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GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLE OF *THYMUS VULGARIS* L. LEAVES AND ITS ANTIBACTERIAL ACTIVITY

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Abstract: In the present study, the green method was used for the synthesis of zinc oxide nanoparticle from the dried leaves of *Thymus vulgaris* L. The synthesized ZnO NPs was characterized by UV-Vis spectrophotometer, XR Diffractometer, Scanning Electron Microscopy (SEM) and EDX (Energy Dispersive X-ray) spectrophotometer. The result suggests that the synthesized nanoparticles are crystalline in nature and in the nanorange. The average sizes of nanoparticle are 13.06 nm. The synthesized ZnO NPs was screened for the antibacterial activity against six pathogenic bacteria. Out of six bacterial strains tested, the ZnO NPs was found active against *Salmonella typhi*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Bacillus cereus* but it does not have shown activity against *E. coli* and *Enterococcus spp.*

Keywords: *Thymus vulgaris* L., ZnO NPs, Antibacterial activity

EFFECTS OF SALINITY ON MORPHOLOGICAL AND BIOCHEMICAL PARAMETERS OF *DALBERGIA SISSOO* AND *ACACIA NILOTICA* UNDER SALT STRESS

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Abstract: For the past hundreds of year's trees like *Dalbergia sissoo* (shisham), *Acacia nilotica* (Kikar), *Prosopis cinneraria* (Khejri) etc. have inhabited vast areas in the plains of Afghanistan, Pakistan, India, Nepal and Myanmar. These have also been widely used for afforestation in many parts of the country except in the very hot, cold and wet tracts. These have good atmospheric N₂ fixing ability, therefore, are extensively planted in social and agro-forestry programmes. In order to evaluate the effect of soil salinity, present investigation was conducted on two tree species i.e. *Dalbergia sissoo* Roxb. ex DC (Shisham) and *Acacia nilotica* (L.) Willd. ex Delile (Kikar) growing under field conditions in Hisar district during the year 2011-2012. It was noteworthy that overall decrease in leaf area due to salinity in *Dalbergia sissoo* was 11.36 % as compared *Acacia nilotica* where it was 9.81 %, indicating that overall sensitivity of *Dalbergia sissoo* to saline conditions was more vis-à-vis *Acacia nilotica*. In *Acacia nilotica* show that specific leaf weight was in the range of 9.53 to 10.96 mg/cm² in healthy trees which was higher i.e. 9.62 to 11.99 mg/cm² in trees growing under saline sites. The mean specific leaf weight was 10.31 mg/cm² under non-saline conditions which was significantly lower than 10.89 mg/cm² obtained under saline environment. *Acacia nilotica* tree leaves sampled from the saline sites showed total soluble salts in the higher range of 222.7 to 279.0 mg/g as compared 223.0 to 263.7 mg/g dry weight in trees growing under non-saline sites. The mean value of total soluble solids in *Acacia nilotica* also showed significant increase in non-saline conditions over saline site trees. Relative stress injury in case of *Dalbergia sissoo* was interestingly in the higher range of 52.1 to 60.2 % as compared to 39.8 to 39.9 % in trees growing under saline soils. Hence, the mechanism of salt tolerance is relatively better in *Acacia nilotica* than in *Dalbergia sissoo* as found from morpho-physiological and biochemical studies.

Keywords: *Acacia nilotica*, *Dalbergia sissoo*, Relative stress injury, Salinity, Total soluble sugar

Abbreviations: LA – Leaf area, SLW- Specific leaf weight, RSI – Relative stress injury and TSS – Total soluble sugar

IN VITRO EVALUATION OF RHIZOSPHERE MICROBIAL ANTAGONISTS AGAINST WILT PATHOGEN *FUSARIUM OXYSPORUM* IN CHILLI (*CAPSICUM ANNUUM* L.)

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Abstract: The indiscriminate use of highly hazardous chemical fungicides and pesticides in the process of disease management leading to serious threat to environment. Biological control represents a viable alternative to the use of chemical fungicides and it is considered to be a safe, effective and eco-friendly method for plant disease. The percent inhibition on the growth of the pathogen by the antagonist over control was calculated for every 24 hrs of inoculation up to seven days. The experimental data on 168 hr. of inoculation revealed that all the four rhizosphere antagonistic fungi inhibited the growth of the wilt pathogens at varying levels at a range of 16.19 to 84.14 per cent (Plate 1 and Table 1). Among which, RFA 2 showed the highest mycelial (84.14%) inhibition of pathogen followed by RFA 4 (75.84%) and RFA 1 (58.09%) where as among rhizospheric bacterial antagonists isolate RBA 1 which was identified as *B.subtilis* had shown highest inhibitory effect (64.14%) and out of two tested rhizospheric fluorescent pseudomonads RFP 1 has antagonistic effect against chilli wilt pathogen which inhibited 72.81 per cent of radial growth of the pathogen.

Keywords: Rhizospheric antagonists, Fusarium, Biocontrol, Chilli, Fluorescent pseudomonads

ASSESSMENT OF CHANGE IN LAND USE PATTERN OF KANTHALLOR PANCHAYATH, IDUKKI, KERALA

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Abstract: Kerala is highly vulnerable to climate change effects due to its high dependency of climate sensitive agriculture, fisheries, forest, and water resource and health sectors. Climate together with soil, natural resources, human resources and economic considerations, determines land use patterns. The present study examined the changes in cropping pattern in Kanthallor Panchayath from 2010-2018. The land use change over a period from 2010 to 2018 was tabulated from the available Land use maps by Kerala State Land Use Board and the land use map generated using Google Earth Pro by creating *kml* file. It was found that total forest area including all kinds of forest has been reduced from 77.28 sq.km to 72.61 sq.km. It can also be seen that the area under Eucalyptus has increased from 7.70 Km² to 9.96 Km². But the area under Sandal wood remains unchanged as there are legal restrictions and the entire area is under government control. There was a drastic increase in area under vegetables from 2.36Km² to 10.15Km² within a span of eight years which indicate that the main livelihood option is annual cool season vegetables and there is a good market support from the Agricultural Department. The traditional food grain crops cultivated in the panchayath were Rice, Wheat and Millets which were now replaced by vegetables and sugarcane.

Keywords: Kerala, Kanthallor panchayath, Land use pattern, Land use map

IN VITRO STUDIES ON EFFICACY OF VARIOUS BOTANICAL AGAINST COLLAR ROT OF TOMATO CAUSED BY *SCLEROTIUM ROLFSII* SACC. IN MANIPUR

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Abstract: *Sclerotium rolfsii* is a soil inhabitant, non-target, polyphagous, and a ubiquitous facultative parasite. Its geographic distribution, profuse mycelial growth, persistent sclerotia and large number of hosts attacked by it indicate that, economic losses are substantial every year due to infection. The present study was carried out to understand about the *in vitro* efficacy of various locally available plant extracts against collar rot pathogen. Three commonly available plant extracts were selected and three concentrations of each was evaluated. Percent inhibition was observed and recorded, it was ranged from 16 to 100% among various extracts under study. Cent percent inhibition had shown by *ocimum* at 5 and 10 % and onion at 10% as the best, whereas *Parthenium* at 2.5% had shown the least inhibition of 16.6%.

Keywords: *Sclerotium rolfsii*, Tomato, *Trichoderma*

INSECT- PESTS SUCCESSION, NATURAL ENEMIES AND THEIR CORRELATION WITH WEATHER PARAMETERS IN MUSTARD CROP

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Abstract: A field experiment was conducted at research station Ambikapur, (C.G.) during Rabi season, 2017-18 to assess the insect- pests succession in mustard crop and their natural enemies and its correlation with weather parameters. The incidence of Aphid and Flea beetle population commenced from 1st week of December with 1.32 aphid/ plant 5cm apical twig and 2.4 beetle/plant. The peak infestation of aphid occurred in 7th SMW which was favored by min. temp. of 11.6^oC and max. temp. of 24.3^oC with morning 91% and evening 44% humidity. Flea beetle was recorded attained its peak level of 15.8 beetle/plant/m² in 1st week of February (6th SMW) which was favoured by max. temp. 26.5^oC and min.temp.11.6^oC with morning 85% and evening 35% relative humidity. The Diamond back moth was observed 2nd week of December and saw fly was recorded from third week December and reached its peak activity 1.96 adult/plant in the 2nd week of February (7th SMW). Painted bug was observed 4th week of December with peak activity (3.8 bug/plant) 2nd week of February (7th SMW) which was favoured by max. temp. 24.3^oC and min. temp. 11.4^oC with morning 91% and evening 44% relative humidity. Bihar hairy caterpillar commenced from 2nd week of December in (50th SMW) and Semilooper commenced from 1st week of January in (1st SMW). While various natural enemies were found on mustard crop. The lady bird beetle (*Coccinella septempunctata*) and Syrphid fly found on mustard on 4th week of December to 2nd week of March. The *Diaretella rapae* was noticed on mustard crop on second week of January to first week of March.

Keywords: Aphid, Natural enemies, Weather parameters

YIELD GAP ANALYSIS IN COTTON PRODUCTION IN MAHARASHTRA: IMPLICATIONS FOR FARMERS' INCOME

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Abstract: Suggestive measures for bridging yield gap are an important means of enhancing farmers' income. This paper aims at analyzing the relationship between cotton farmers output and their socio-economic characteristics, estimation of yield gap and to identify the factors responsible for yield gap in the study area. The study adopted multistage sampling technique in selecting 120 cotton farmers in four villages from Kalmeshuwa and Saona blocks in Nagpur district, Maharashtra. Both primary and secondary data were used for the study. Primary data was collected with the aid of structured questionnaires administered to the cotton farmers and secondary data on potential yield in the research station, potential yield in the demonstration plot and recommended input usage was obtained from the Central Institute for Cotton Research, Nagpur (CICR). Frequencies, percentage and cross tabulation, yield gap index and multiple regression model were used for analyzing the data obtained. Results from cross tabulation indicated that gender, farm size and educational status of the respondents might not necessarily guarantee larger cotton output in the study area. Findings from yield gap analysis showed that yield gap I, yield gap II and total yield gap in the study area were 375kg/ha, 815.11kg/ha and 1190.11kg/ha respectively, implying that there is still scope for increasing actual farmers' yield and hence more farm income. Results from the multiple regression model revealed that educational status, farm size, seed rate gap and location of the farmers were the major factors responsible for yield gap in the study area. The study therefore suggested a need to sensitize farmers by relevant Government agencies on the unfavorable effects of excess input usage with a view to minimize yield gap in the study area.

Keywords: Yield gap, Potential yield, Demonstration plot

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KNOWLEDGE LEVEL OF FARMERS ABOUT MAIZE (*ZEA MAYS*) PRODUCTION TECHNOLOGY IN DURG DISTRICT OF CHHATTISGARH STATE

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Abstract: Knowledge about innovation may be an important factor affecting the adoption behavior of farmers. The farmers who have more knowledge about newly developed technology also have more level of adoption of technology compare than those who have low knowledge. Operationally knowledge was used in this study as actual knowledge of farmers regarding maize production technology. The present study was investigating the overall level of knowledge about maize (*Zea mays*) production technology of rice-maize grower families of Durg district of Chhattisgarh state. Data was collected from rice-maize grower families that were selected randomly from each selected 12 villages to make a sample size of 120 rice-maize farm families, with the help of pre-tested interview schedule. The result reveals that the maximum of the respondents (48.33%) had medium level of overall knowledge, followed by 29.17 per cent of them had high level of knowledge and 22.50 per cent of them had low level of overall knowledge knowledge about maize production technology.

Keywords: Knowledge, Maize Production, Technology, Rice-Maize, Cropping system

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SEASONAL INCIDENCE OF MAJOR INSECT PESTS IN LINSEED

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Abstract: A field trial was conducted at Rajmohini Devi Collage of Agriculture and Research station, Ambikapur during Rabi seasons of 2017-18 . The activity of major insect pest of linseed was noticed on Linseed crop during December 2017 to

February 2018. Linseed thrips was observed from first week of December to last week of February with peak population of thrips occurred in third week of January. Linseed bud fly was recorded from first week of January to last week of February with peak activity during last week of February. Jassids were noticed during the third week of December to second week of February with peak incidence during third week January. Red cotton bug was observed during last week of December to second week of February with the peak incidence during third week of January. The population of linseed caterpillar larvae remained active from third week of December to first week February, with the peak activity were recorded during the third week of January. Green stink bugs were noticed during second week of January to last week of January with peak incidence during third week of January. Various natural enemies lady bird beetle and predatory spider were found on linseed plant from third week of December to first week of February.

Keywords: *Linum usitatissimum*, Linseed, Insect pests