved by the pigmentation of *Rhodotorula mucilaginosa* at the concentration of 100 μ gml⁻¹.

Key words: Natural pigment, Antioxidant potential, Yeast, *Rhodotorula* sp.

MANAGEMENT OF BHENDI POWDERY MILDEW BY *ERYSIPHE CICHORACEARUM* DC THROUGH BIOTIC AND ABIOTIC APPROACHES

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ABSTRACT

A pot culture experiment was conducted with the effective biotic and abiotic agents to find out its efficacy against powdery mildew pathogen (*E.cichoracearum*). Incidence of powdery mildew was recorded at weekly interval up to four week after spraying. Results revealed that all the biotic and abiotic agents exerted their significant effect individually and in combination the mean PDI data clearly indicated its efficacy by recording the PDI of 11.37 to 22.56. Among the seven treatments, four foliar application of PF (CBE1)P combined with FA(5%) and NC(5%) at weekly interval significantly reduced the disease incidence. The same treatment on 4th week was recorded PDI of 16.62 which accounted maximum per cent disease reduction of 83.73. This was followed by PF(CBE1)P+FA(5%) which recorded 82.70 per cent disease reduction over control. Distilled water spraying in control recorded heavy incidence of powdery mildew fungus from first week onwards (35.85 PDI) and reached its maximum level on 4th week after spraying (PDI 85.05). The results revealed that the foliar application of biotic and abiotic agents combination (PFCBE3) + FA(5%) +NCE(5%)) was effective in reducing the powdery mildew of bhendi.

Keywords: Powderymildew, *Pseudomonas fluorescens*, Flyash,

INFLUENCE OF G × E INTERACTION ON GRAIN YIELD AND RELATED TRAITS IN MAIZE HYBRIDS

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ABSTRACT

The performance of genotypes often diverges in response to production environments represented by temporal (year-to-year) and spatial (location-to location) variation resulting in significant crossover genotype × year and genotype × location interactions. Crop varieties or cultivars should perform consistently across years, referred to as stability and across locations referred to as adaptability from the commercial crop production point of view. However, cultivars show inconsistent performance across the environments due to cross over genotype × environment interaction (GEI). Hence, it is important to identify stable cultivars with consistent performance across environments. Genotype environment interaction provides an opportunity to select the stable cultivar. A field experiment was conducted to identify high yielding and stable maize hybrid(s). The experimental material consisted of eight single cross hybrids (selected out of 380 single cross hybrids based on average performance over two locations during 2015-16 *Kharif*), evaluated along with seven checks (three public bred and four private bred checks) at three locations *viz.*, UAS, GKVK, Bangalore, Agricultural Research Station (ARS), Bheemaranaganudi and farmer's field at Kudupali village, Hirekerur Taluk, Haveri district of Karnataka during *rabi* 2016. The observations were recorded on 11 quantitative characters. The Additive Main Effects Multiplicative Interaction (AMMI) analysis of variance revealed that all quantitative traits were significantly affected by hybrid, location and hybrid × location (GLI) interaction. Based on the polygon view of the GGE bi-plot, the hybrids MAI 349×MAI 283 for days to anthesis, MAI 283×KDMI 16 for anthesis silking interval and KDMI 16×BGUDI 118 for grain yield per plant were found to have wider adaptation across the locations. Based on AMMI Stability Value (ASV) hybrids MAI 349×MAI 283 and BGUDI 120×VL 109252 were identified with least ASV for days to anthesis, days to silking and anthesis-silking interval, respectively. The hybrid MAI 349 × MAI 283 for cob length; MAI 283 × KDMI 16 for cob circumference; BGUDI 88 × MAI 349 for kernel rows ear⁻¹; MAI 349 × MAI 283 for plant height; MAI 394 × BGUDI 88 for shelling *per cent* and BGUDI 120 × VL 109252 for 100 grain weight were identified as widely adaptable across the locations. Based yield stability values, hybrids MAI 349×MAI 283 and BGUDI 120×VL 109252 for flowering characters, MAI 349 × MAI 283 for ear length, ear circumference and plant height and BGUDI 88 ×MAI 349 and MAI 283×KDMI 16 for kernel rows ear⁻¹ and kernels row⁻¹ were identified as widely adapted to all the three locations. The hybrids MAI 394× BGUDI 88 for shelling *per cent* , KDMI 16 × MAI 283 for 100 grain weight and grain yield were identified as widely adapted across the locations. Among the three production environments, location ARS, Bheemaranaganudi was found favourable for the expression of grain yield and most of its component traits.

Key words: environment, genotype, hybrid, field, experiment, location, plant.

CHARACTERIZATION OF INTESTINAL BACTERIA OF FRESH WATER FISH (ROGU) AND IT'S ROLE ON GROWTH

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ABSTRACT

The present study deals with the characterization, digestive enzyme productivity and antibacterial activity of intestinal bacteria of Rogu. Pure colonies were isolated from the intestinal content of Rogu was characterized morphologically and biochemically using the Berge's manual of Determinative bacteriology. The isolated and identified intestinal bacteria was *Escherichia coli sp.*, (RB1), *Pseudomonas sp.*, (RB2), *Vibrio sp.*, (RB3), *Proteous sp.*, (RB4), *Streptococcus sp.*, (RB5). The isolated intestinal bacteria were subjected for its efficacy to produce digestive enzymes like amylase, cellulase, lipase, and protease were studied using selective media. The intestinal bacteria of *Proteous sp.*, (RB4) was higher enzyme productivity and other was lower productivity. The antibacterial activity of intestinal bacteria was higher zone of inhibition was *Proteous sp.*, (RB4) with compare to the commercial antibiotic of Gentamycin. Based on the results the *Proteous sp.*, (RB4) was higher enzymatic productivity and higher inhibition of antibacterial activity of intestinal bacteria in Rogu. The presence of this organism in the intestinal flora of the fish enhance the probiotic nature and helps in the nutritional benefits of fish.

Keywords : Characterization, Enzymatic Productivity, Antibacterial activity, Intestinal Bacteria and Rogu.

MARINE MICROBES: SUSTAINABLE DEVELOPMENT AND CHALLENGES

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ABSTRACT

Recent scenario, exploring of novel and versatile microbes such as bacteria, fungi, actinomycetes, viruses, mycoplasma, and protozoans are very much important in development of modern human society for food, drugs, textiles, agriculture, and environment. Especially, marine microbes serves a unique properties because they have to adapt to extreme marine environment condition such as high or low temperature, alkaline or acidic water, high pressure and limited substrate in the deep-sea water. These distinctive characteristics have attracted many researchers to explore in depth since there is the potential of marine microorganisms used in industry. Furthermore, microorganisms and their enzyme system are responsible for the degradation of various organic matters. In addition, these microbes are extensively used to design and develop new potentially useful therapeutic agents. However, in depth study is needed to overcome the challenges faced by researchers in order to explore and exploit the marine reservoir.

Keywords: Marine microbes; properties; industry application; therapeutic agent.

A REVIEW ON RECENT PEST OUTBREAKS IN INDIA**Yandava Swarupa*, M. Krishnaveni. M¹and S. Gyathri¹**

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ABSTRACT

Invasive insect pests are exotic organisms that occur outside their natural adapted habitat and dispersal potential. Invasive insect pest is one which becomes established in natural or seminatural ecosystems or habitat, and threatens native biological diversity. Maderiamealybug *Phenacoccus madeirensis* Green (Hemiptera: Pseudococcidae) was first collected from *Cestrum nocturnum* during the 2012 in Karnataka later severe infestation was recorded for the first time on cotton crop Bandipur National park, Karnataka. Jack Beardsley Mealybug, *Pseudococcus jack beardsleyi* Gimpel (Hemiptera: Pseudococcidae) was recorded on Papaya at Tamil Nadu (Erode) may 2012. The tomato pinworm, *Tuta absoluta* Meyrick (Lepidoptera: Gelechiidae) was recorded for the first time on tomato at the IIHR, Bengaluru, Karnataka, India during the rabi season of 2014. In Tamil Nadu (Polalchi) and Kerala (Palakkad) Rugose Spiralling Whitefly (RSW) *Aleurodicus rugioperculatus* Martin (Hemiptera: Aleyrodidae) was reported during July-August 2016 on coconut. The Fall Armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith, Lepidoptera: Noctuidae), has been detected for the first time on the Indian in mid-May 2018 in maize fields at the College of Agriculture, University of Agricultural and Horticultural Sciences (UAHS), Shivamogga, Karnataka. Desert locust, *Schistocerca gregaria* Forsskal (Orthoptera: Acrididae) have affected 3.6 lakh hectares of crops across ten districts of Rajasthan showed devastating outbreak in the year Dec 2019. In this regard this paper will discuss about the detailed information of pests and their nature of damage.

Keywords: Maderia mealy bug, Rugose Spiralling white fly, Fall army worm, Desert locust.

GREEN SYNTHESIS OF SILVER NANO PARTICLES USING *COUROUPITA GUIANENSIS* LEAF EXTRACT AND ITS CHARACTERIZATION

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ABSTRACT

The Green synthesis of silver nanoparticles using *Couroupita Guianensis* leaf extract. For the synthesis of silver nanoparticles (SNPs) using the 10ml of leaf extract of *Couroupita Guianensis* as a dropping agent from 1 mm silver nitrate (AgNO₃) has been investigated. The Silver nanoparticles were synthesized within 24 hours of incubation period and synthesized SNPs showed an absorption peak at more or less 200-600 nm in the UV-visible spectrum. The FTIR spectrum analysis has confirmed the presence of functional groups of stabilizer *Couroupita Guianensis* leaves extract in capping the silver nanoparticles the morphological study of Silver nanoparticles using (SEM, TEM) suggests that the nanoparticles are globular in shape with a diameter more than 50-100nm. This simple without any hazardous chemicals as dropping agent and economical to synthesized SNPs.

Key words: Green synthesis, *Couroupita Guianensis* leaves, silver nitrate (AgNO₃).

INFLUENCE OF MORPHO-PHYSIOLOGICAL CHARACTERS AND YIELD OF RABI SORGHUM (*SORGHUM BICOLOR* (L.) MOENCH) GENOTYPES UNDER MOISTURE STRESS LATE SOWN CONDITION

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ABSTRACT

A field experiment on Sorghum was conducted to assess variation for morpho-physiological characters and grain yield ha⁻¹ during *rabi* 2015-16 and 2016-17 at research farm of Sorghum research unite, Dr. PDKV, Akola. The experiment was laid out in randomise block design, replicated thrice, with thirteen sorghum genotypes including three checks. Analysis revealed wide variation for morpho-physiological characters and grain yield ha⁻¹. Significant variations were found in all the traits among the sorghum genotypes studied. Based on the performance the genotypes CSV-26R exhibited high mean pooled values followed by CSV-29R and M 35-1 for plant height. Whereas, in terms of leaf area, total dry matter, relative water content, canopy temperature depression, SPAD value, stomatal frequency and grain yield ha⁻¹ genotypes CSV-29R and E-19 noted significantly highest value when compared with best check M 35-1 and other genotypes under stress condition. Finally these research findings would certainly contribute food security in Maharashtra state.

Keywords: *Rabi* sorghum, moisture stress, late sown, morphological characters, physiological characters and seed yield ha⁻¹.

TALINUM PANICULATUM EXTRACT AS A GREEN CORROSION INHIBITOR FOR CARBON STEEL IN SEA WATER

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ABSTRACT

Talinum Paniculatum Extract (TP) on the corrosion of carbon steel in sea water was investigated using potentiodynamic, AC impedance study, weight loss technique. Weight loss study reveals that the formulation consisting of 300 ppm of TalinumPaniculatumExtract (TP) and 15 ppm of Zn^{2+} gives 95% inhibition efficiency to carbon steel immersed in sea water. The results of Polarization study reveals that this system functions as a mixed type of inhibitor. The AC impedance study reveals that a protective film formed on the metal surface. Scanning electron microscopy (SEM) observation, confirmed the existence of inhibitor molecules on the metal surface. FTIR spectra reveals that the protective film consists of Fe^{2+} -TP and $Zn(OH)_2$ complex.

Keywords: Talinum Paniculatum Extract, sea water, AC impedance study.

DNA PROFILING OF THE SHORT- HORNED GRASSHOPPERS

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ABSTRACT

Insects represent a major life form on earth. Insects comprise the largest species composition in the entire animal kingdom and possess a vast undiscovered genetic diversity and gene pool that can be better explored using molecular marker techniques. Grasshoppers are insects grouped under the sub order Caeliera, order Orthoptera. Grasshoppers have antennae that are generally shorter than their body and short ovipositors. Grasshoppers have pinchers that cut and tear off food. Grasshoppers, one of the most familiar insects in the world, total about 12,800 species worldwide. At least 10 families of grasshoppers are recognized worldwide. Grasshoppers survive in diverse habitats that include the tundra, the alpine zones of mountains, coniferous and temperate deciduous forests, dry and wet tropical forest, aquatic vegetation floating on lakes, meadows, grasslands, savannas and deserts. DNA sequences based phylogenetic reconstruction is a fast growing field that enriched by different algorithm based approaches. Phylogenetic analysis of sequence depends on having a reliable alignment of the sequences. Molecular information is used in terms of character or distance based methods, which form the two basic approaches in molecular phylogenies. In distance based methods, a matrix of pair wise distances is computed between Operational Taxonomic Units and their sequence differences. Evolutionary distances are fundamental for the study of molecular evolution and are useful for phylogenetic reconstructions. The sequence data analysis using computational methods provides interactive phylogenetic trees and evolutionary distances matrices to infer congruent phylogeny. Molecular information based phylogenetic relationships among the short-horned grasshoppers –Acridids have little been studied using DNA sequences.

Keywords: Grasshoppers, Different algorithm based approaches, Operational Taxonomic Units and their sequence, Phylogenetic analysis,

MORPHOLOGICAL CHARACTERIZATION OF ROSELLE GENOTYPES (*Hibiscus Sabdariffa* L.)

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ABSTRACT

Sixty roselle (*Hibiscus sabdariffa* L.) germplasm consisting 45 indigenous, 14 exotic and four released varieties has been utilized for studying morphological characterization at three locations viz., Agricultural Research Station, Ragolu, Srikakulam district, Andhra Pradesh, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal and Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar, West Bengal during *khari*, 2013 & 2014. The data on eighteen morphological traits viz., stem pigmentation, nature of stem, leaf shape, leaf vein colour, leaf margin pigmentation, number of leaf lobes, leaf angle, petiole colour, nature of petiole, calyx pigmentation, type of calyx, nature of calyx, petal colour; petal eye spot, staminal column colour, pollen colour, stigma colour and pod shape were recorded by visual, touch and feel assessment. Based on stem pigmentation, these germplasm can be grouped into pink, nodal pink and green; pink, edges pink and green for petiole colour; smooth, hairy and bristled for nature of stem and petiole; fully and partially lobed for leaf shape; pink and green for leaf vein and leaf margin pigmentation; three and five lobed for number of leaf lobes; pink, sparsely pink and green for calyx pigmentation; fleshy and normal type of calyx; yellow and yellowish pink for petal colour; red and white for petal eye spot; red and white for staminal column colour; yellow and brown for pollen colour; dark red and light green for stigma colour; and round and oval for pod shape. From utilization point of view, this crop can be broadly divided into two groups i.e. leafy vegetable and fibre purpose. The germplasm with partially lobed leaf and short in stature are being used for leafy vegetable and preparation of pickles. Within the leafy vegetable types, fleshy calyces were noticed which are used for preparing natural dyes, jam, jellies, pickles etc. Fibre purpose germplasm are taller in nature and mostly fully lobed leaves.

Key words: *Hibiscus sabdariffa*, Morphological characterization, Roselle

SCIENCE AND SPIRITUALITY THEME FOR SHIRDI SAINT SAIBABA'S CENTENNIAL

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ABSTRACT

Today Science is developing at tremendous pace in all fields. The prominent among them are Information technology, Communication technology, Space technology, Biotechnology etc. So which were once upon a time termed as “**miracle**” now they become common phenomenon. Scientific thoughts by scientists reveal the science of secrets of miracles. These miracles like communicating anybody of any point of time, moving in space, recovering from diseases which were considered earlier as incurable are achieved through certain instruments or gadgets like mobile, computer, space vehicle etc. So Human mind is so engrossed in physical world that what he thinks or what he sees is only fact and there is no creation beyond this. This is called Limited Consciousness, because their consciousness is limited by physical things only. The activities of various personalities in Hindu Scriptures like Rama, Krishna, in Christianity Lord Jesus and in Islam many prophets and Fakir could not be understood at that time so we called them “miracle” and afterwards we started worshipping them. The net result is that nobody attempted to unravel the truth behind activities of all these great miraculous personalities in all religions. When truth hidden so conflicts surfaces and innumerable religion, community, gurus, temples came into existence. Spirituality means search for truth only. Spirituality is Pure Science, there is no place of blind belief in this. Blind belief creates all sorts of confusion and divides the creation whether sentient or insentient. So a scientist is a more spiritual personality than any so called spiritual guru in society as a scientist sacrifices his life after truth only. The Shri SaiBaba Sansthan Trust will combine Science and Spirituality with a series of key initiatives taken for the benefit of several lakhs of pilgrims from all over the world for the Centennial. Among these would a Unique project to harness the “Foot Energy” of over 50,000 pilgrims who visit the Sai Baba Samadhi Temple daily, to convert it into power. This project also would include a Sai Planetarium, a Wax Museum with Statues of great Indian religious leaders and 50 great Indian National figures, a sky – gazing gallery with 25 Modern Telescopes and a Science Park.

RELATIVE RESISTANCE IN THRIPS *SCIRTOTHRIPS DORSALIS* TO CONVENTIONAL INSECTICIDES

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ABSTRACT

Chillies, *Capsicum annuum* L. the important and indispensable condiment as well as vegetable in every Indian household and an important commercial crop earning valuable foreign exchange for the country. The pungency in chilli is due to alkaloid capsaicin which has high medicinal value. The extracted capsaicin is used in pain balms and cosmetics. It prevents the heart diseases by dilating blood vessels (Thamburaj and Singh, 2001). India has emerged today as the foremost producer and exporter of chillies contributing to almost 1/4th of the world's production. In Andhra Pradesh, chilli is cultivated in an area of 1.89 lakh hectares with a production of 2.08 lakh tonnes. Guntur district in Andhra Pradesh alone contributes to over 35 per cent in area under chilli crop in India. Chilli accounts for 40 per cent of the total spices exported from India and 23 per cent in terms of value.

Chilli thrips, *Scirtothrips dorsalis* (Hood) (Thysanoptera : Thripidae) is a serious pest of *Capsicum annuum* L. in India, responsible for leaf curling (Ananthakrishnan, 1971). It multiplies appreciably at a faster rate during dry weather periods and the yield loss caused by the thrips is reported to range from 30-90 per cent (Borah, 1987 and Varadharajan, 1994). The excessive dependence on insecticides, their over use and abuse has accelerated insect control problems through development of insecticide resistance (Reddy *et al.*, 1992), pest resurgence, pesticide residues (Joia *et al.*, 2001), reduction in natural enemy population and environmental contamination. Moreover, several of the chilli consignments meant for export were rejected stating higher insecticide residues being the culprit, thus lots of foreign exchange was lost by way of rejections. In view of the above constraints in chilli cultivation, it is felt high time to estimate the current status of insecticide resistance so as to corroligate with field control problems besides evaluating newer insecticides with novel mode of action both under laboratory and field conditions so as to have better option on hand that could mitigate the present control failures and residue problems plausing the farming community.

**MOLECULAR CHARACTERIZATION OF INSECTICIDE RESISTANT
H.armigera (Hubner) IN SOUTH INDIA**

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ABSTRACT

Molecular characterization of the insecticide resistant larvae was done by cytochrome oxidase I (CO-I) primers. Based on the multiple nucleotide sequence alignment of cytochrome oxidase I (CO-I) region, the larval samples were divided in to three haplotypes. Haplotype I: A1 Cyper selected –MBNR; A2 Metho selected-MBNR; A3 Spino selected- MBNR; A4 Indo selected – MBNR and B1 Cyper selected –Raichur. Haplotype II: C1 Cyper selected- Nagpur; C2 Metho selected-Nagpur; C3 Spino selected- Nagpur; C4 Indo selected- Nagpur. Haplotype III: B2 Metho selected-Raichur; B3 Spino selected-Raichur and B4 Indoselected-Raichur.

DECOLOURIZATION OF TOXIC DYE BY ELECTROCHEMICAL METHOD

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ABSTRACT

The removal of reactive (Toxic) dyes from effluents by electro coagulation has become an attractive method in recent years. This paper deals with the removal of the reactive textile dye Methylene Blue from an aqueous medium by the electro coagulation method using Platinised Titanium, Mild steel, Stainless steel, Copper and Aluminium steel electrodes. The effects of electrolyte concentration, initial pH, current density, electrode area, inter electrode distance, dye concentration, and treatment time on the decolourization efficiency have been investigated. The optical density of the dye solution was measured before and after electrolysis, and hence the decolourization efficiency (DE) was calculated. UV spectroscopy and Fluorescence spectra have been used to investigate the nature of dye before and after decolourization.

Key words: Electro coagulation, wastewater treatment, textile dye, Methylene Blue, decolourisation efficiency

MARINE BIOLOGY - A CHALLENGING CAREER

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ABSTRACT

In general, parents foremost career choice about their children is to venture in the field of Medicine and Engineering. Owing to poor placement records and enrollments outnumber the required manpower the choice of career as Doctor and Engineer had lost its past glory. In the wake of “Globalization” the job market is diverse and plenty of career choices are available for students. One of the interesting domains in science career is “Marine Biology”. Marine Biologist conducts scientific study of marine life, the organisms’ behaviors and interactions with the marine environment. The lecture will explore the career opportunities in marine biology with reference to avenues in universities and colleges, national and international organizations, private companies, marine related industries, nonprofit laboratories and self-employed. Marine Biology as a career is challenging in a sense that the field of specialization test one's ability and demand high analytical skills to work in the natural environment. Marine research gain importance in the recent decades as we continue to look to the oceans to help sustain our basic needs. The recent advances in technology combined with demand improved our ability to derive food, drinking water, energy harvest and utilization, waste disposal site, and transportation in marine environment.

EVALUATION OF IMPROVED MANAGEMENT PRACTICES FOR GREENGRAM UNDER IRRIGATED CONDITION

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ABSTRACT

Pulses are the important source of vegetable protein in the world. In India, pulses are cultivated in marginal land under rainfed conditions and only 15% of the area under pulses has assured irrigation. Although these crops are nutrient rich, they are cultivated under nutrient starved low soil fertility environments, and the average yield of most pulse crops in India is low (less than 1000kg ha⁻¹). The field experiment was conducted at National Pulses Research Centre, Vamban, Pudukkottai with the objectives to evaluate improved management practices for higher productivity and to study the feasibility of mechanized package of practices for greengram. The field experiments was conducted during *rabi* 2016 to 2018 with a variety VBN 2. The experiment results revealed that adoption of improved management practices, comprises of designer seed, sowing by seed cum fertilizer drill, combined with integrated nutrient management (bio-fertilizer @ 2 kg/ha each of *rhizobial* culture CRM 6, phosphobacteria and PGPR with 25 kg of FYM + RDF (25:50:25:20 kg NPK&S/ha) and TNAU MN mixture @ 5 kg/ha as EFYM (1:10 ratio of MN mixture & FYM) and integrated weed management practices (pendimethalin 30 EC + imazethapyr 2 EC - (ready mix) herbicide @ 1.0 kg a.i./ha at 3 DAS followed by one hand weeding at 30 DAS) found to be better crop establishment and management methods to augment the greengram productivity which recorded the mean grain yield of 982 kg ha⁻¹ and benefit cost ratio of 2.15 than the traditional methods practiced by the farmers.

Key words: Greengram, Designer seed treatment, improved management, yield, economics

EFFICACY OF NOVEL INSECTICIDE AND FUNGICIDE COMBINATIONS AGAINST MAJOR PESTS AND DISEASES OF RICE

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ABSTRACT

In Andhra Pradesh farmers are regularly going for 2-3 sprays in rice crop with mixed combinations of insecticides and fungicides. The present study was undertaken during *kharif* and *rabi* 2017 at Agricultural Research Station, Ragolu, Srikakulam district in North Coastal Zone of Andhra Pradesh with two novel insecticides and two recommended fungicides to find their efficacy as well as the compatibility. During *kharif*, highest reduction of BPH was observed in Triflumezopyrim 0.48ml/l + Hexaconazole 2.0ml/l and in Triflumezopyrim 0.48ml/l. Highest sheath blight reduction was observed in Hexaconazole 2.0ml/l followed by Spinetoram 6% w/v (5.66% w/w) + Methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75ml/l + Hexaconazole 2.0ml/l. and Tricyclazole 0.6g/l. Lowest neck blast was recorded in the treatment Tricyclazole 0.6g/l followed by Spinetoram 6% w/v (5.66% w/w) + Methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75ml/l + Tricyclazole 0.6g/l. Highest yield was observed in Triflumezopyrim 0.48ml/l + Tricyclazole 0.6g/l with 6.95 t./ha followed by Triflumezopyrim 0.48ml/l + Hexaconazole 2.0ml/l. During *rabi*, Spinetoram 6% w/v (5.66% w/w) + Methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75ml/l and its combination with Hexaconazole 2.0ml/l and Tricyclazole 0.6g/l significantly reduced the stem borer incidence as % dead hearts at vegetative stage and % white ears at preharvest stage. For leaf blast incidence, Tricyclazole 0.6g/l. and its combination with Triflumezopyrim 0.48ml/l and Spinetoram 6% w/v (5.66% w/w) + Methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75ml/l significantly reduced the incidence. For neck blast, Tricyclazole 0.6g/l significantly reduced the incidence. At preharvest stage Spinetoram 6% w/v (5.66% w/w) + Methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75ml/l significantly reduced the sheath rot incidence.

WOMEN AND RICE FARMING

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ABSTRACT

Rice is one of the world's main staple crops, with nearly 2.5 billion people depending on it as their main food. Rice farming is a major source of employment, especially for the poor, and about four-fifths of the world's rice production is grown by small-scale farmers in developing countries. Globally, rural women play an important role in both rice production and rice post-harvest activities. In rice farming, many tasks related to rice planting, weeding, harvesting and processing are the domain of women. Land preparation and irrigations are two which is predominantly done by men. Women participation in rice production varies by country, production systems, type of household (nuclear or extended), social and economic status, and availability of male family members. Women in Southeast Asia contribute 25–60% of the required labor; in South Asia it is as high as 60–80%. In Africa, 80% of Africa's food is grown by Africa's 100 million rural women. The participation of women in crop and natural resource management increases with poverty and environmental stresses (drought, submergence and problems soils). Economic development and technological response options affect women in different ways *i.e.*, depending on whether they are paid or unpaid laborers, migration of men to work in urban areas *etc.*, Hence, effective, sustainable rice production that provides food security to all people depends on gender roles being fully understood and considered in policy, planning, research and extension.

Key words: Women, Rice farming, Planting, Weeding, Harvesting, Processing

GRAIN C₄ PHOTOSYNTHESIS IN C₃ CROP PLANTS – WILL IT HELP SCALING-UP PRODUCTIVITY?

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ABSTRACT

Photosynthesis is one of the key physiological innovation, that uses light source to generate chemical energy and further to synthesize organic compounds, providing O₂ and organic compounds for survival. The conversion of light to chemical energy by chloroplasts are termed 'light reaction', and synthesis of organic compounds (photosynthates) from the chemical energy is called 'dark reaction' or carbon-fixation. The latter is grouped into seven types *viz.*, C₃, C₃-C₄ intermediate, C₄ (NADP-ME, NAD-ME, and PEPCK subtypes), CAM, C₄-like, C₃-CAM, and C₄-CAM, exhibiting obligate or inducible types, with varied efficiency. Using transcriptome approaches, our research team reported the discovery of grain specific C₄ photosynthesis in wheat, commonly considered as C₃ plant, without Kranz. This is accomplished through two cell layers – cross- and tube-cell layers – of grain's inner pericarp, we named *Bose* anatomy, honoring his earliest work on role of malic acid in *Hydrilla* sp., during summer for carbon fixation, and much later known to be single-cell C₄ type. Our recent finding identifies few of the C₄-specific gene copies being significantly differentially expressed in developing rice grains than in leaves (under communication). Understanding grain specific C₄ from evolutionary perspective in BOP clade, will help develop strategies to foresee C₄ photosynthesis in rice grains. This might open the avenues for envisioning C₄ photosynthesis in rice grains using advanced genetic engineering technology. Additionally, with available genome editing tools, it sounds possible to foresee the leaves of rice and wheat, accomplishing C₄ photosynthesis. How far these modifications help enhance productivity could be addressed once we have mutants of rice (for grains and leaves) and wheat (for leaves) accomplishing C₄ photosynthesis, as like the grains of wheat.

CROP ESTABLISHMENT TECHNIQUES AND RESIDUE MANAGEMENT PRACTICES ON THE PERFORMANCE OF SOYBEAN (*Glycine max*)—WHEAT (*Triticum aestivum*) CROPPING SYSTEM

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Soybean-wheat is the most emerging cropping system to diversify the existing unsustainable predominant rice-wheat in the Indo-Gangetic Plain Zone of India. Cultivation of soybean in *kharif* season (June-September) has a considerable potential due to congenial climate, while wheat in *rabi* season (October-April) has witnessed a phenomenal growth in the region. Besides including a legume (soybean) in sequence with a cereal crop (wheat), combined use of available crop residues along with conservation tillage may prove beneficial for long-term productivity and sustainability of the system. Our previous studies in the area of conservation agriculture involving conservation tillage, zero tillage etc in rice-wheat cropping system revealed that adopting the zero tillage will lead to significant saving in energy and inputs in crop production. Hence the study was conducted to assess the suitability of conservation tillage, vis-a-vis conventional tillage and crop establishment techniques, viz. bed planting vis-a-vis flat planting in the recently emerging soybean-wheat cropping system in the region. The growth attributes viz. plant height, dry matter production, leaf area index, crop growth rate and relative growth rate, yield attributes and yield were statistically similar for soybean as well as wheat under different continuous tillage and crop establishment techniques. However, the growth, yield attributes and yields were significantly influenced by residue management practices. The highest values were obtained when residues of both wheat and soybean were applied compared to application of single residue. The study revealed that the continuous zero tillage during *kharif* (soybean) and *rabi* (wheat) season either in flat or in bed system performed equally good with conventional tillage. The maximum system productivity (7.06 t/ha in first year and 8.4b t/ha in second year) was obtained with combined application of wheat + soybean residue. The maximum net returns of ₹45.88 and ₹63.73 thousands and B:C ratio of 1.35 and 2.08 were recorded in the system with ZT-Flat during first and second year respectively.

Keywords: Bed and flat planting, Residue, Continuous tillage, Soybean–wheat cropping system, System productivity

ENERGY DYNAMICS IN INTENSIVE DIVERSIFIED CROPPING SYSTEMS

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ABSTRACT

Field investigations were carried out in farmer field of Dharmapuri in Tamil Nadu to study the energy dynamics of intensive diversified cropping systems. Experiment was laid out in strip plot with four replications with five diversified intensive cropping systems in horizontal plot and five level of integrated nutrient management practices in vertical plot were accorded. Maize based cropping system utilized higher input energy with 63 GJ/ha during both the years. Higher output energy was registered in groundnut based intercropping system. Lower input and output energy were recorded in brinjal based intercropping system. With regard to nutrient management practices, higher input and energy output were registered in farmyard manure at 12.5 t/ha along with 100 per cent NPK fertilizer during both the years. Lower input and output energy were recorded in vermicompost at 7.5t/ha along with 50 per cent NPK fertilizer during both the years. Higher energy use efficiency and specific energy was recorded in oilseed based cropping system (24.13 and 4.34 MJ kg⁻¹) followed by cereal based cropping system. Among the nutrient management, higher specific energy was recorded in Farm Yard Manure applied at 12.5 t ha⁻¹ with 100 per cent NPK fertilizer plot.

Keywords: Energy, Cropping system, Nutrient Management and Sustainable

INFLUENCE OF WEED MANAGEMENT PRACTICES ON GROWTH AND YIELD ATTRIBUTES OF MESTA (*Hibiscus cannabinus* L.)

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ABSTRACT

Mesta (*Hibiscus cannabinus* L.) is an important commercial fibre crop next to cotton and jute. Mesta has proved as a major substitute for jute and is successfully being grown in Tropical and Sub Tropical regions of both the hemispheres. However, mesta is grown as intercrop in Tamil Nadu under intercropping situation. A uniform and optimum plant stand can exhibit its maximum yield potential only if it is properly nourished and managed thereafter. An effective weed management practice is necessary for higher crop production and better economic returns. Most effective and economic cultural practices for weed control in mesta crop are not clearly known to our farmers till date. Weeds are generally controlled by hoeing (hand weeding) and weeding and thinning operations involve about 50% or more of the labour cost. Therefore, it is proposed to study different weed control methods for managing weeds at different growth stages, so that it can be recommended to Mesta growing farmers. A field experiment was conducted at Tamil Nadu Rice Research Institute, Aduthurai to evaluate the suitable weed management practices on growth and yield of mesta during June 2018 – November 2018. The experiment was laid out in randomized block design and replicated thrice with treatment schedule viz., Pretilachlor @900 g/ha at 45 -48 hrs of sowing with irrigation + one hand weeding (15 DAE) (T₁), Quizalofop ethyl 10% @ 38 g/ha at 15 DAE + one hand weeding (30 DAE) (T₂), Quizalofop ethyl 5 EC 60 g + Ethoxysulfuron @100g/ha at 15 DAE (T₃), Quizalofop ethyl 5 EC 60 g + Ethoxysulfuron @ 50 g/ha at 15 DAE + one hand weeding (30 DAE) (T₄), Propaquizafop 10 EC @ 90 g/ha at 15 DAE + one hand weeding (30 DAE) (T₅), Pendimethalin 35% EC @ 525 g/ha (48 hours of sowing with irrigation or sufficient rain) + one hand weeding (15 DAE) (T₆), Nail weeder at 5 DAE + Quizalofop ethyl 5 EC 60 g at 25 DAE (T₇), Unweeded check (T₈) and Two hand weedings (HW)/Mechanical Weeding (nail weeder) at 15-20 DAE and 35-40 DAE (T₉). The experimental results revealed that growth and yield attributes of mesta such as plant height, basal diameter and fibre yield were significantly influenced by weed management treatments. Highest weed control efficiency was recorded with application of Pretilachlor 50% EC 900ml/ha at 45-48 hours of sowing with irrigation + one hand weeding (15 DAE) (85.72%) with higher fibre yield of 22.0 q/ha.

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING PLANT EXTRACTS**R. Surega* and B. Anita**

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ABSTRACT

Agricultural production is continuously reduced worldwide every year due to biotic stress including nematodes. Therefore millions of dollars have been invested in efforts to control the menace caused by the biotic stress. Various natural and artificial methods of control are being practiced for protecting plants from the damage caused by insects, plant disease causing organisms and phytonematodes. Among different methods used for plant pathogens control the use of pesticides is the most prevalent and common practice everywhere. An attempted was made for the green synthesis of silver nanoparticles using commonly available plants *viz.*, *Tridax procumbans*, *Euphorbia hirta* and *Azardirect aindica*. The plants yielding silver nanoparticles successfully were characterized and compared. It is concluded that the plant source of *T. procumbans* is most preferable for the synthesis of nanoparticles having smallest particle size with spherical shape, crystalline nature, stable silver elemental composition etc., In recent years, environmental hazards caused by excessive use of pesticides have been widely discussed. Therefore, the agricultural fields are searching for alternative measures against pesticides.

Keywords: Silver nanoparticles, green synthesis, *T. procumbans*, *E. hirta* and *A. indica*.

BETA CAROTENE IMPROVEMENT IN MAIZE LINES WITH THE INTROGRESSION OF *CRTRB 1* ALLELE THROUGH MARKER ASSISTED BACKCROSS BREEDING

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ABSTRACT

Maize is the third most important cereal after rice and wheat. Vitamin A deficiency is an important problem of maize consumers resulting in retarded growth and poor nutritional status of women and children. To overcome this hidden hunger, a genetic stock has to be developed with genotypes having high beta carotene content. In this study an attempt has been made to introgress an allele responsible for high beta carotene to elite maize inbred through marker assisted backcross breeding. In this MABB program CE 477 (donor parent) is used to transfer the high beta carotene trait to the elite inbred UMI 1200 (recurrent parent). The plants were screened with the gene specific marker *crtRB1* to select the positive plants in every backcross population and high beta carotene lines were isolated from BC₂F₂ population. The lines DBT1-1-1-17-5-5 (5.12µg/g), DBT1-1-1-17-5-14 (5.11µg/g) and DBT1-1-1-17-9-6 (5.36µg/g) were identified with high beta carotene and maximum recurrent parent genome.

Keywords: vitamin A deficiency, beta carotene, Marker Assisted Backcross Breeding

**REVIEW ARTICLE ON MATERIALS ANALYZED AND USED IN ENERGY
CONVERSION FOR SUSTAINABLE DEVELOPMENT**

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Statistical results show that more than 66% of energy loss is in the form of heat majorly from automobiles, factories and nuclear power plants. In today's world, waste heat is one of the most abundant untapped resources. We could convert waste heat into electricity through thermoelectric effect. The Thermoelectric generator is a device which converts the heat of kerosene lamp or stove into electricity. Research on materials for converting heat energy to electrical energy has been in thrust for over two decades. In the process of selection of a good, efficient material for thermoelectric applications one should keep in mind the description and criteria set by Slack. Bi₂Te₃ is the most studied thermoelectric material, whose ZT is 0.6 at 300K. ZT can be increased if thermal conductivity is decreased; this can be achieved by doping as suggested by Ioffe. Recently, half Heusler alloys are being studied because of their narrowband gap, tuneable Fermi energy level and high-power factor. In this review article, we have discussed about few materials which have been proved to be efficient material for converting wasted heat into electrical energy. If we could convert the wasted heat released by converting into electrical energy, we can control global warming and increase the production of electricity without much impact to the environment.

Key words: Thermoelectric effect, Fermi energy, electrical energy, global warming.

WEEDY RICE IN INDIAN AGRICULTURE AND MANAGEMENT STRATEGIES**Mude Ashok Naik* and Darthiya. M**Department of Agronomy, Tamil Nadu Agricultural University,
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ABSTRACT

Rice is the primary food source for over half the world's population. It is grown globally on around 153 M ha, 90 per cent of which is in Asia. Rice is traditionally cultivated in Asia through manual transplantation of seedlings into puddled soil. In recent years, questions about labor and water shortages have been posed in many areas along with the problem of rainfall instability in the climate change scenario (Mahajan *et al.*, 2013). While interest in the move to Direct Seeded Rice (DSR) has increased. In many areas DSR cultivation has a weedy rice problem. Weedy rice is one of the most common and noxious weeds found in habitats where rice is cultivated. It is a cluster of *Oryza morphotypes* widely distributed in more than 50 countries around the commercial rice fields. Weedy rice is variable in height, shape of panicle, size of grain, length of awn, flag leaf and period of growth. It is similar to cultivated rice, but has higher seed dormancy, longevity, lower seed shattering exposure and pericarp red pigmentation. Weedy rice can cause yield loss of 60 per cent under moderate infestation (15-20 weedy rice panicles m⁻²), 80 per cent under strong infestation (21-30 weedy rice panicles m⁻²), and 100 per cent under heavy infestation in India. Therefore weedy rice infestation in the field of farmers required immediate attention and management program aimed at local field level eradication followed by integrated management strategies. Integrated management strategies such as the use of clean seeds, sterile seed beds, preplant application of herbicides to avoid early emergence, and the use of wiper devices to selectively dry weedy rice panicles in standing crops to prevent soil seed banks from building up are viable technologies for controlling rice weeds that are difficult to control (Arya and Ameena, 2015).

INDIRECT ESTIMATION OF THE STEP LENGTH OF WALKING AND RUNNING ON THE TREADMILL

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ABSTRACT

Very important biomechanical variables of walking and running are step length and cadence (stride frequency) but they are not typically monitored by the treadmills. This study explains a simple method to estimate the step length of walking and running to maximize the scientific capabilities of Physiotherapists and Exercise professionals. 10 men and 7 women who have been undergoing supervised fitness training programs were selected for the biomechanical analysis of the relationship between cadence and step length of walking and running on the treadmill in the speeds ranging from 5 Km/h to 15 Km/h for men and 5 Km/h to 12 Km/h for women. Exercisers displayed different step length strategies to manage the speeds opted for the experiment. Additionally, when the same exercisers were allowed to exhibit their maximum running speed in the outdoor environment, a statistically significant difference was found because all of them faced mental constraints to explore or sustain their fastest running ability on the treadmill. Assessment of cadence and step lengths of the patients and exercisers looks indispensable. Visual counting method to calculate the cadence can be easily acquired through practice, usually accompanied by the development of the skill to compute the step lengths using formula method. Experts should continue exploring such feasible, non-invasive and cost-effective diagnostic procedures.

Key words: Treadmill, Cadence, Step length, Gait, Running, Sprinting.