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## FIELD PERFORMANCE OF *SWIETENIA MACROPHYLLA* KING. SAPLING IN MUNICIPAL GARBAGE AS THE POTTING MEDIA FOR REFORESTATION IN THE TROPICS

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**Abstract :** The term 'garbage' used internationally to describe waste materials arising from domestic, trade, commercial, industrial, agricultural and other related activities and from public services. It has created a real threat not only to the living environment but also for the cultivation of crops as well as afforestation. The present investigation was conducted to study the influence of two weeks decayed or stored waste materials as component potting media on the growth and vigour of *Swietenia macrophylla* (Mahogany) seedlings. The survival rate was ranged from 96 per cent to 99 per cent among various treatments studied. Mixture of soil, partially decayed tea waste and sand was recorded the maximum height in nursery and T1 (Control - Soil: Sand: cow dung) recorded maximum collar diameter (9.35 mm). With regards to height (155.62 cm) and diameter (14.2 mm), the maximum performance was registered in potting media containing soil and partially decayed Municipal waste (T2) in sapling level. Height and diameter increment at nursery level after eighth month showed the maximum increase was in T7 (28.32 per cent) and -3.53 per cent as compared to the control (T1) in seedling level and maximum increment per cent in the plantation was recorded in T2 (45.28) and T4 (49.55) for height and diameter respectively. The combined use of soil with garbage result in the production high quality planting material and the effect of plantation development were very less.

**Keywords:** *Swietenia macrophylla*, potting media, survival rate, diameter, height, increment percentage

## MICROPROPAGATION OF AN ENDANGERED MEDICINAL HERB *OCIMUM CITRIODORUM* VIS.

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**Abstract:** An efficient protocol has been developed for rapid micropropagation of *Ocimum citriodorum* Vis., an endangered medicinal herb. The cotyledons were excised from the *in vitro* germinating seedlings and used as explants for the present study. The explants yielded the highest frequency of 87.49% shoot regeneration with an average shoot length of 4.98 cm on Murashige and Skoog (MS) medium supplemented with 1 mg l<sup>-1</sup> 6- benzylamino purine (BAP) + 0.1 mg l<sup>-1</sup> naphthalene acetic acid (NAA) + 500 mg l<sup>-1</sup> casein hydrolysate (CH) + 25 mg l<sup>-1</sup> adenine sulphate (AS). Alteration from the optimal concentration of BAP resulted in the formation of callus. Regenerated microshoots were separated and rooted on MS medium containing NAA (0.5 mg l<sup>-1</sup>). Well-developed complete plantlets were transferred onto plastic cups containing sterile soil and humus (1:1). Subsequently the acclimatized plantlets were successfully grown in garden. The regenerated plants were morphologically identical and exhibited similar growth characteristics as compared to the donor plants. Cytological studies of the regenerants revealed no change in chromosome numbers. Thus, regeneration protocol demonstrated in the present study provides a basis for the germplasm conservation and investigation of its medicinally active constituents.

**Keywords:** Cotyledonary explant, cytology, histological observations, *ocimum citriodorum*

## EVALUATION OF TGMS LINE OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) AT RAIPUR

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**Abstract :** Safflower is an often cross pollinated oilseed crop. The oil of safflower contains lenoleic and oleic acid supposed to be the best for human health. Number of spiny or non spiny varieties of safflower has been developed through the India. Now there is constant plateau in the yield, varieties A-1, Bhima and JSF-1 are some of the high yielding varieties their yield level is not crossed by most of the newly developed varieties. This constant yield plateau in safflower can be broken down by exploitation of heterosis, through development of hybrid varieties. To develop male sterile lines number of genetic tools such as CMS, GMS and now TGMS lines are in use and under testing. The major constraint in hybrid development through GMS is maintenance of male sterile lines and required skill hence not popular. At Nimbkar Agricultural Research Institute (NARI), Phaltan (Maharashtra), thermo genic male sterile (TGMS) lines TMS-3-6-7-9 in safflower has been identified. Its seed has been sent to Raipur for its evaluation for pollen sterility and its performance under rice based cropping system at Raipur.

**Keywords :** *Carthamus tinctorius*, crop, safflower

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## **COMPARATIVE CYPSELAR FEATURES OF TWO SPECIES OF *TAGETES* (TAGETEAE-ASTERACEAE) AND THEIR TAXONOMIC SIGNIFICANCE**

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**Abstract :** Morphological and anatomical studies of cypselas in *Tagetes lucida* L. and *Tagetes tenuifolia* L. have been carried out in details with the help of light microscope. Some morphological features like cypselar surface hairs, carpodium, detachment area, pappus bristles have potential value for characterization. Anatomically, phytomelanin layer is present in the mesocarpic region and which is continuous in case of *Tagetes tenuifolia* and discontinuous in case of *Tagetes lucida*. In the cypselas of *Tagetes lucida*, testa and endosperm layers are uniseriately arranged, whereas in *Tagetes tenuifolia*, testal layer is uniseriately arranged but endosperm layer is biseriately arranged. Based on the above mentioned morpho-anatomical features, an artificial key to the studied taxa has been constructed.

**Keywords:** Diacritical features; tageteae; asteraceae

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## **BUD GROWTH AND POSTHARVEST PHYSIOLOGY OF GLADIOLUS AND CHRYSANTHEMUM-A REVIEW**

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**Abstract:** This paper deals with mechanism of flower bud growth and postharvest physiology of gladiolus and chrysanthemum. Both gladiolus and chrysanthemum are leading cut flowers trade in India as well as World. A spike of gladiolus occurs of an acropetal sequence of stage of bud development on a single axis. A critical stage in flower bud growth in the spike of gladiolus is initiated by gibberellic acid and sustained by sucrose. The important role of continued and sequential basipetalis starch hydrolysis in the gladiolus petals could be to maintain by constant osmotic as well as a sink potential in the growing area of the petal. In case of, Chrysanthemum flower fresh and dry weights of the ray florets increase until the capitula is fully open. The soluble protein content declines after opening of capitula. The maximal activity of this enzyme and acid invertase coincide with the period of highest increment in fresh and dry weight. Postharvest senescence of gladiolus and chrysanthemum depends mainly of their methods of harvesting, transporting and increase the longevity of flowers. Two factors play a major role in regulating the vase life of cut flower are carbohydrate supply and water balance. This can be achieved through using of sucrose along with any of the following chemicals CoCl<sub>2</sub>, NiCl<sub>2</sub>, FeCl<sub>2</sub> and AgNO<sub>3</sub>.

**Keywords:** Gladiolus, chrysanthemum, bud growth, postharvest, physiology, vase life

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## **MOLECULAR CHARACTERIZATION OF CHRYSANTHEMUM (*CHRYSANTHEMUM MORIFOLIUM* RAMAT) GERMPLASM USING RAPD MARKERS**

**Deeksha Baliyan, Anil Sirohi, Devi Singh, Mukesh Kumar, Sunil Malik and Manoj Kumar Singh**

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**Abstract:** Genetic variation among 24 chrysanthemum cultivars was examined by RAPD markers. A total of 79 fragments was produced with 10 RAPD primers and out of which 64 (81.01%) were found polymorphic and 15 bands (18.99%) monomorphic. The number of polymorphic fragments varied from 4.0 (OPF13) to 15 (OPF06) with an average of 7.9 bands per primer. The PIC was varied from 0.10 to 0.66 with an average .50, MI varied from 0.36 to 6.99 with an average 2.92 and RP value was noted in the range from 5.17 to 14.50 with an average 9.40. UPGMA clustering revealed two major groups (Group 1 and Group 2) and these further divided into seven clusters. Among the 24 genotypes, Poncho, Terri, Rangoli, Sweta, Ravikiran and Nanco are divergent and may be useful for breeding programme. Results suggested that RAPDs are highly useful for assessing the genetic diversity analysis among the chrysanthemum germplasm and parental selection studies in chrysanthemum.

**Keywords:** Chrysanthemum, molecular characterization, RAPD markers, genetic diversity

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**ASSESSMENT OF GENETIC DIVERSITY IN CHRYSANTHEMUM  
(CHRYSANTHEMUM MORIFOLIUM RAMAT) USING MICROSATELLITE MARKERS**  
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**Abstract:** The genetic diversity among 24 chrysanthemum cultivars was investigated by 07 Simple Sequence Repeats (SSRs). A total of 16 bands were produced out of which 15 bands were found polymorphic and 01 band monomorphic. The number of polymorphic fragment varied from 02 (RM1) to 03 (RM433) with an average 2.14 fragment per primer and percent polymorphism varied from 66.75 to 100% with an average of 93.75%. The PIC varied from 0.42 to 0.95 with an average of 0.74. The RP and MI ranged from (0.83 to 0.57) to (4.0 and 2.76) with an average (2.03 and 0.57) respectively. The UPGMA clustering revealed two major groups and found considerable amount of genetic diversity. Among the 24 cultivars, Ravikiran, Selection 44, Kundan, Terri, Sonton and Poncho are divergent and may be used for breeding programme Results suggested that SSRs are highly useful for assessing the genetic diversity analysis among the chrysanthemum germplasm and parental selection studies in chrysanthemum.

**Keywords:** Chrysanthemum, molecular characterization, SSR marker, genetic diversity

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**PHENOLOGICAL BEHAVIOUR OF SELECTED TREE SPECIES IN TROPICAL  
DECIDUOUS FOREST OF HASTINAPUR REGION IN WESTERN U.P.**

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**Abstract :** Vegetative and reproductive phenology of 20 selected tree species in tropical deciduous forest of Hastinapur region in western U.P. was monitored through fortnightly visit during November 2009 to December 2011 revealed that there exists a strong seasonality for leaf flush, leaf fall, flowering and fruiting phenophases. A considerable variation was found in leaf flushing, leaf fall, flowering and fruiting behaviour that could be partly attributed to biotic and abiotic factors. Peak activity of leaf fall and leaf emergence that occurred in the early dry period, could be to take full advantage of the first rainy season for vegetative growth and reproduction. Interphenophases duration between phenological events varied for different selected dominant tree species. The fruiting phenology follows closely the flowering phenology. The duration of maturation of leaves was the shortest, while that of fruit ripening was the longest.

**Keywords:** Hastinapur, phenology, tree species, tropical deciduous forest, etc.

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**EFFECT OF ZINC AND IRON APPLICATION ON YIELD AND ACQUISITION OF  
NUTRIENT ON MUSTARD CROP (BRASSICA JUNCIA L.)**

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**Abstract:** The field experiment was conducted on Pusa Bold variety of Mustard with 10 treatments in RBD in rabi season-2009-10 at Crop Research Centre of, Sardar Vallabhbhai Patel University of Agriculture and Technology; Meerut (U.P). Maximum primary branches (11.05), secondary branches (31.33), Siliqua per plant (545.35), number of seed per Siliqua (13.55), seed weight per plant 30.38 g and test weight (1000 seed weight, 6.50 g) were recorded, the biological yield was observed highest (114.80 q ha<sup>-1</sup>) and the grain yield was also (23.40 q ha<sup>-1</sup>) in T9{ 100 per cent NPK (RDF) + Zn @ 25 Kg ha<sup>-1</sup> (B) + Fe @ 25 Kg ha<sup>-1</sup> (B)}. The maximum Stover yield noticed 91.40 q ha<sup>-1</sup> as compared to T1 (control) (40.82 q ha<sup>-1</sup>), highest total nitrogen uptake by mustard crop, recorded 97.87 kg/ha, in case of phosphorus and potassium uptake by mustard crop was also observed 21.82 kg/ha and 152.82 kg/ha, respectively. The all over present investigation shows that the maximum yield attributes was found when zinc and iron was applied basal with recommended dose of fertilizers.

**Keywords:** Mustard, micronutrient, uptake Kg ha<sup>-1</sup>

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**EFFECT OF TIME AND METHOD OF BUDDING IN BER (ZIZYPHUS MAURITIANA  
LAMK.)**

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**Abstract:** Ring budding gave better response than patch and shield budding with respect to bud take, bud sprouting and vegetative growth followed by patch budding, while shield budding showed poor response. Budding performed on 15<sup>th</sup> June showed better response with respect to all the character studied followed by 30<sup>th</sup> June and budding done on 15<sup>th</sup> April showed poor response. On the basis of the above observation, it is concluded that there is tremendous possibilities of commercialization of asexual propagation in ber by adopting ring budding performed on 15<sup>th</sup> June followed by 30<sup>th</sup> June.

**Keywords:** Ring budding, patch budding, shield budding, bud sprouting

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## **RESPONSE OF HYBRID RICE (*ORYZA SATIVA* L.) TO INTEGRATED NUTRIENT MANAGEMENT (INM) IN PARTIALLY RECLAIMED SODIC SOIL**

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**Abstract :** The field experiment was carried out at Instructional Farm of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) during *Kharif* season of 2010 and 2011 to study the response of hybrid rice to Integrated Nutrient Management on grain yield, nutrient uptake and economics of various treatments and their effect on physico-chemical properties of soil after harvest of the crop. The experiment was carried out on silt loam soil having pH 8.9, EC 0.4 dSm<sup>-1</sup> organic carbon 3.6mg kg<sup>-1</sup>, Available N 194.00, P<sub>2</sub>O<sub>5</sub> 14.46 and K<sub>2</sub>O 246.80 kg ha<sup>-1</sup>. The Seven treatments of integrated nutrient management practices (T<sub>1</sub> -100% NPK, T<sub>2</sub> -75% NPK T<sub>3</sub> -50% NPK, T<sub>4</sub> -75% NPK +25% FYM-N, T<sub>5</sub> -50% NPK +50% FYM-N T<sub>6</sub> -25% NPK+75% FYM-N and T<sub>7</sub> -100% FYM-N) were tested in randomized block design, replicated thrice. The maximum grain yield (69.26 qha<sup>-1</sup>), straw yield (83.22qha<sup>-1</sup>), nutrient uptake of N (155.32 kg ha<sup>-1</sup>), P (44.15 kg ha<sup>-1</sup>), K (158.23kg ha<sup>-1</sup>) were recorded with the application of 75% NPK +25% FYM-N (T<sub>4</sub>) which were significantly superior over 75% NPK and 50% NPK + 50 % FYM-N, minimum was recorded with 100 % N through FYM. The maximum gross income Rs. 70489.0 ha<sup>-1</sup> was recorded with 75% NPK +25% FYM-N (T<sub>4</sub>) followed by 100% NPK ( T<sub>1</sub>).

**Keywords :** INM, hybrid rice, sodic soil

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## **CULTIVATION OF MEDICINAL PLANTS IN NATURAL ECOSYSTEM IN GUJARAT (INDIA): CONSTRAINTS AND CONSERVATION NEED**

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**Abstract :** The present paper deals briefly about cultivation of medicinal plant of Gujarat. The number of plant species yielding raw materials used by the industry on regular basis and/or in substantially large quantities is put at around 143 species. Among these, 78 species occur wild in forests or other forms of natural vegetation, 23 species grow as weed, 42 species are grown as cash crop for other plant based products and 22 species are cultivated as medicinal crop. There has been a tremendous increase in the production of herbal medicines and other items in recent years. These include such important sources of raw materials as *Aegle marmelos*, *Commiphora wightii*, *Embllica officinalis*, *Eucalyptus*, *Mentha viridis*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula*, *Withania somnifera* and *Zingiber officinalis*. Few effects have been made to highlight the problems encountered for necessary constraints and conservation need to medicinal plants in this state.

**Keywords:** Medicinal plant, conservation, cultivated, natural vegetation, Gujarat

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## **RESPONSE OF PHOSPHORUS AND WEED CONTROL MEASURES ON YIELD AND YIELD CONTRIBUTING CHARACTERS OF CHICKPEA (*CICER ARIETINUM* L.)**

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**Abstract:** The field experiment was conducted during the rabi season of 2005-06 at Agronomy Research Farm at Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj) Faizabad, U.P. to, study the "Effect of phosphorus and weed control measures on growth and yield of chickpea (*Cicer arietinum* L.)" variety udai (KPG-59). Sixteen-treatment combinations comprised of four levels of phosphorus (control, 20, 40 and 60 kg P<sub>2</sub> O<sub>5</sub> ha<sup>-1</sup> ) and four treatment of weed control measures (weedy check, Hand weeding at 30 DAS, pendimethline at 1 kg ha<sup>-1</sup> and rice straw mulch) were tested in Randomized Block design with three replications . Growth and yield attributes as well as root length, number of take were affected significantly due to increase the phosphorus levels. However, weed density and weed dry

weight were decreased significantly with increasing levels of root nodules and nodules dry weight, nitrogenase activity and nitrogen and phosphorus up phosphorus. Among the weed control measures, hand weeding at 30 DAS found promising to reduce the weed density as well as weed dry weight. Hand weeding at 30 DAS proved its superiority over other methods of weed control in respect of all the growth characters and yield attributes as well as grain and straw yield of chickpea crop followed by pendimethline at 1.0 kg ha<sup>-1</sup>. On the basis of economics the highest net return was recorded under the effect of Hand weeding at 30 DAS alone has been found most remunerative which was recorded the highest net income rupee invested of Rs 3.52

**Keyword:** Chickpea, phosphorus levels, weeds control measures

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**VARIABILITY AND GENETIC PARAMETERS FOR GRAIN YIELD AND ITS QUALITY ATTRIBUTES IN CMS BASED RICE HYBRIDS (*ORYZA SATIVA* L.)**  
**Madhuri Grace Minz, Deepak Sharma, Alice Tirkey, Fakeer Chand Sao, Laxmi Singh and Hadassah Ch.**

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**Abstract:** The present investigation is carried out to the genetic parameters for yield and its quality attributes in eighteen rice hybrids. Analysis of variance revealed significant differences for all traits under study. The characters viz. biological yield per plant(g), grain yield per plant(g), number of unfilled spikelet/plant, number of filled spikelet/plant, productive tiller/plant, spikelet fertility%, pollen fertility %, kernel length breadth ratio and harvest index. High GCV and PCV were recorded for traits viz., followed by biological yield/plant, grain yield/plant, number of unfilled spikelet/plant, number of filled spikelet/plant, productive tiller/plant, spikelet fertility%, pollen fertility%, kernel length breadth ratio and harvest index. High heritability coupled with high genetic advance as percent of mean was registered for grain yield/plant(g), number of unfilled spikelet/panicle, number of filled spikelet/panicle, productive tiller/plant, tiller/plant, spikelet fertility %, pollen fertility %, kernel length breadth ratio, harvest index, brown rice length breadth ratio, flag leaf area(cm<sup>2</sup>), hundred seed weight(g), plant height(cm), head rice recovery percentage, flag leaf length(cm), kernel length(cm), brown rice(cm), leaf area index, paddy length breadth ratio, paddy breadth(cm) suggesting preponderance of additive gene action in the expression of these characters.

**Keywords:** Variability, Heritability, Genetic advance, Hybrid rice

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**IDENTIFICATION OF COLD TOLERANT GENOTYPES AT SEEDLING STAGE IN RICE (*ORYZA SATIVA* L.)**

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**Abstract:** In Chhattisgarh, rice is also grown during summer season in about 2 lakh hectares, mainly in areas with canal irrigation. Usually the productivity during summer is higher than *Kharif* season. However, in this season the sowing is usually done in the month of December or January during which the minimum temperature is low, which results in poor seedling establishment, stunting, yellowing and mortality. To overcome the problem of damage caused by low temperature, rice breeders have been making efforts to develop more cold-tolerant cultivars mainly at seedling stage. In this study, 17 different genotypes, including commonly grown varieties, were screened under field condition during December-January 2011 and 2012 during seedling stage at Research cum Instructional Farm, IGKV, Raipur (C.G.). The minimum temperature during this period was below 10°C at-least for a 12 days. Lines were evaluated on 1-9 score according to SES of rice, IRRI. Genotypes Samleshwari, Annada and R-RF-75 showed dark green leaf colour with score 1, while Sahbhagidhan and IR-84887-B-15 exhibited yellowing of leaf with score of 9 and 7, respectively. The result of this study is discussed in context of breeding value and practical significance from farmers' point-of-view.

**Keywords:** Rice *Oryza sativa* L., cold tolerance, seedling stage screening

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**INFLUENCE OF ORGANIC AND INORGANIC FERTILIZERS ON GROWTH, YIELD AND ECONOMICS OF POTATO CROPS UNDER CHHATTISGARH PLAINS**

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**Abstract:** The field experiment was conducted at the All India Coordinated Research Project on Potato, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh during *Rabi* 2013-2014 in factorial randomized block design with fifteen treatment combinations consisting of different levels of RDF as (75%, 100% and 150% NPK) and different organic fertilizers as (FYM, PSB and *Azotobacter*) were replicated three times. Among the inorganic fertilizer treatments 150% RDF performed better over other treatments, while in case of organic fertilizer treatments PSB + *Azotobacter* was found superior

than others. The interaction between organic and inorganic fertilizers was found differ non significantly. The results indicated that the highest gross return (Rs 271480 ha<sup>-1</sup>), net return (Rs 192827.52 ha<sup>-1</sup>) and benefit: cost ratio (Rs 2.45) was obtained under 150% RDF with PSB + *Azotobacter*.

**Keywords:** Potato, fertilizers, biofertilizers, yield

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## **EFFECT OF DIFFERENT LEVELS OF FYM, PRESS MUD AND ZINC SULPHATE APPLICATION ON SOIL PROPERTIES**

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**Abstract:** An experiment was conducted during the years 2006-2007 and 2007-2008 at farmers field to find out the effect of farm yard manure (FYM), press mud and in combination of inorganic fertilizer zinc sulphate. The rice variety PRH 10 was grown with thirteen treatments *i.e.* T<sub>1</sub> = Control; T<sub>2</sub> = FYM 5 t ha<sup>-1</sup> + 0.0 kg ZnSO<sub>4</sub>; T<sub>3</sub> = FYM 5 t ha<sup>-1</sup> + 2.5 kg ZnSO<sub>4</sub>; T<sub>4</sub> = FYM 5 t ha<sup>-1</sup> + 5.0 kg ZnSO<sub>4</sub>; T<sub>5</sub> = FYM 5 t ha<sup>-1</sup> + 7.5 kg ZnSO<sub>4</sub>; T<sub>6</sub> = FYM 10 t ha<sup>-1</sup> + 0kg ZnSO<sub>4</sub>; T<sub>7</sub> = FYM 10 t ha<sup>-1</sup> + 2.5 kg ZnSO<sub>4</sub>; T<sub>8</sub> = FYM 10 t ha<sup>-1</sup> + 5.0 kg ZnSO<sub>4</sub>; T<sub>9</sub> = FYM 10 t ha<sup>-1</sup> + 7.5 kg ZnSO<sub>4</sub>; T<sub>10</sub> = Press mud 5 t ha<sup>-1</sup> + 0.0 kg ZnSO<sub>4</sub>; T<sub>11</sub> = Press mud 5 t ha<sup>-1</sup> + 2.5 kg ZnSO<sub>4</sub>; T<sub>12</sub> = Press mud 5 t ha<sup>-1</sup> + 5.0 kg ZnSO<sub>4</sub>; T<sub>13</sub> = Press mud 5 t ha<sup>-1</sup> + 7.5 kg ZnSO<sub>4</sub>. After the crop harvest soil samples were analyzed for physico-chemical parameters. The results showed that application of FYM and press mud in combination enhanced the soil organic carbon, available N, available P, available K and DTPA extractable Zn in soil solution. The highest increment was observed in the application of FYM 10t ha<sup>-1</sup> + 7.5 kg ZnSO<sub>4</sub> compared to rest of the treatments. In conclusions, use of FYM and press mud with inorganic fertilizers enhanced the plant nutrient level in soil solution for better crop yield.

**Keywords:** Farm Yard Manure (FYM), press mud, soil properties, zinc sulphate

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## **GENETIC VARIABILITY, CORRELATION AND PATHCOEFFICIENT ANALYSIS OF SOME YIELD COMPONENTS OF MUNGBEAN (*VIGNARADIATA* L.)**

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**Abstract:** Genotypic and phenotypic coefficient of variation, heritability, genetic advance was evaluated for yield and its contributing characters in 30 mungbean genotypes significant variations among the genotypes were observed for all the characters. Analysis of variance revealed that mean sum of squares due to genotypes were highly significant for all the characters except number of pod per clusters, 100 seed weight whereas, pod length shown significant differences thus revealing the existence of considerable variability in the material studied. Analysis of Variance was given in table no.4. High heritability coupled with high genetic advance was recorded for seed yield per plant, number of pod per cluster, plant height and days to 50% flowering. Indicating these characters would be best for phenotypic selection. The correlation coefficient analysis revealed high significant positive association of plant height, number of flower per raceme, number of seed per pod, petiole length, number of pod per clusters, pod length, days to 50% flowering and days to maturity and significant positive association of 100 seed weight with seed yield per plant. The path coefficient analysis showed that, days to 50% flowering had the highest direct effect on seed yield. The estimated Genotypic Coefficient of Variation (GCV) and Phenotypic Coefficient of Variation (PCV) helped in getting a clear understanding of the variability present among the various genotypes. The GCV was maximum for seed yield per plant (32.70%). The phenotypic coefficient of variation was high for seed yield/plant (35.43%), number of pod per cluster (21.62%) and plant height (20.64%).

**Keyword:** Mungbean, correlation, variability, path analysis

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## **METHODS AND PRACTICAL ASPECTS IN MUNGBEAN HYBRIDIZATION**

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**Abstract:** Mungbean [*Vigna radiata* (L.) Wilczek] is one of the short duration pulse crop predominantly cultivated in Asia. It is a self pollinated crop where crossing or hybridization is tedious. Under field conditions easy and efficient crossing technique is needed to exploit genetic potential of mungbean. Due to complexity and lack of appropriate crossing technique,

outcomes achieved have been less in mungbean. From last five decades scientists were developing different methods of hybridization to accelerate the success rate of crossing in mung. However Khattak and co-researchers developed efficient new technique where more pod setting was observed. Based on limited available information, this review summarizes the methods of crossing techniques and practical measures followed during hybridization in mungbean.

**Keywords:** *vigna radiata*, mungbean, crossing, hybridization

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### **ASSESSMENT OF INTERNET USING BEHAVIOR OF POST GRADUATE AGRICULTURE STUDENTS IN CHHATTISGARH**

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**Abstract:** The present investigation entitled “Study on Utilization Pattern of Information and Communication Technology (ICT) By the Agriculture Post Graduate Students” was conducted in India Gandhi Agriculture University, Raipur (C.G.). There are around 380 students studying in P.G. (M.Sc. 340 and M.Tech. 40) in faculty of Agriculture and Agriculture Engineering during the session of 2013-1014. Out of them 50% students were selected randomly for this study. The findings of this study revealed that maximum number of students were medium extent of utilization of internet

**Keywords:** Internet utilization, behavior, Chhattisgarh

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### **YIELD AND ECONOMICS OF FINGER MILLET INFLUENCED BY POST EMERGENCE HERBICIDES**

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**Abstract :** Finger millet (*Eleusine coracana* L.) is an important small millet crop that is hardy and grows well in dry zones as rain-fed crops. It is used both as medicinal and traditional purposes. Finger millet is a high stature crop with slower initial growth which remains under smothering due to the infestation of weeds at early stages of growth. This situation causes higher competition and may result in drastic reduction in yield up to 20 to 50 per cent (Kushwaha *et al.*, 2002). The critical period of crop weed competition for the finger millet varies from 25-45 days after sowing (Lall and Yadav, 1982). Manual weed management, which is the most prevalent method for weed management in finger millet, requires a lot of labour. Now a day, due to the scarcity of labours, chemical weed management is considered as better option than the hand weeding. It may increase over all benefit of finger millet cultivation. The work on effect of post emergence herbicides in weed management of finger millet is very limited; therefore, keeping these points in view the present investigation was carried out for evaluation of post-emergence herbicides for weed management in direct sown finger millet.

**Keywords:** Weed management, finger millet, herbicide

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### **PROSPECTS OF UTILIZING WATER CABBAGE (*LIMNOCHARIS FLAVA* (L.) BUCHENAU) BIOMASS AS AN ALTERNATE ORGANIC MANURE SOURCE**

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**Abstracts :** Water cabbage (*Limnocharis flava* (L.) Buchenau) (Malayalam name: *Malamkoovalam / Nagapola*), an aquatic invasive alien weed was introduced as an ornamental plant in India. Now it has invaded vast tracts of low lying wetland system in Kerala and has become a serious threat to paddy cultivation. The weed clogs irrigation tanks and drainage channels, resulting in poor drainage. The luxuriant vegetative growth coupled with the fast spreading root systems extract large quantities of nutrient elements from the soil. Sannigrahi *et al.* (2002) reported that large scale utilization is the only way to control noxious aquatic weeds which require no tillage, fertilizer or nourishment for their proliferation. Non availability of good organic source at cheaper rates is another serious problem faced by farmers interested in organic crop production. Information on quality of the weed biomass as a source of manure would motivate farmers to manage such weeds through utilization. The present study was conducted to assess the possibility of utilizing the luxuriant weed biomass of water cabbage through vermicomposting.

**Keywords :** Water, cabbage, utilization, fertilizer

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### **ANALYSIS OF FACTORS ASSOCIATED WITH THE PRODUCTIVITY OF SCENTED RICE VARIETIES AMONGST THE TRIBAL FARMERS OF JASHPUR DISTRICT (CHHATTISGARH)**

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**Abstract:** The present study was conducted in Jashpur district (Chhattisgarh) among scented rice growing tribal farmers. Total 4 blocks were purposively selected for the study and three villages were selected randomly from each selected block. Twelve scented rice growing tribal farmers were selected randomly from each selected village. Thus the total 144 scented rice growing farmers (12X12=144) were considered as respondent for this study. The results of the study revealed that the productivity of scented rice varieties of respondents was found to be positively and high significantly related with the three variables viz. extension participation, source of information and contact with extension personnel at 0.01 per cent level of probability.

**Keywords:** Scented rice, productivity, adoption, factors

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## **ANALYSIS OF FACTORS ASSOCIATED WITH THE TECHNOLOGICAL GAP IN ADOPTION OF RECOMMENDED PRODUCTION TECHNOLOGY OF BLACK GRAM AMONG TRIBAL FARMERS OF JASHPUR DISTRICT (CHHATTISGARH)**

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**Abstract:** Present study was conducted in Jashpur district (Chhattisgarh) among tribal farmers. Total three blocks were purposively selected for the study; four villages were selected randomly from each selected block to make a total of 12 villages in the sample. Ten black gram producing tribal farmers were selected randomly from each selected village. Thus the total 120 black gram growers (10X12=120) were considered as respondent for this study. The results of the study revealed that the technological gap of respondents was found to be negatively and significantly related with the independent variables viz.:- extension participation, land holding, annual income, credit acquisition, source of information, contact with extension personnel, knowledge level.

**Keywords:** Technological gap, black gram

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## **MAJOR WEED SPECIES IN FINGER MILLET**

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**Abstract :** The experiment comprising 13 weed management practices which comprised single application of different post-emergence herbicides either alone or in combination and hand weeding was conducted on Clayey *Vertisols* soil of College of Agriculture, Raipur during *khariif* season of 20012. *Echinochloa colona* among grasses, *Cyperus iria* among sedges and *Alternanthera triandra*, *Eclipta alba* and *Phyllanthus urinaria* among broad leaf weeds were dominant. Over all the most dominant species was *Echinochloa colona* which ranged between 24-46 per cent at all the growth stages.

**Keywords:** Major weed species, finger millet

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## **IMPACT OF WEED MANAGEMENT PRACTICES ON WEED CONTROL, NODULATION, RHIZOBIUM POPULATION AND YIELD IN SOYBEAN**

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**Abstract:** The experiment using JS 97-52 variety of soybean was laid out during *khariif* season of 2013 at the Research Cum Instructional Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) using Randomized Block Design, comprising four replications and eight treatments. The result revealed that highest number of root nodules plant<sup>-1</sup> was recorded under hand weeding twice at 20 and 40 DAS, however it was found comparable with Sulfentrazone @ 300 g a.i. ha<sup>-1</sup>as PE + Imazethapyr @ 100 g a.i. ha<sup>-1</sup> as PoE. The lowest root nodules plant<sup>-1</sup> was registered under untreated control. Maximum dry weight of nodules plant<sup>-1</sup> was recorded under hand weeding twice at 20 and 40 DAS as compared to other treatments, however it was on par with Sulfentrazone @ 360 g a.i. ha<sup>-1</sup> as PE and Sulfentrazone @ 300 g a.i. ha<sup>-1</sup>as PE + Imazethapyr @ 100g a.i. ha<sup>-1</sup> as PoE. The lowest weight of root nodules plant<sup>-1</sup> was registered under untreated control. Maximum rhizobial population was observed under treatment untreated control, which was at par with treatment hand weeding twice at 20 and 40 DAS, and minimum rhizobial population was observed under treatment Pendimethalin @ 1 kg a.i. ha<sup>-1</sup> as pre-emergence. Minimum density and dry weight of weeds were also registered under Hand weeding twice at 20 and 40 DAS.

**Keywords:** Nodule number, rhizobium population, weed control, soybean

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## **PROBING BEHAVIOUR OF NILAPARVATA LUGENS (STAL.) ON RICE PLANT AS INFLUENCED BY POTASH APPLICATION**

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**Abstract:** Rice is an important cereal crop of the world which is known to be attacked by several insect pest during its different development stages out of these brown plant hopper (*Nilaparvata.lugens*) is an important insect pest of rice. The main approach for the management of this pest has been through the chemical methods which has resulted several problems; therefore the fertilizer components affecting the biophysical parameters of the host ultimately influencing the probing behaviour of BPH (*N.lugens*) was thrust point of investigation. In present study the major components of fertilizer viz., nitrogen was tested at 0, 40, 60, 100, 160, 220, 280, 340, 400 and 460 kg/ha and its impact on the probing behaviour of *N.lugens* was recorded. There was significant negative correlation ( $r = -0.99$ ) between probe marks and nitrogen doses. The regression equations for probe marks in relation to different nitrogen levels applied was  $= 0.0324x + 4.9589$ .

**Keywords:** *Nilaparvata lugens*, paddy, probing behaviour, brown plant hopper

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## **EVALUATION OF NEWER INSECTICIDES AGAINST WHITE BACKED PLANT HOPPER (*SOGATELLA FURCIFERA* HORVATH) OF RICE CROP.**

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**Abstract:** Rice is an important cereals crop of the world which is known to be attacked by large numbers of insect pest during its different development stages, out of this white backed plant hopper (*Sogatella furcifera*) is an important insect pest of rice. Evaluation of newer insecticides combine them with present one and new formulations of older molecules was thrust point of investigation viz. incidence of white backed plant hopper (*Sogatella furcifera*) was found in best reducing form by the application of ethiprole + imidacloprid @ 100g.a.i./ha and alika 247 ZC @ 44 g.a.i./ha were observed as effective insecticide for minimizing the WBPH incidence.

**Keywords:** *Sogatella furcifera*, cereal crop, insecticide

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## **EFFECT OF P SOLUBLIZING BACTERIA ON YIELD OF WHEAT AND NUTRIENT AVAILABILITY IN ACID SOIL IN VARANASI REASON**

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**Abstract :** A field experiment was conducted for two rabi crop during season 2009-2010 at Varanasi.To study the effect of application of rack phosphate along with P solublizing microorganism on yield of wheat and nutrient availability in inseptisol. The experiment finding the grain yield was significant increased with rack phosphate application up to 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> highest yield was recorded with the addition of rack phosphate and P solublizing bacteria in combination of rack phosphate @60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>. A significant increase in organic carban and available NPK was also observed with use of rock phosphate +P solublizing bacteria. The result indicate that yield, maintained the soil health minimizing the cost of P fertilizer.

**Keyword :** Rock Phosphate, P use efficiency, wheat, PSM

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## **EFFECT OF POST EMERGENCE HERBICIDE ON GROWTH AND YIELD OF FINGER MILLET**

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**Abstract:** The experiment comprising 13 weed management practices which comprised single application of different post-emergence herbicides either alone or in combination and hand weeding was conducted on Clayey *Vertisols* soil of College of Agriculture, Raipur during *kharif* season of 20012. *Echinochloa colona* among grasses, *Cyperus iria* among sedges and *Alternanthera triandra*, *Eclipta alba* and *Phyllanthus urinaria* among broad leaf weeds were dominant. Hand weeding twice recorded the highest grain yield and net return. This higher yield in Hand weeding twice was reflected in terms of better yield parameter like Number of fingers m<sup>-2</sup>, finger length, number of fingerlet finger<sup>-1</sup>, grains finger<sup>-1</sup> and test weight and growth parameter like plant height, dry matter accumulation, Number of tillers. Application of ethoxysulfuron registered the highest B:C ratio which was at par with metsulfuron methyl + chlorimuron ethyl and hand weeding twice.

**Keywords:** Weed management, Finger millet, herbicide