

INVITED ARTICLE

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Studies on Yield and Nutrient Uptake of *kharif* Popcorn (*Zea mays everta*) as Influenced by Different Levels of Fertilizer and Plant Density

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ABSTRACT

A field experiment was conducted during *Kharif* 2012 to study the different levels of fertilizer and planting pattern on yield and nutrient uptake of popcorn. The experiment was laid out in factorial randomized and replicated thrice. It consisted of three fertilizer levels viz., 75% RDF (90:45:30 Kg NPK ha⁻¹), 100% RDF (120:60:40 Kg NPK ha⁻¹) and 125% RDF (150:75:50 Kg NPK ha⁻¹) and four plant spacing levels viz., 60 x 15 cm², 60 x 20 cm², 75 x 15 cm² and 75 x 20 cm². The results indicated that highest LAI, LAD, drymatter accumulation per plant, chlorophyll SPAD readings, 1000 grain weight, grain yield and nutrient uptake with application 150:75:50 Kg NPK ha⁻¹ (125% RDF), while the lowest of all these parameters were recorded with 90:45:30 kg NPK ha⁻¹ (75% RDF). Among the different plat densities 75 x 20 cm² shows significantly higher LAI, LAD, drymatter accumulation per plant, chlorophyll SPAD readings, 1000 grain weight, grain yield and nutrient uptake over 60 x 15 cm².

Key words: *Fertilizer levels, Plant densities, Popcorn.*

Fortification of Zinc in Rice-Greengram Cropping System

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ABSTRACT

A field experiment was conducted during *kharif* and *rabi*, 2015-16 on clay loam soils of Regional Agricultural Research Station, Anakapalle study the effect of fortification of zinc in rice-greengram cropping system. The results revealed soil application of 50 kg ZnSO₄ ha⁻¹ along with foliar application of 0.2% ZnSO₄ at panicle emergence to *kharif* rice significantly enhanced the growth parameters, yield attributes and yield by 11.6 to 15.9 per cent as compared to no application of zinc. Similarly, foliar application of 0.2% ZnSO₄ to rice fallow greengram at flowering significantly improved the yield and quality of rice fallow greengram besides realizing higher net returns and hence application of Zinc to rice-greengram system the improved the productivity and quality of this cropping system.

Key words: *Net returns, Rice-fallow greengram, Yield, Zinc content.*

Effect of N, P and K Application on Yield and Nutrient Uptake of Machine Transplanted Rice

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ABSTRACT

A field experiment was conducted during *kharif* 2014 under canal irrigation at Andhra Pradesh Rice Research Institute & Regional Agricultural Research Station, Maruteru, West Godavari (Dist.) of Godavari agroclimatic zone, to study "Effect of N, P and K application on yield and nutrient uptake of machine transplanted rice." The results of the present investigation showed that application of graded levels of nitrogen only increased the growth, yield of rice but not with the application of phosphorus and potassium. Increase in level of nitrogen significantly increased the grain and straw yields of rice upto 120 kg N ha⁻¹. While, further increase to 150 kg N ha⁻¹ resulted in significant reduction in yields. A significant interaction between N and K yield (kg ha⁻¹) was recorded and rest of the interactions remained non significant. Among the nutrient combinations tested, application of 120-90-90 kg N-P₂O₅-K₂O ha⁻¹ followed by 120-90-60 kg N-P₂O₅-K₂O ha⁻¹ for machine transplanted rice will be more beneficial in achieving higher grain yield.

Key words: *Machine transplanted rice, yield, nutrient uptake, N, P, and K*

Nitrogen and Sulphur Nutrition for Enhancing the Growth and Yield of Quality Protein Maize (QPM)

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ABSTRACT

A field experiment was conducted during *rabi*, 2014-15 at S.V. Agricultural College Farm, Tirupati to find out the response of quality protein maize hybrid (HQPM-1) to various N and S levels. The treatments consisted of four nitrogen levels (60, 120, 180, 240 kg N ha⁻¹) in combination with three sulphur levels (15, 30, 45 kg S ha⁻¹). The results of the experiment revealed that among the four nitrogen levels, application of 240 kg N ha⁻¹ recorded the maximum plant height (185.6 cm), leaf area index (2.64), dry matter production (10903 kg ha⁻¹), grain yield (5101 kg ha⁻¹) and stover yield (5569 kg ha⁻¹) followed by 180, 120 and 60 kg N ha⁻¹. Similarly, application of 45 kg S ha⁻¹ resulted in significantly more plant height (162.9 cm), leaf area index (1.87), dry matter production (8117 kg ha⁻¹), grain yield (3679 kg ha⁻¹) and stover yield (4029 kg ha⁻¹) followed by lower levels of sulphur. Hence N and S can be applied at the rate of 240 kg ha⁻¹ and 45 kg ha⁻¹, respectively to obtain higher yield.

Key words: *Growth, Nutrition, Quality protein maize.*

Plant Height and Yield of Maize-Chickpea Sequence as Influenced by Different Sowing Windows and Nitrogen Management

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ABSTRACT

A field experiment was conducted on clay soils of Regional Agricultural Research Station, Lam, Guntur during *kharif* and *rabi* of 2013-14 & 2014-15 to assess the influence of sowing windows and nitrogen management in maize-chickpea sequence under rainfed areas of Krishna zone. Sowing windows and nitrogen levels significantly influenced the plant height and grain yield at all growth stages of preceding maize and succeeding chickpea except plant height at 30 DAS in preceding maize. Significantly maximum plant height at different growth stages and the highest kernel yield of preceding maize was recorded when maize was sown on the 2nd FN of June with 200 RDN. Plant height and grain yield of succeeding chickpea was recorded when succeeding chickpea was sown in the 1st FN of July sowing window of preceding maize with 200 % RDN followed by 100 % RDN applied to chickpea in both the years of the experimentation.

Key words: *Maize-chickpea sequence, recommended dose of N and sowing window.*

Influence of Integrated Weed Management Practices and Bio-Fertilizers on Chlorophyll Content of *KHARIF* Soybean [*Glycine max (L.) Merrill*] in Southern Telangana Agro- Climatic Zone

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ABSTRACT

A field experiment entitled “Influence of integrated weed management practices and bio-fertilizers on chlorophyll content of *kharif* soybean [*Glycine max (L.) Merrill*] in southern Telangana agro- climatic zone” was conducted at the Agricultural College farm, Rajendranagar, Hyderabad, Telangana State during 2014 and 2015. In the present investigation, the chlorophyll content cm^{-2} and mg^{-1} fresh weight of green leaves exhibited significant differences due to weed management treatments. The leaves in the un-weeded crop had maximum chlorophyll content of 139.11 n moles cm^{-2} and 2.16 mg^{-1} fresh weight of leaves in 2014. The chlorophyll content was 142.33 n moles cm^{-2} and 2.22 mg^{-1} during 2015. Hand weeding at 25 and 45 DAS or the integrated weed management treatments did not change the chlorophyll remarkably. But, the pre and post emergence herbicide treatments significantly reduced the chlorophyll cm^{-2} and mg^{-1} . Therefore, the complete dependence on herbicide use should be minimized or avoided. The chlorophyll concentration were not influenced by the bio-fertilizers at any stage in the two years. The interactions due to weed management treatments and bio-fertilizers were also not significant.

Key words: *Bio-Fertilizers, Chlorophyll Content, Integrated Weed Management Practices.*

Combing Ability Analysis and Gene Action for Seed Cotton Yield and Fibre Characters in Upland Cotton (*Gossypium hirsutum* L)

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ABSTRACT

A study was conducted with forty five intra-hirsutum hybrids along with their parents for combining ability for seed cotton yield and its component traits. The analysis of variance for combining ability revealed that, the variance due to SCA variances were higher than GCA variances for all the characters except for days to 50 % flowering and 2.5% span length indicating the predominance of non-additive gene action. The estimates of GCA effects revealed that the parents NDH 1938 and RAH 1004 were found to be best general combiners for yield and fibre quality traits in desired direction. The crosses, NDH 1938 × RAH 1004, L 770 × G COT 16 and NA 1325 × MCU 5 recorded high *per se* performance (241.2, 185.5 and 172.73 g) and significant positive SCA effects (60.99, 49.79 and 30.48) for seed cotton yield plant⁻¹ respectively. These hybrids were also recorded high *per se* performance and significant positive SCA effects for number of bolls plant⁻¹, boll weight, lint yield plant⁻¹.

Key words: *Combining ability, Fibre quality, Gene action, Seed cotton yield.*

Genetic Variability, Heritability, Character association and Path Coefficient Analysis in Sugarcane (*Saccharum officinarum* L.)

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ABSTRACT

Investigation on extent of variability, heritability, character association and path coefficient analysis were conducted in sugarcane. Analysis of variance revealed significant amount of variability for all the characters studied. Moderate variability and high heritability coupled with moderate genetic advance as per cent of mean was observed for cane volume and CCS yield indicating the predominance of additive gene action and hence, direct phenotypic selection may be useful with respect to these traits. Correlation studies revealed that cane yield was found to be significantly and positively correlated with number of millable canes at harvest, single cane weight and CCS yield, while number of millable canes, brix per cent, sucrose per cent, CCS per cent and cane yield with CCS yield at both phenotypic and genotypic level. Path coefficient analysis indicated that the germination per cent at 35 DAP, shoot population at 90 DAP, stalk population at 180 DAP, NMC at harvest, sucrose per cent, CCS per cent, cane length, single cane weight, cane volume and fibre per cent had high positive direct effect on cane yield at phenotypic level and shoot population at 90 DAP, stalk population at 120 DAP, NMC at harvest, brix per cent, purity per cent, CCS per cent, cane length, cane diameter, single cane weight and fibre per cent at genotypic level. Hence, emphasis should be given on those characters while making selection for improvement of cane yield in sugarcane.

Key words: *Correlation, Genetic advance, Heritability, Path Coefficient Analysis, Sugarcane.*

Microarray Expression Profiling of Wilt Responsive Genes In Chickpea (*Cicer arietinum*)

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ABSTRACT

Microarray is a technology to measure and analyze the expression of thousands of genes expressed at any given time. DNA microarray technology, especially the use of Gene Chip microarrays, has become a standard tool for parallel gene expression analysis. DNA microarray uses between hundreds and hundreds of thousands of DNA probes arrayed on a solid surface to interrogate the abundance and/or binding ability of DNA or RNA target molecules. In the present study non redundant unigene set comprising 384 clones (192 Clones from Incompatible library (WR315), 192 clones from compatible library (Jg62) and 72 control clones were selected for the microarray and microarray hybridization was carried out using probes prepared from resistant and susceptible plants after *Fusarium* infection at 0hr and 48hr in chickpea. Microarray analysis showed differences in the pattern of expression between compatible and incompatible interaction. Micro array hybridization on the array set using two different time points showed global differences in pattern of expression between compatible and incompatible interaction and the expression ratios were similar to earlier hybridization experiments for majority of genes under study. For majority of the genes similar expression ratios were obtained using macro array and microarray.

Key words: *Chickpea, Expressed sequence tag (EST), Fusarium wilt, Genomics and Microarray.*

Multivariate analysis in Upland Cotton (*Gossypium hirsutum* L.)

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ABSTRACT

An experiment was conducted to analyze the genetic diversity among 60 genotypes for 16 quantitative characters in upland cotton. The 60 genotypes were grouped into 15 clusters based on Mahalanobis D^2 analysis with cluster I being largest with 15 genotypes followed by 13 genotypes in cluster II, 11 genotypes in cluster XII and 10 genotypes in cluster VII. Based on Hierarchical cluster analysis all the genotypes were grouped into 8 clusters with cluster I being largest with 23 genotypes followed by 9 genotypes in cluster II and 8 genotypes in cluster IV. This random distribution of genotypes indicated that the genetic diversity and geographical diversity are not related. In Principal component analysis first six principal components with eigen value more than one contributed 87.315 per cent towards the total variability with PC_1 alone showing maximum of 22.27 per cent variability.

Key words: *Cotton, Hierarchical cluster analysis, Mahalanobis D^2 analysis, Principal component analysis.*

Diversity Analysis in Sesame (*Sesamum indicum* L.)

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ABSTRACT

Diversity analysis was carried out using thirty six sesame genotypes. The genotypes were evaluated for nine characters viz., days to 50% flowering, days to maturity, plant height, number of primary branches/plant, number of capsules per plant, number of seeds per capsule, 1000 seed weight, oil content and seed yield per plant. In the diversity analysis, it was observed that the per cent contribution towards genetic divergence was maximum by the trait, number of primary branches per plant. The genotypes were grouped into seven clusters using Tocher's method and the distribution into seven clusters was at random with maximum number of genotypes in cluster I (12 genotypes). The maximum intra cluster distance was observed in the cluster IV and the inter cluster distance was the highest between clusters V and VI indicating wide genetic diversity between the clusters and crosses can be attempted between the genotypes of these clusters to obtain desirable transgressive segregants. Higher cluster mean values for number of primary branches per plant, number of seeds per capsule, days to maturity and plant height were observed in cluster V while cluster VI recorded minimum number of days to 50% flowering and the highest seed weight and seed yield per plant indicating the importance of this cluster in breeding programmes to generate early maturity types with increased seed yield through seed weight.

Key words: *Diversity, Sesame, Tochers' method.*

Genetic Variability, Heritability and Genetic Advance for Yield and Yield Component Characters among Restorer Lines of Pearl millet [*Pennisetum glaucum* (L.) R. Br.]

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ABSTRACT

An investigation was carried out to study genetic variability, heritability and genetic advance among 182 restorer (R-)lines of pearl millet for twelve characters viz., days to 50% flowering, plant height, ear length, ear diameter, productive tillers per plant, head yield per plant, grain yield per plant, panicle harvest index, fresh stover yield per plant, dry matter yield per plant, 1000 grain weight and grain harvest index. The results revealed that the characters ear length, ear diameter, productive tillers per plant, head yield per plant, grain yield per plant, fresh stover yield per plant, dry matter yield per plant and 1000 grain weight showed high PCV and GCV. High estimates of heritability along with genetic advance (% mean) were observed for plant height, ear length, ear diameter, productive tillers per plant, and 1000 grain weight indicating that the selection for these traits would be more effective.

Key words: *Genetic Advance, Heritability, Pearl millet, Restorer (R-) lines, Variability.*

Assessment of Genetic Diversity for Grain Yield and Quality Traits Using Principal Component Analysis in Rice (*Oryzasativa*.)

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ABSTRACT

The present experiment was conducted with forty long duration rice genotypes for estimation of genetic diversity by using Principal Component analysis. The first four principal components with eigen values more than one contributed 78.913 per cent towards the total variability. The analysis thus identified the maximum contributing variables *i.e.*, L/B ratio, days to maturity, days to 50% flowering, seed yield per plant, grains per panicle, panicle length, test weight, productive tillers per plant and grain yield per plant. The contribution of the main characters for variance was easily identified by the characters loaded on the PC₁ with high loading values.

Key words: *D², Grain Yield, PCA, Rice.*

Chemical Composition of Soils of Krishna delta Region in Andhra Pradesh

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ABSTRACT

Horizon-wise soil samples from fourteen pedons representing Krishna delta region of Andhra Pradesh were analyzed for elemental composition. The study revealed that silica and sesquioxides were the dominant fractions contributing to more than 75 per cent followed by calcium and magnesium oxides. The coarse textured pedons registered higher SiO₂ / R₂O₃, SiO₂ / Al₂O₃ and SiO₂ / Fe₂O₃ ratios due to higher silica and lower sesquioxide content than fine textured soils. In much of the study area silica/ alumina and silica/iron oxide ratios increased with depth. The order of other elements was found to be Na>K>Mn>P₂O₅>CuO>ZnO in soils represented by majority of the pedons.

Key words: *Molar concentration, Molar ratios, P₂O₅, K₂O, Na₂O, CaO, MgO, ZnO and CuO.*

Influence of Soil Applied Boron on Yield and Nutrient uptake of Black gram (*Vigna mungo* L.) grown in Calcareous soils

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ABSTRACT

A green house experiment with blackgram grown on boron (B) deficient calcareous soils was conducted at Agricultural College, Bapatla to study the influence of soil applied boron on yield and uptake of blackgram (var. PU-31) during 2015-16. Five soils with calcium carbonate content 1.08 (Soil I), 5.25 (Soil II), 10.37 (Soil III), 16.20 (Soil IV) and 17.75 (Soil V) per cent were collected from different sites of Sattenapalli mandal which falls under Krishna western delta system of Andhra Pradesh. The treatment comprised of four levels of boron viz. 0, 0.25, 0.50 and 0.75 mg B kg⁻¹ supplied as boric acid laid out in completely randomized block design and replicated thrice. Different levels of boron had more influence on mean biomass production and seed yield. The mean total boron uptake at harvest varied from 38.73 to 67.14 µg pot⁻¹ in blackgram. The highest mean seed yield of 1.67 g pot⁻¹ was recorded by the addition of 0.75 mg B kg⁻¹ followed by 0.25 mg B kg⁻¹ (1.55 g pot⁻¹), and control (1.40 g pot⁻¹). Soil I (1.08% CaCO₃) which received B @ 0.25 mg kg⁻¹ (B₁) was found sufficient to produce optimum seed yield of blackgram although maximum yield obtained with application of B @ 0.50 mg kg⁻¹ soil (B₂) was on par with B₁ level. For all other soils having more than 1.08% CaCO₃ content, the yields were increased with increase in B doses.

Key words: *Boron content, Black gram, Calcareous soils, Seed yield, Soil applied Boron.*

Evaluation of Front Line Demonstrations on Fertigation in Cotton

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ABSTRACT

The present study in the form of frontline demonstrations were conducted by DAATT Centre, Warangal during 2011, 2012 to 2013 crop seasons in six villages of Warangal district of Telangana state. The results of demonstrations showed that farmers could increase the seed cotton yield notably by switching over to drip fertigation and adoption of improved production technology. From the front line demonstrations, it was observed that the drip fertigation in cotton recorded the higher average yield of three years (56.03q/ha) compared to average yield of the farmers' practices (28.82 q/ha). The percentage in yield increase in the demonstration was 91.6, whereas extension gap, technology gap and technology index over farmer's practices were 27.87 kg/ha, 13.1 and 18.9 respectively.

Key words: Fertigation in cotton, FLDs, evaluation.

Evaluation of AB-DTPA and DTPA Extractants for Cationic Micronutrients in Calcareous Soils

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ABSTRACT

This study was conducted in order to evaluate the efficiency of ammonium bicarbonate-DTPA (AB-DTPA) and DTPA extractants for cationic micronutrients (Zn, Fe, Mn and Cu) in calcareous soils of Piduguralla mandal. The relationships between the amounts of micronutrients extracted by AB-DTPA with those extracted by DTPA (the conventional extraction method widely used in soil testing laboratories widely used in soil testing laboratories in India) and those taken up by blackgram were elucidated. Between DTPA and AB-DTPA extractants tested for micronutrient availability, the mean available micronutrient content was the highest in AB-DTPA than DTPA and their efficiency in extracting available micronutrient content of soils was higher in AB-DTPA than DTPA based on correlation values in the pot culture study. Highest positive and significant correlation was observed between zinc, iron, manganese and copper uptake and AB-DTPA extracted micronutrient cations (0.451**, 0.941**, 0.443** and 0.386**, respectively) than with DTPA extracted cationic micronutrients (0.437**, 0.489**, 0.441** and 0.379**, respectively). Since DTPA and AB-DTPA extractants showed significant positive correlation ($r = 0.902^{**}, 0.939^{**}, 0.907^{**}, 0.897^{**}$) with each other and with that of blackgram uptake, suggested that AB-DTPA could be used effectively for estimating available cationic micronutrients in calcareous soils.

Key words: *AB-DTPA, Cationic micronutrients, DTPA, Multinutrient extractant, Soil test.*

Screening of Maize Genotypes against Maize Stem borer, *Chilo partellus* (swinho)

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ABSTRACT

A total of 55 maize genotypes obtained from Regional Maize Research Center (RMRC) Dharwad, Karnataka including with a resistant check, DHM 117 and a susceptible check, 30v92 were screened against stem borer, *Chilo partellus* during *kharif* 2013 under natural field conditions. Among these, 22 genotypes including checks were selected for further screening during *rabi* 2013-14 & 2014-15. Among the 20 maize genotypes, fifteen exhibited a damage score of 1.2 to 2.2, where ST X BM 254-1 (1.2), Dhk 12 X 5321 (1.3), ST X BM 32 (1.3), ST X 5422 (1.3), ST X BM 258-1 (1.4) and ST X BM 59-3(1.4) were designated as resistant. The remaining genotypes P3596, Dhk 12 X CM 1504, DHM 117, Dhk 12 X CM 142, ST X 5311, ST X 5416, ST X BM 254-3 and Dhk 12 X CM 151 were moderately resistant ranging from 1.6 to 1.8. The genotypes ST X BM 59-1(1.9) and P3396 (2.2) are designated as intermediate resistant. The highest intensity of damage was recorded in susceptible check 30v92 (3.5) which was followed by Dhk X CM 135 (3.0), ST X RNBL 4611 (2.8), Dhk 12 X CM 213, Dhk 12 X CM 138 (2.5) and Dhk 12 X 5304 (2.3) which were designated as susceptible to stem borer, *C. partellus*.

Key words: *Chilo partellus*, Maize genotypes, Screening.

Incidence of leafhopper, *Amrasca devastans* (Distant) on Cotton under High Density Planting System (HDPS)

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ABSTRACT

An investigation was carried out to know the incidence and development of leafhopper, *Amrasca devastans* (Distant) under High Density Planting Systems (HDPS) of cotton during 2015 -2016 at the Regional Agricultural Research Station, Lam, Guntur, Andhra Pradesh. The results indicated that the plant density exerted positive affect on the incidence and development of cotton leafhopper, *Amrasca devastans* (Distant). The leafhopper population ranged from 1.60 to 18.27 per three leaves during the crop growth period. The lowest population of 1.60 leafhoppers per three leaves was recorded in the plots with 14814 plants ha⁻¹ at 93 Days After Sowing (DAS) and highest population of 18.27 leafhoppers per three leaves was recorded in the treatment where plant density was 111111 plants ha⁻¹ (HDPS) at 45 DAS. Plant density has affect on the overall mean population of leafhoppers as it was increased from 5.03 to 6.97 leafhoppers per three leaves as plant density increased from 14,814 plants ha⁻¹ to 1,11,110 plants ha⁻¹.

Key words: *Cotton*, *HDPS*, *Incidence*, *Leafhopper*.

Variability in Resistance of *Spodoptera litura* (Fab.) to Different Insecticides in Groundnut

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ABSTRACT

A study was conducted to determine the relative toxicity of different insecticides through bioassay at Department of Entomology, S.V. Agricultural College, Tirupati. Highest levels of resistance to conventional insecticides (lambda cyhalothrin, cypermethrin, quinalphos, chlorpyrifos and acephate) was found in third instar larvae of *Spodoptera litura* Guntur strain (19.99 to 39.45 folds) followed by Karimnagar (17.54 to 34.87folds) and Kurnool (15.36 to 27.96 folds) strains. Whereas Anantapuramu (3.64 to 11.63 folds), Kadapa (4.83 to 13.53 folds), Chittoor (11.91 to 18.63 folds), Nellore (13.48 to 18.39 folds), Mahaboobnagar (13.16 to 25.06 folds) and Warangal (3.63 to 13.08 folds) strains recorded moderately high level of resistance compared to baseline susceptible population.

Key words: Groundnut, Resistance to insecticides, *Spodoptera litura*.

Synergistic Effect of Piperonyl Butoxide, Triphenyl Phosphate and Sesame Oil on Malathion and Deltamethrin Resistant Bapatla Strain of *Rhyzopertha dominica* in Andhra Pradesh

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ABSTRACT

A laboratory experiment was carried out in the Department of Entomology to know the synergistic activity on commonly used insecticides. The synergists such as PBO, TPP and sesame oil showed synergistic factors of 10.85, 27.12 and 0.47 at LC_{50} and 5.97, 6.68 and 1.95 at $LC_{99.9}$ level respectively with malathion. The corresponding synergistic values for deltamethrin were 34.50, 43.12 and 6.05 at LC_{50} and 14.07, 8.97 and 3.51 at $LC_{99.9}$ level. The levels of resistance to malathion and deltamethrin are brought down significantly with all the three synergists viz., PBO, TPP and sesame oil.

Key words: *Deltamethrin*, *PBO*, *TPP*, *Sesame oil*, *Synergists*, *Malathion*, *Rhyzopertha dominica*.

Survey on Predacious Coccinellids of Pulse Crops Cultivating in Guntur District, Andhra Pradesh

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ABSTRACT

The survey was conducted in ten major pulses cultivating mandals of Guntur district, Andhra Pradesh and collected coccinellid beetles from greengram, blackgram, redgram and cowpea fields of twenty villages (@ two villages per mandal). Coccinellid population varied from vegetative stage to crop maturity stage of all surveyed pulse crops. The peak population of coccinellid adults were found during November month in which all pulse crops were at flowering to pod formation stage. About 999 ladybird beetles were collected, described and identified six species on the basis of morphological characters and genitalia. Among these four species, *Cheilomenes sexmaculata*, *Coccinella transversalis*, *Harmonia octomaculata* and *Micraspis discolor* belonged to subfamily Coccinellinae and tribe Coccinellini, *Scymnus (pullus) coccivora* Ayyar in subfamily Scymninae and tribe Scymnini, *Brumoides suturalis* belonged to subfamily Chilocorinae and tribe Chilocorini of family Coccinellidae. *Cheilomenes sexmaculata* (47%) and *Coccinella transversalis* (44%) were found as the most abundant species in different pulse-ecosystems, while very few population of *Harmonia octomaculata* (5%), *Micraspis discolor* (2%), *Scymnus (pullus) coccivora* (1%) and *B. suturalis* (1%) were observed feeding on aphids in and around Guntur region, A.P.

Key words: Predacious coccinellid species, Pulses, Survey.

Effect of Foliar Spray of Ethrel and Boron on Growth, Drymatter and Yield of Groundnut

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ABSTRACT

A field experiment was conducted during the *kharif* season of 2011-2012, at agricultural college farm, Bapatla, Andhra Pradesh to evaluate the effect of foliar application of ethrel and boron on growth, and yield of groundnut. The experiment was laid out in a randomized block design with ten treatments comprising sprays of ethrel (400 ppm), borax (0.25%) at 25 and 45 days after sowing alone and in combinations with three replications. The results revealed that foliar application of ethrel @400 ppm + boron @0.25% at 25 & 45 DAS significantly increased the plant height (59.2 cm), number of branches (43.0) number of leaves (49.9), number of flowers (36.6), leaf area (1768 cm²) and total drymatter (43 g) over control (33.1 cm, 31.2, 30.3, 22.6, 911.3 cm² and 24.8g respectively). The spray of Ethrel (400ppm) + Borax (0.25%) at 25 and 45 DAS resulted in higher yield (36.3 %) over control (1980 kg/ha)

Key words: Boron, Drymatter, Ethrel, Foliar application, Growth, Yield.

Physiological Effect of Salicylic Acid on Pod Setting and Yield of Groundnut (*Arachis Hypogaea* L.)

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ABSTRACT

To study the effect of Salicylic acid on growth and yield of groundnut, to find out its effective concentration along with the proper stage of spraying in improving growth, yield parameters and yield of groundnut plants, present investigation was under taken with salicylic acid at 50,100 and 150ppm concentrations sprayed at three different stages *viz.*, peak vegetative stage, flowering stage and peg formation stage. Number of pods per plant (15.53), pod yield per plant (6.59 g), kernel yield per plant (5.02 g), shelling percentage (76.11), harvest index (28.96), yield (2329 kg ha⁻¹) increased with spray of salicylic acid @ 150 ppm at flowering stage (T₆). Test weight (47.63 g) and oil percentage of kernels (48.90) increased with foliar spray of salicylic acid @ 150 ppm at peg formation stage (T₉).

Key words: *Groundnut, Salicylic acid, Pod setting and Yield.*

Effect of Growth Regulators on Nodulation and Nitrogen Fixation in Groundnut (*Arachis Hypogaea* L.)

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ABSTRACT

To study the effect of growth regulators *viz.*, Indole-3-Acetic Acid (IAA), Kinetin, and Homobrassinolide (HBL) on nodulation and nitrogen fixation in groundnut. The present investigation was under taken with IAA, Kinetin @ 10 ppm and HBL @ 3.0 µM at 30 DAS. Nitrate reductase activity (5.67 µM NO₂⁻ g⁻¹ hr⁻¹), leghaemoglobin content (1.93 mg per fresh weight of nodules), leaf nitrogen content (3.48 %), soil nitrogen content (0.052 %), number and fresh weight of nodules (68.96 and 0.57 g) respectively were increased in the treatment pre soaking of seeds before sowing with kinetin @ 10 ppm followed by foliar spray of kinetin @ 10 ppm (T₄) at 30 DAS which is on par with the treatment, pre soaking of seeds before sowing with HBL @ 3.0 µM followed by foliar spray of HBL @ 3.0 µM at 30 DAS (T₁₂).

Key words: *Groundnut, Indole Acetic Acid, Kinetin, Homo brassinolide, Nitrogen fixation.*

Performance of Woodapple Germplasm in Venkatagiri, Nellore District

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ABSTRACT

A total of 10 accessions of woodapple germplasm collected from various sources in the country are maintained and evaluated for growth, yield, adoptability at Citrus Research Station Petlur, Venkatagiri dist.. Some of the accessions performed very well and some did not perform well. Among the various accessions PWAS 2 , PWAS-9 performed well in this area. The accessions unfavorable to this climate possessed low average mean for various characters in the present study. Since considerable variation exists in the species there is good scope for varietal improvement .Changes in physical and chemical properties of wood apple pulp collected from unripe, half ripe and full ripe stages were studied. Edible portion of wood apple fruit (42.9 to 60.6% total fruit weight) comprised 6.9 to 12.7% of seeds. Fresh pulp contained 75.16 % moisture, 3.0 % sugar, 2.0 % protein and 1.31 % ash. The total soluble solid, brix/acidity ratio, total sugar and reducing sugar of wood apple fruit increase with maturity, whereas moisture content, pectin content and ascorbic acid was decreased. The pH of the wood apple pulp increased with the advance in maturity. The ripe fruits were found significantly less acidic than unripe and half ripe.

Key words: *Germplasm, Performance, Woodapple.*

Method for Preserving Bird of Paradise Flower through Freeze Drying Process

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ABSTRACT

Flowers preserved from special occasions, evoke the past, and leave us with sentimental thoughts. They help us commemorate good times punctuating every celebration in our lives. Freeze drying flowers retains the shape and colour of the flowers almost as if they are still fresh, original colour and shape for many years to come. This study was taken to protect the physical characteristics of Bird of Paradise flower through freeze drying technique. Different preservatives were identified and tested for hydration, pre and post treatments to retain the physical characteristics of flowers. Among the different methods, the flower treated with preservative (a blend of Sprite and Bleach) in luke warm water during hydration process, followed by pre treatment with (T₅) which includes composition was evolved by blending chemicals meant for dehydration solvent, colour fixative, environmental fixer, biofixer and shatter resistant polymer. After hydration and pre treatments, those flowers were dried with freeze drier followed by application of DMP as sealant as post treatment was found to be effective for retaining inherent qualities of the flowers.

Key words: *Freeze Drying Process, Bird of Paradise, Physical Characteristics, Preservative.*

Time Utilization of the Farm Women of Maharashtra in Rabi and Kharif Seasons in Farming and Post-Harvest Activities

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ABSTRACT

The largest number of working women in India is engaged in farming operations either as cultivators or as agricultural labourers. They spent major part of the day in farming activities. It was also observed that good part of active hours during day time was spent in economic activity on the farms. The study was carried out from two agro-climatic zones of Maharashtra. Nanded district was selected from Central Maharashtra Plateau zone and Nagpur district was selected from Central Vidarbha zone. The data was collected from total 600 women, from which 409 women were involved in actual farming activities and 410 in post-harvest activities from urban, rural and tribal areas. In the present study, time spending pattern of the respondents was studied for rabi and kharif seasons in days/year. It was found that farm women spent maximum time in weeding and land preparation in both rabi and kharif seasons as far as farming activities were concerned whereas they utilized maximum time on drying and storage as regards post-harvest activities. It was noted that the women spent total of 123.33 days/year on farming activities in both the seasons and that of 49.29 days/year on post-harvest activities.

Key words: Farming, Kharif, Post-harvest activities, Rabi, Time utilization, Women.

Crop Water Requirement and Effect of Planting Date on Yield of Gladiolus Under Polyhouse, Shade Net and Open Conditions

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ABSTRACT

Water is becoming increasingly scarce worldwide. Aridity and drought are natural causes of scarcity. More recently however man-made desertification and water shortages have aggravated scarcity phenomenon. In order to apply irrigation water efficiently, the water requirement of the crops is to be estimated accurately. Several computer models are now available to estimate the crop water requirements. Crop Water Requirement (CWR) was effectively calculated using Penman-Monteith method using CROPWAT simulation programme. Accuracy of estimation of CWR greatly depends on the cropping pattern followed and staggering of crops sown in the command area. Crop Water Requirement (CWR) under different field conditions, open condition was estimated to be ranging from 201.8 – 219.8 mm/season, shade net ranging from 197.4 – 312.2 mm/season and polyhouse ranging from 202.7 – 310 mm/season. The corms of American beauty in poly house recorded significantly more number of days to sprout (11.5), while the earliest sprouting of corms was observed in the open condition (9.2) and the more earliest sprouting of corms was observed in shade net house(6.5). Number of spikes (1.2) in open condition recorded more which was on par with shade net (1.1) and least in poly house (1.0) condition. Spikes yield in open condition recorded maximum number of spikes per hectare (94666.6 ha⁻¹) where as the value was recorded under shade net (10138.4 ha⁻¹) and poly house it was (80888.9 ha⁻¹). Shade net recorded maximum vase life (11.5 days) compared to open condition (10.66 days) and poly house recorded less vase life (9.5 days).

Key words: *Crop, Gladiolus, Yield.*

Performance Evaluation of Thatipudi Irrigation Project Using Landsat 8 Images

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ABSTRACT

Synergistic application of satellite remote sensing and Geographic Information System (GIS) techniques were used to analyse the agricultural performance and sustainability of the Thatipudi irrigation project of Vijayanagaram district of Andhra Pradesh state. Presently, there are number of satellites providing such datasets and many of them are available in public domains. Methodology was established for the use of public domain satellite datasets from Landsat 8 OLI. Analysis of Landsat 8 multirate satellite data during the year 2014-15 for all the seasons helped to generate spatially distributed information on total cropped area. The study thus demonstrated the synergy possible from applying satellite remote sensing and GIS to estimate the cropped areas of different seasons. It is concluded that the satellite crop area estimated as *kharij* crop constitutes 81% (5057 ha), *rabi* crop constitutes 5% (303 ha) of the ayacut designed ayacut during the year 2014-15 and irrigation intensity is 88%.

Key words: *GIS, Irrigation, Remote Sensing, Satellite, Public domain.*

Some Studies on Drying Characteristics of Potato Slices

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ABSTRACT

The drying characteristic of potato slices were studied by using sun drying, solar drying, tray drying and microwave oven drying. Dried potato powder characteristics were studied. Drying is widely used in a variety of thermal energy applications. Generally, the term drying refers to the removal of a relatively small amount of moisture from solid or nearly solid material by evaporation. In order to improve the quality, the traditional sun drying technique should be replaced with industrial drying method such as hot air and solar drying. The moisture content of potato slices decreased from 87.81% (w.b). The time taken for drying the potato slices was 55 min in microwave oven drying, 4h in tray drying, 8h in solar drying and 14h in open sun drying. The microwave drying took very short period of time (55min) for complete drying of potato slices compared to the all other three methods. The potato slices dried in microwave oven have better colour followed by open sun drying, solar cabinet drying and tray drying. Comparing different driers, the solar dryer produced better quality having more quantity of total soluble solids; total carbohydrates, vitamin- C and reducing sugars.

Key words: *Microwave oven drying, Potato slices, Solar cabinet dryer, Sun drying, Tray drying.*

Optimization of Process Parameters for Corn Germ Oil Extraction

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ABSTRACT

In this study, oil extracted from corn germs was optimized using Response Surface Methodology (RSM). Effects of preheating temperature and time on the yield and oil quality were investigated. Sixteen experimental runs applying an optimal (custom) design with RSM was employed. The parameters measured were oil yield, saponification value, acid value, iodine value and peroxide value. Statistical analysis with response surface regression showed that the oil yield, acid value, iodine value and peroxide value of corn germ oil were significantly ($p < 0.001$) affected with preheating temperature and time. But saponification value affected by $p < 0.01$. Based on response surface, optimum conditions were preheating temperature of 110 °C and time of 8 min. Analysis of variance indicating that the models were adequate for representing the experimental data. The treatments resulted in oil yield ranging from (38.26 to 47.30%), saponification value (209.88 to 219.70 mgKOH/g), acid value (1.12 to 1.68 mgKOH/g), iodine value (92.1 to 122.68 gIodine/100g) and peroxide value (0.6 to 2 meq/kg). Oil extracted from corn germ was successfully optimized using RSM. The regression models obtained has provided a basis for selecting optimum process variables for the recovery of oil using mechanical pressing.

Key words: *Corn germ, Heating temperature, Heating time, Oil yield, Oil quality, Optimization.*

Studies on Processing and Storage of Tender Coconut Water

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ABSTRACT

Tender coconut water (*Cocos nucifera* L.) is a delicate and refreshing natural beverage whose original properties have drawn to highlight as a natural functional drink. Thermal treatments combined with chemical additives are used by the industry but other technologies such as micro and ultrafiltration are yet to be used on an industrial scale. MF and UF offer excellent potential in food industry for clarification and pasteurization of liquid foods to replace conventional processing techniques. A continuous cross flow flat sheet membrane module was used to process by microfiltration (MF) and ultrafiltration (UF) technology. In the first treatment, the tender coconut water (TCW) was passed through MF of 0.2 μm pore size at a pressure of 5.06 kg/cm^2 to remove microbes and suspended particles. In the second treatment, TCW was passed through UF of molecular weight cut off (MWCO) 40 kDa at pressures about 5.06 kg/cm^2 to remove enzymes such as polyphenoloxidase (PPO) and peroxidase (POD). In the third treatment, TCW was bottled and pasteurized at 85°C for 10 min in a water bath. In the fourth treatment, TCW was filtered through a MF membrane and chemical preservative nisin was added to coconut water in two concentrations of 5000 IU and 2500 IU. The TCW filtered through muslin cloth was bottled and refrigerated as control sample. All the samples using different treatments were bottled using crown corking machine and refrigerated at 4 °C to assess the quality during storage. The samples were taken out for every four days interval to assess physico-chemical, microbiological and sensory characteristics upto 20 days of storage. Finally among all the treatments, pasteurized, microfiltered and ultrafiltered treatments gave quality bottled TCW.

Key words: *Membrane processing, Microfiltration, Ultrafiltration.*

Development and Testing of Trolley Mounted Solar Operated Low Volume Boom Sprayer

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ABSTRACT

Sprayers are mechanical devices that are specifically designed to spray liquids quickly and easily. A sprayer of this type is a great way to cover large areas such as lawns quickly and easily. The main objective of this paper is to economize the cost of operation by using renewable energy as a source of power and to evaluate the performance of this equipment. Solar operated low volume sprayer was developed with higher operational features. This sprayer typically consists of a tank (20L.) for carrying the liquid to be sprayed, a solar panel (20W), a battery (12V), a control panel, a motor for pumping out liquid, spray nozzle on a boom that automatically disperse the liquid in a downward direction over an appreciable area, ball valve, a chassis with wheels on which the sprayer is mounted, and a hose attachment for spraying. The sprayer runs for complete 90 min after 3 hours continuous charge by exposing in hard sun. The operational features like application rate, swath width, discharge rate and adjustment angle at boom height 43.5 cm was found to be 87.03L/ha, 1.35m, 0.47 L/min and 112.41° respectively on uncultivated land. The field capacity of sprayer was found to be 0.324 ha/h which is very economical for such sprayers.

Key words: Application rate, Adjustment angle, Discharge rate, Field capacity, Swath width.

Performance Evaluation of PV Ventilated Hybrid Greenhouse Dryer Under no Load Condition

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ABSTRACT

The PV ventilated hybrid greenhouse dryer was designed and fabricated for drying of food grains. The greenhouse dryer with 446.7 X 213.4 cm size and central height of 259 cm was constructed using 50.8X25.4 mm MS pipe and 19X30.2 mm MS angles. Clear twin wall polycarbonate sheet with 6 mm thick was used insulate the greenhouse dryer structure. Performance evaluation was conducted under no load test condition. It was observed that, the average temperature inside the dryer was 6.3-13.2 °C (22-43%) higher and average relative humidity was 23-40% lower than ambient temperature and relative humidity during the month of December. Exhaust air flow rate varied in the range of 28-63 m³/min. Elevated greenhouse dryer air temperature and reduced relative humidity would reduce the drying time considerably.

Key words: Greenhouse dryer, Forced ventilation, Performance Evaluation, Photovoltaic.

Analysis on Price Behaviour of Cotton in Guntur Market of Andhra Pradesh

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ABSTRACT

The present study is based on analysis of secondary data. Time series analysis was used to study the variations in monthly prices of cotton for a period of 17 years from 1999 to 2015. The data reveals that there are price fluctuations up to the year 2005, later the prices increased for the next seven years until 2012, after which it showed fluctuations during 2013 to 2015. The highest price of 4696 Rs/q was recorded in the year 2012 and lowest price of Rs 1885/q was recorded in the year 2005. The highest seasonal price index was found in the month of February, followed by July and March with 103.14, 103.05 and 101.90 respectively. The lowest seasonal price index was noticed in the months of August, September and November with 97.41, 98.32 and 98.78 respectively. The cyclical variations for prices are increasing until the year 2006, later it shows decreasing trend until the year 2012. Finally the cyclical variation for prices started increasing from 2013 to 2014.

Key words: *Cotton, Price behaviour.*

Resource use Efficiency of Banana in Kurnool District of Andhra Pradesh

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ABSTRACT

The present study was conducted in Kurnool district of Andhra Pradesh with a sample of 120 farmers by probability proportionate to size from four villages with thirty farmers from each village. Data used were pertaining to the period of 2013-14. Cobb-Douglas production function analysis of data indicated that suckers were found to be significant variables affecting the productivity of banana in all size of farm groups except large farms. Nitrogen fertilizers were found to be significant variables affecting the productivity of banana in all size of farm groups. The value of () was highest on pooled farms (0.869) followed by medium (0.843) and large farms (0.826). The MVP to MFC ratio for suckers and nitrogen fertilizers were > 1 indicating that there is scope to increase the level of these inputs in banana crop production

Key words: *Banana, Efficiency, Resource.*

Comparative Analysis of the Extent of adoption of Recommended ICM practices by the Participant and Non participant farmers of Rice FFSs

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ABSTRACT

The present investigation was carried out in Nellore district of Andhra Pradesh state during 2014-15 to compare the extent of adoption of ICM practices by the participant and non participant farmers of rice FFS. A total of 150 respondents were selected for the study out of which 75 farmers were participant farmers of rice FFS and the other 75 were non participants. The results of the study revealed that 42.67 per cent of the participant farmers were having medium level of adoption, followed by low (32.00%) and high (25.33%) levels. Whereas in case of non participant farmers majority (66.67%) of the respondents were having medium level of adoption, followed by high (21.33%) and low (12.00%) levels. Independent sample 't' test and Chi square tests were carried out to compare the extent of adoption of recommended ICM practices by the participant and non participant farmers of rice FFS. The Independent sample 't' test showed that there is significant (p value < 0.01) difference between participant and non participant farmers with regard to their extent of adoption of recommended ICM practices. The results of Chi square test revealed that there is significant association (p value < 0.01) between the 'participation in FFS' and the 'extent of adoption' of recommended ICM practices.

Key words: *Extent of adoption, Farmer Field School, Integrated Crop Management.*

Knowledge Level of Direct Sown Rice Farmers in Guntur district of Andhra pradesh

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ABSTRACT

The present study was conducted in Guntur district of Andhra Pradesh during 2014-15 to study the level of knowledge of farmers about recommended technology of direct sown rice cultivation. A total of 120 respondents constituted the sample of the present study. The findings revealed that most of the respondents (35.83%) had medium knowledge level about recommended direct sown rice technology. Content analysis of knowledge statements showed that majority of the farmers have knowledge about practices like seed drilling, maturity of direct sown rice crop, recommended doses of weedicides, recommended chemicals for plant protection and suitable varieties for direct sown rice cultivation. The knowledge level of direct sown rice farmers was positively and significantly influenced by the factors like Age, Education, Experience, Training received, Source of information, Social participation, Extension contact, Innovativeness and Risk orientation. Age, Training received, Source of information, Extension contact and Innovativeness were significant with knowledge level in multiple regression.

Key words: *Direct sown rice, Knowledge.*

Profile Characteristics of Bengalgram Farmers in Prakasam District of Andhra Pradesh

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ABSTRACT

Bengalgram is the most important pulse crop in India. The study was taken up in, Parchur, Inkollu, Korisapadu, Nagulauppapadu, and Ongole mandals of Prakasam district by following random sampling procedure. Three villages from each of the selected mandals were selected by following simple random sampling procedure. Thus making a total of 15 villages. A total sample of 120 bengalgram growers were selected by selecting 8 farmers from each village by simple random sampling procedure. Majority of the Bengal gram farmers had high school education, small land holding with high farming experience and medium socio-Political participation. They had medium extension contact, medium mass media exposure, medium Innovativeness, medium scientific orientation, medium risk orientation, medium economic orientation and medium market orientation.

Key words: *Bengalgramfarmers, Profile characteristics.*

Socio- Economic Characteristics of Farmers and Constraints in Tobacco Cultivation

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ABSTRACT

The present investigation was undertaken to study the socio-economic characteristics of farmers, constraints and suggestions in tobacco cultivation. Ex-post-facto research design was adopted. One hundred and fifty farmers were selected randomly from fifteen mandals of Prakasam Dist. Majority of the farmers were in old age, illiterates, with semi medium land holding, tenant barn holding, with medium farming experience, achievement motivation, innovativeness, risk orientation, economic orientation, social participation, extension contact and mass media exposure. Majority of the tobacco farmers felt that low price (100.00%), increased cost of cultivation, rainfed cultivation and insufficient rains (92.00%), *Orabanche* problem (88.00%), increased labour charges (86.00%), labour intensive crop (82.67%) and abnormal price fluctuations were the major constraints experienced by them in tobacco cultivation. The suggestions given by the tobacco farmers were providing minimum average support price not less than Rs.15000/- per quintal (97.33%), providing license to unauthorized barns (89.33%), at a time purchase to avoid weight losses (80.67%), developing high yielding varieties with good quality (72.67%) and management for *Orabanche* (70.67%).

Key words: *Constraints, Socio-economic characteristics, Suggestions, Tobacco.*

Scale for Measuring Attitude of Agripreneurs Towards Agri Entrepreneurship

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ABSTRACT

A scale was developed to measure the attitude of the agripreneurs towards agri entrepreneurship based on Likert's technique. A tentative list of 47 statements was drafted keeping in view the applicability of statements suited to the area of study. The statements collected were edited in the light of the informal criteria suggested by Thurstone and Chave, Wang, Bird, Edward and Kilpatrick. These statements were framed in such a way that they expressed the positive or negative attitude. The score of each individual item on the scale was calculated by summing up the weights of the individual items. On the basis of total score, 25 percent of the subjects with the highest total score and also 25 percent of the subjects with lowest total scores were taken assuming that these groups provided criterion groups in terms of high and low evaluated by the individual statement. In order to find out the discriminating index for each item, 't' value was calculated using the formula and procedure given by Edwards. The scale so developed finally consisted of 22 statements (11 positive and 11 negative) whose 't' values were found to be significant at one percent level of probability.

Key words: *Attitude scale; Continuum; Reliability; Validity.*