

culture filtrate (FCF) of *Sclerotium rolfsii* that was prepared from Raichur and Dharwad isolates. Culture filtrate @ 0, 25, 50 and 75 per cents was included in to MS Media with 2.5 mg/lit 2, 4 - D. In presence of culture filtrate a few mutant resistant cell lines were identified based on survival of calli and were subjected to regeneration. Plants were regenerated and transferred to pots.

Analysis of regenerates was carried out using PCR that indicated differences among culture filtrate tolerant plants and controls. A few *in vitro* regenerated plants flowered on rooting media. A field evaluation of 548 accessions indicated differential reactions to diseases. A set of 331 accessions was identified as resistant lines. Further, *in vitro* selected resistant cell lines should be tested under field conditions.

Characterization of Asian Core Collection of Groundnut (*Arachis hypogaea* L.)

B.P.MALLIKARJUNA SWAMY

2002

MAJOR ADVISOR: Dr. P.V. KECHANAGAUDAR

Groundnut (*Arachis hypogaea* L.) is one of the important oil seed crop. It is cultivated in the 96 countries with a world production of 33.07 m.t. on an area of 22.74 m.ha. For any crop improvement programme it is essential to evaluate the germplasm accessions, to identify the superior sources. So in the present study a core collection of 504 accessions were evaluated at Raichur and Kawadimatti during 2000 rainy and 2001 post rainy seasons.

Characterization of Asian core collection revealed that erect type of growth habit, alternate and sequential branching pattern, absence of stem pigmentation, sub glabrous with one or two rows of hairs on the stem, light green leaf colour, almost sub-glabrous type of leaf surface, elliptic leaf shape, orange flower colour, presence of peg colour, 2-1 seeded pods, slight to moderate beak and constriction, moderate reticulation, tan seed color dominated the core collection.

Analysis of variance indicated the entry as a major source of variation, mean, median and Levene's tests were found significant and wider variations were observed for almost all the traits, with highest coefficient of variation for number of primary branches, number of pegs per plant and number of mature pods.

Association of different traits revealed significant correlation with most of the traits. Almost all the traits exhibited moderate to high level of diversity and superior accessions were identified like ICG 3148, ICG 116, ICG 3048, ICG 15125 for oil content, ICG 13942, ICG 6377, ICG 15015, ICG 10707, ICG 3954, ICG 11197, ICG 13934, ICG 4453, ICG 7867, ICG 121, ICG 11328, for shelling percentage, ICG 521, ICG 6996, ICG 15017, ICG 521, ICG 2918, ICG 9581 for seed weight and ICG 2990, ICG 2986, ICG 3048, ICG 13324 for early maturity were identified.

SEED SCIENCE AND TECHNOLOGY

Influence of Seed Treatment with Chemicals and Botanical on Storability and Field Performance of Fresh and Aged Hybrid Cotton Seeds

G.M. SANDYA RANI

2002

MAJOR ADVISOR: Dr. M. SHEKHARGOUDA

An experiment was conducted to find out the influence of seed treatment with chemicals and botanical on storability of fresh and hybrid cotton seeds and field performance of fresh and aged DHB-105 hybrid cotton seeds.

Storage experiment consisted of three cotton hybrids viz., DHB-105, DCH-32 and NHH-44 as first factor, two different aged seeds viz., fresh seeds and revalidated seeds as second factor and six seed treatments viz., bavistin, CaOCl₂, arappu leaf powder, bavistin + CaOCl₂, and bavistin+ arappu leaf powder and untreated (control) as third factor and laid out in Completely Randomised Design with factorial concept. Storage study was made in

the laboratory of Seed Science and Technology, University of Agricultural Sciences, Dharwad, from March 2000 to February 2001.

The results of the storage experiment indicated that cotton hybrid DRB-105 seeds recorded significantly higher germination (60.48%), seedling dry weight (40.50 mg), vigour index (1429) and field emergence (40.50%) besides recording lower electrical conductivity (61.50 dSm⁻¹), per cent fungal (6.4) and insect (10.15) infestation at the end of twelve months storage while, fresh seeds showed better performance with higher germination (64.05%), seedling dry weight (40.29 mg), vigour index (1602) and minimum electrical conductivity (52.7 dSm⁻¹),

Abstract of Theses

per cent fungal (4.25) and insect (7.52) infestation. Seeds treated with bavistin + CaOCl_2 maintained higher germination and seedling vigour character even after twelve months storage.

Field experiment was carried out during kharif 2000 at Main Research Station, University of Agricultural Sciences, Dharwad, with two different aged seeds viz., fresh seeds and revalidated seeds as one factor and six seed treatments viz., bavistin, CaOCl_2 , arappu leaf powder,

bavistin + CaOCl_2 , bavistin + arappu leaf powder and untreated (control) as another factor and laid out in Randomised Block Design with factorial concept.

Fresh seeds recorded maximum plant height along with higher number of bolls per plant (40.8), cotton weight per boll (4.00 g) and cotton yield per plant (107.2 g) compared to aged seeds. Treated seeds recorded significantly higher growth, yield and yield components over untreated seeds.

Effect of Gypsum, Boron, Harvesting and Post Harvest Ripening on Seed Yield and Quality in Tomato Cv. Megha

M.R. HAMSAVENI

2002

MAJOR ADVISOR: Dr. M.B.KURDIKERI

A field experiment was conducted to ascertain the effect of gypsum and boron on crop growth, fruit yield, seed yield and quality in Tomato Cv. Megha at University of Agricultural Sciences, Dharwad during kharif 2000. The experiment comprised of four levels of gypsum as soil application viz., 0, 100, 125 and 150 kg per ha and three levels of foliar application of boron viz., 0, 0.1 and 0.5 per cent spray at 50 per cent flowering. Among the treatment combinations, soil application of gypsum @ 150 kg per ha and foliar spray of boron (0.5%) resulted in maximum plant height (114.30 cm), fruit size (17.70 cm), number of fruits per plant (44.97), fruit yield (34.01 t/ha), number of seeds per fruit (145.47), seed yield (264.97 kg/ha) and seed recovery (1.07%). Similarly this treatment combination recorded maximum seed quality parameters viz., 1000 seed

weight (3.02 g), germination (97.12%), vigour index (1378), seedling dry weight (3.34 mg) and field emergence (87.84%) while electrical conductivity of seed leachates was minimum (0.92 dSm^{-1}).

A study conducted to ascertain the effect of fruit harvesting stages (turning, yellow, half red and full red colour and post harvest ripening periods (0, 2, 4, 6, 8 and 10 days) on seed yield and quality in tomato. Fruits harvested at full red colour stage and kept upto two days of post harvest ripening period recorded highest seed weight per fruit (0.49 g), seed recovery (0.95%), 1000 seed weight (2.41g), germination (91.36%), vigour index (892), seedling dry weight (1.95 mg) and field emergence (85.73%) while, electrical conductivity was lowest (1.07 dSm^{-1}).

Influence of Nitrogen, Phosphorous, Spacing and Growth Retardants on Seed Yield and Quality of Ageratum (*Ageratum hou tonianum*)

BALACHANDRA R. AKKANAVAR

2002

MAJOR ADVISOR: Dr. V.K. DESHPANDE

A study on effect of nitrogen, phosphorous, spacing and growth retardant on seed yield and quality of ageratum was conducted at Main Research Station, University of Agricultural Sciences, Dharwad during summer 2001. The experiment -I consisted of twelve treatments comprising four levels of fertilizers viz., 75: 60:60 (F_1), 75: 75: 60 (F_2), 100: 60:60 (F_3) and 100: 75: 60 (F_4) kg NPK per ha and three spacing 30x30 cm (S_1), 30x45 cm (S_2) and 45x45 cm (S_3). It was laid out in factorial randomized block design with three replications. The experiment -II was consisted of ten treatments viz., Mepiquat chloride (MC) @ 250 and 500 PPM, Maleic Hydrazide (MH) @ 250 PPM and 500 PPM, TIBA @ 100 and 200 PPM, CCC @ 500 and

1000 PPM, water spray and control. The experiment was laid out in randomized block design with three replication.

The results indicated that significantly higher plant growth, chlorophyll content, plant dry matter production and higher yield components like number of capitulum per plant and higher seed yield per plant and higher seed quality components viz., germination percentage (65.7%), speed of germination, vigour index and seedling dry weight were recorded at 45 x 45 cm (S_3) spacing with the application of 100:75:60 kg NPK per ha. Where as application of 100:75:60 kg NPK/ha at lower spacing S_1 (30x30 cm) recorded higher seed yield per ha (161.4 kg) and net returns.

Among growth retardant spraying of MH @ 500 PPM recorded higher growth components viz. number of branches and leaves per plant, chlorophyll contents, dry matter production and higher yield components viz., number

of capitulum, seed weight per capitulum, seed germination percentage(67.0%), speed of germination, seedling vigour index and dry weight and higher net returns. Next best treatments were MH 250 PPM and TIBA 200 PPM.

Influence of Pre- Harvest Insecticidal Spray on Seed Yield and Quality and Post- Harvest Seed Treatments on Storability of Greengram (*Vigna radiata* (L.) Wilczek)

SANJEEVARADDI BIRADAR

2002

MAJOR ADVISOR: S. D. SHASHIDHARA

Field experiment was conducted at the Main Research Station, University of Agricultural Sciences, Dharwad during kharif season of 2000 to ascertain suitable insecticide and application stage for controlling the insect pests of greengram. Further, storage experiment to find out the effect of chemical or plant product treatment on storability of greengram seeds was carried out in the laboratory of the Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad.

Insecticides used for pre-harvest spraying at different stages of crop growth differed significantly with respect to yield, yield attributes and seed quality characteristics. However, their interaction effects were non-significant. Seed yield per hectare was significantly higher (7.98 q) with lower seed infestation (2.57%) and better seed quality characteristics in the treatment sprayed with monocrotophos 36 SL and the decreased seed yield per hectare (3.94 q) with higher seed infestation (12.25%) and lower seed quality characteristics was noticed with control.

Spraying of insecticides at 45 DAS recorded significantly higher seed yield per hectare (6.53 q) with lower seed infestation (4.41%) and better seed quality characteristics. Whereas, spraying of insecticides at 25 DAS recorded significantly lower seed yield per hectare (4.63 q) with higher seed infestation (9.60%) and lower seed quality characteristics.

Post-harvest seed treatment with chemicals and plant products differed significantly with respect to seed quality during ten months storage of greengram. Post-harvest seed treatment with the combination of captan + malathion and captan alone recorded significantly lower bruchid infestation (5.00% and 9.25%, respectively) and seed moisture content (9.63% and 9.70%, respectively) with higher seed quality attributes after ten months of storage. However, the control recorded significantly higher bruchid infestation (65.50%) and moisture content (10.33%) with lower seed quality parameters after ten months of storage.

Studies on Seed Treatment and Containers on Storability and Field Performance in Fresh and Aged Seeds of Paddy (*Oryza sativa* L.) Cv. Sonamasuri

BUKKA DEVA RAYALU

2002

MAJOR ADVISOR: Dr. M. SHEKHARGOUDA

An experiment was conducted to find out the influence of seed treatment and containers on storability and field performance in fresh and aged seeds of paddy Cv. Sonamasuri. The experiment consisted of two ages of seeds i.e. fresh and aged seeds as main factor, five seed treatments (bleaching powder, bavistin, arappu leaf powder, sweet flag rhizome powder and untreated as control) as sub factor and stored in ambient condition of Dharwad

Storage studies was made in the laboratory of Seed Science and Technology Department, College of Agriculture, Dharwad by adopting completely randomized design with factorial concept from March 2000 to February 2001. The field experiment was conducted at Agricultural Research Station, Gangavati during kharif 2000 by adopting randomized block design with factorial concept.

At the end of twelve months of storage fresh seeds recorded significantly higher 1000 seed weight

(13.02g), germination (78.6%), root length (10.02cm) shoot length (9.93cm), seedling dry weight (10.09 mg), vigour index (1535) and lower electrical conductivity (2.91dSm⁻¹) compared to aged seeds. Seed treatment with bleaching powder and polythen bag container maintained germination above the minimum certification standard (80%) up to end of ten months of storage.

The fresh seeds (A_0) recorded significantly higher productive tillers (254.26/sq.mt), number of spikelets (93.80/ panicle), seed set (90.71%) thousand seed weight (14.12g) compared to aged seeds (A_1). However it was to the extent of three per cent. In respect of seed quality, fresh seeds recorded higher germination (94.4%), shoot length (14.40cm), root length (13.36 cm), seedling dry weight (15.8 mg) vigour index (2621) and field emergence (88.90%) compared to aged seeds (A_1). The effect of seed treatments and storage containers showed non significant differences for growth, yield and quality parameters.

Abstract of Theses

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

A Case Study on Soil available Nutrient Status and Petiole Nutrient Concentration in Papaya Orchards of North Karnataka

S. MANOHAR GOUDA

2002

MAJOR ADVISOR: Dr. S.N. UPPERI

Survey was conducted during 2000-01 in the 28 papaya growing orchards of north Karnataka, with an objective to assess the available soil nutrient status and petiole nutrient concentration and to diagnose the most limiting nutrient through the concept of DRIS.

In general, pH of the soil were neutral to alkaline, electrical conductivity was optimum and in safe range, the organic carbon content in all the orchards, varied with in the limit.

The available nutrient status (mg kg^{-1}) of the papaya orchard soils in north Karnataka are in the range of, N (35-217 mg kg^{-1}), P (9-38 mg kg^{-1} (120-380 mg kg^{-1}); Ca (405-1444 mg kg^{-1}); Mg (57-1046 mg kg^{-1}), S (10-37.50 mg kg^{-1}); Cu (1.75-7.11 mg kg^{-1}); Mn (8.22-132.10 mg kg^{-1}), Fe (3.45-34.90 mg kg^{-1}); Zn (0.11-2.71 mg kg^{-1}) and B(0.25-3.13 mg kg^{-1}). The range of nutrient composition in sixth petiole from top are N (1.26-3.15%); P (0.15-0.56%); K

(1.70-4.80%), Ca (1.87-3.15%); Mg (0.64-1.65%); S (0.30-0.59%); Cu (15.90-59.90 mg kg^{-1}); Mn (73.70-182.30 mg kg^{-1}); Fe (30.90-316.90 mg kg^{-1}); Zn (15.40-28.40 mg kg^{-1}) and B(9.12-40.79 mg kg^{-1}).

The petiole nutrient norms were developed for obtaining sustained fruit yields. The optimum nutrients in the petioles were: 1.35-3.27 per cent N, 0.25-0.49 per cent P, 2.44 -4.46 per cent K, 2.45-3.09 per cent Ca, 0.93-1.65 per cent Mg, 0.33-0.56 per cent S, 17.77-26.43 mg kg^{-1} Zn, 17.37-43.37 mg kg^{-1} Cu, 69.48-105.58 mg kg^{-1} Fe, 82.81-140.71 mg kg^{-1} Mn and 18.08-38.96 mg kg^{-1} B.

The DRIS indices indicated that in most of the low yielding papaya orchards, boron was the most limiting nutrient. However, often more than one nutrient was found to limit the yield. In addition to boron, P, K, Mg, Ca, N and Zn were also equally yield limiting, although the order varied in individual orchards.

Effect of P- Sources and P -Solubilizers on Growth and Yield of Maize and Bengalgram in Calcareous vertisol

J. MAHESHA

2002

MAJOR ADVISOR: Dr. H.T. CHANNAL

An experiment was conducted in farmer's field at Amminabhavi village, Dharwad district during kharif and rabi seasons of 2000-01, to study the effect of P-sources and P-solubilizers on growth and yield of maize and bengalgram in calcareous Vertisol. The experiment was laid out in randomized block design with eight treatments and three replications. Phosphorus was applied in the form of single superphosphate and Mussoorie rock phosphate along with *Pseudomonas striata* and *Aspergillus awamori* alone or in combination.

The treatment combination of SSP+ *Pseudomonas striata* + *Aspergillus awamori* recorded the highest grain yield (30 q/ha), stover yield (61.1 q/ha), nutrient content, uptake and better quality (protein and starch) of maize grains. However, it was on par with MRP + *Pseudomonas striata* + *Aspergillus awamori* treatment and SSP + *Pseudomonas striata* + *Aspergillus a wamori* was significantly superior over all other treatments.

Residual crop bengalgram performed well in treatment MRP + *Pseudomonas striata* + *Aspergillus awamori* indicating better residual effect of MRP and greater benefits of dual inoculation.

Single superphosphate + *Aspergillus awamori* + *Pseudomonas striata* increased significantly the available P in soils after the harvest of maize crop. However, the residual effect of MRP + *Pseudomonas striata*+*Aspergillus awamori* proved to be better for bengalgram crop in increasing the yield and protein content.

Application of MRP + *Pseudomonas strictata* + *Aspergillus awamori* recorded the highest B:C ratio (1.33) and net returns (Rs. 6909/-) for maize crop and B:C ratio (5.79) and net returns (Rs. 15437/-) for residual crop bengalgram.

Behavior of Cadmium in FlyAsh and Sewage Sludge Amended Soils in Karnataka

T.N. ASHOK

2002

MAJOR ADVISOR: Dr. C.V. PATIL

The effect of fly ash and sewage sludge on the adsorption and desorption behaviour of Cadmium in five major soil types of Karnataka, namely, laterite soil, alluvial soil, saline soil, red soil and black soil was evaluated under laboratory condition.

The Cd adsorption data obtained were in agreement with Langmuir adsorption isotherm. The Cd adsorption maxima (b) varied with the soil type and it was in the following decreasing order back soil > saline soil > alluvial soil > red soil > laterite soil. Amending the soil with sewage sludge increased the (d) adsorption maxima (b) of all soil types. The extent of increase in (d) adsorption maxima (b) was maximum in soil amended with sewage sludge (@ 200 t ha⁻¹) followed by both fly ash and sewage sludge (@ 100 t ha⁻¹ each) amended soil and the least increase was noticed in fly ash (@ 200 t ha⁻¹) amended soils. However, the constant relating to bonding energy (k) decreased as the adsorption maxima (b) increased and vice versa.

The Cd desorption varied from soil to soil, the highest Cd desorption was noticed in black soil and the least in laterite soil. Amending the soils with fly ash and sewage sludge increased the extent of Cd desorption. The amount desorbed was the highest in sewage sludge (@ 200 t ha⁻¹) amended soil compared to fly ash (@ 200 t ha⁻¹) of fly ash plus sewage sludge (@ 100 t ha⁻¹ each) amended soil.

The simple correlation analysis exhibited that the soil properties such as clay, organic carbon, CEC and CaCO₃ content were positively correlated with Cd adsorption maxima (b) and negatively correlated with bonding energy (k). The linear stepwise regression analysis revealed that organic carbon, CEC, DTPA-Cd and clay content were the most important soil components contributing upto 83 per cent variation in adsorption maxima (b) and upto 90 per cent in bonding energy (k). Similarly, organic carbon, pH, CEC and free MnO₂ content together contributed upto 96 per cent variation in the per cent desorption of Cd from soils.

Long-Term Effect of Integrated Nutrient Management on Soil Fertility and Rice Productivity

N. CHANDRA KUMAR

2002

MAJOR ADVISOR: Dr. C.V. PATIL

A long-term experiment to study the effect of organic and inorganic sources of nutrients on rice-rice crop sequence in Vertisol was initiated during 1991 at Agricultural Research Station, Siruguppa (Karnataka). During the past one decade, lot of data has been generated on the growth and yield of rice. However, the information on nutrient uptake, soil properties and fertility status was lacking. Hence, the present study was aimed to assess the effect of long-term application of different organic and inorganic sources of nutrients on rice yield, nutrient uptake and soil properties.

The results revealed that combined application of organic materials, namely, FYM, glyricidia, *Sesbania aculeata* and recommended dose of fertilizers (150: 75: 75: 20 NPK Zn) significantly improved the grain yield of rice. However, significantly the highest grain yield of rice (6149 kg ha⁻¹) was obtained due to application of organic materials along with higher dose of fertilizers (200: 100: 100: 20 NPK

Zn) and it was 13.65 per cent higher than the treatment receiving 100 per cent recommended dose of fertilizers alone. Increasing plant population by 25 per cent and application of inorganic fertilizers either alone or in combination with organic sources of nutrients did not increase the grain yield significantly. The net return and B:C ratio were maximum in the treatment receiving recommended dose of fertilizer along with all the three organic sources of nutrients. The uptake of both macro and micro-nutrients by rice grain and straw increased significantly due to combined application of organic materials and fertilizers. Results clearly indicated that combined application of organic and inorganic sources of nutrients significantly improved soil physical condition in terms of decrease in bulk density and increase in porosity. Available N, P, K and S and DTPA extractable Zn, Cu, Fe and Mn contents of soil increased significantly due to combined application of organic and inorganic sources of nutrients.

Abstract of Theses

Effect of Fly ash and FYM on Micronutrients (Fe, Mn, Zn and Cu) Transformation in Soil Under Submerged Condition

H.R. YOGESWARA

2002

MAJOR ADVISOR: Dr. N. A. YELEDHALLI

Laboratory incubation study was carried out at Agricultural College, Raichur, Karnataka during 2000-2001, to study the effect of fly ash and FYM incorporation on transformation of micronutrients viz., Fe, Mn, Zn and Cu under submerged condition in black soil. Fly ash a residue arising out of burning of coal in Thermal Power Plants is a potential source of nutrients it contains certain macro and micro nutrient elements. Application of fly ash either alone or in combination with FYM in general, increased the content of DTPA extractable Fe, Mn, Zn and Cu in soil throughout the incubation period. However, the combined application of fly ash @ 200 t ha⁻¹ and FYM @ 20 t ha⁻¹ was superior over rest of the treatments.

The addition of fly ash either alone or combination with FYM generally, increased the water soluble, exchangeable, organically bound and Fe-Mn oxide bound fractions of Fe, Mn, Zn and Cu in soil. The water soluble Fe content decreased while, the exchangeable Fe content

increased upto 30 days of incubation, thereafter there was a marginal increase in water soluble Fe concentration and decrease in exchangeable Fe was observed in fly ash amended soil compared to soil alone. Carbonate bound Fe content decreased with increase in incubation time in fly ash amended soil. Further, it was decreased when fly ash was added to soil along with FYM. In fly ash amended soil the organically bound Fe content increased, with increase in days after incubation upto 30 days, thereafter it decreased. The Fe-Mn oxide bound Fe content increased upto 30 days of incubation due to application of fly ash @ 100 and 200 t ha⁻¹. Application of fly ash along with FYM marginally decreased the residual Fe fraction throughout the incubation. The distribution of different fractions of Mn, Zn and Cu viz., water soluble, exchangeable, carbonate bound, organically bound, Fe-Mn oxide and residual fractions followed the similar trend as it was observed with Fe, except organically bound Zn and Cu which showed decreasing trend.

Effect of Fly ash and Biosolids on Soil Properties, Growth and Yield of Cowpea (*Vigna unguiculata*)

G.B. VASANTHA KUMAR

2002

MAJOR ADVISOR: Dr. N.A. YELEDHALLI

Pot culture and laboratory studies were carried out at College of Agriculture Raichur, Karnataka during 2000-2001 to study the effect of fly ash and biosolids on soil properties, growth and yield of cowpea and nitrogen mineralization. Fly ash, an amorphous ferro alumino silicate and finally divided ash residue produced by Thermal Power Plants. Fly ash is a potential source of major and micronutrients and serve as soil amendment to improve soil and crop, productivity. The treatments consists of fly ash @ 30 t ha⁻¹ and biosolids viz., sewage sludge @ 20 t ha⁻¹ poultry manure @ 5 t ha⁻¹ vermicompost @ 2.5 t ha⁻¹ biogas sludge @ 1 t ha⁻¹ and FYM @ 20 t ha⁻¹ with and without RDF. Seed yield of cowpea increased significantly due to application of fly ash plus biosolids along with RDF and the seed yield of cowpea increased by 6 to 12 per cent over RDF and the maximum (16.02g p pot⁻¹) seed yield of cowpea was recorded in the treatment receiving fly ash

plus poultry manure along with RDF. The uptake of macro and micronutrients by cowpea plant parts at different growth stages increased significantly due to combined application of fly ash and biosolids along with RDF. Significant increase in the organic carbon content and major and micronutrient availability in the soil was also recorded.

Incubation study indicated that the addition of fly ash and different biosolids increased the NH₄-N content progressively upto 40 DAI, while the NO₃-N content increased from 10 DAI and the maximum content was recorded at 60 DAI. The results of the present investigation have clearly indicated that combined application of fly ash and different biosolids had a mutual beneficial effect of a mixture compared to fly ash alone and act as good soil amendments and have a better fertilizer value for agricultural utilization.

Studies on Effect of Bhumilabh on Growth and Yield of Maize (*Zea mays* L.) and Soil Properties

N.H. BHANDI

2002

MAJOR ADVISOR: Dr.G.S. DASOG

A field experiment was conducted at Karnataka Institute of Applied Agricultural Research (KIAAR) farm, Sameerwadi (Dist. Bagalkot) on clay soil during rabi season of 1998-99 to study the effect of Bhumilabh on growth and yield of maize (*Zea mays* L.) and its effect on soil properties.

Application of 100 per cent RDF recorded the highest grain yield (88.86 q ha⁻¹) and was on par with 75 per cent RDF (83.60 q/ha). But application of 3.00 t ha⁻¹ of Bhumilabh recorded significantly highest grain yield (92.26 q ha⁻¹) and it was on par with 2.25 and 1.50 t ha⁻¹ of Bhumilabh (87.41 and 86.07 q ha⁻¹ respectively). Similarly, application of 100 per cent RDF recorded the highest stover yield (9.39 t ha⁻¹) and it was on par with 75 per cent RDF (9.14 t ha⁻¹). Application of 3.00 t ha⁻¹ of Bhumilabh recorded highest stover yield (9.52 t ha⁻¹). The interaction effects were found non-significant.

Application of 100 per cent RDF recorded highest uptake of N, P and K (171.55 and 37.83, 115.17 kg ha⁻¹, respectively) by maize crop. Application of 2.25 t ha⁻¹

recorded highest uptake of N (179.97 kg ha⁻¹) maize and it was on par with 3.00 t ha⁻¹ of Bhumilabh. Application of 10 t ha⁻¹ of FYM recorded the highest K (127.15 kg ha⁻¹) uptake by maize crop.

Application of 100 per cent RDF recorded the highest availability of N, P₂O₅ and K₂O (243.0, 25.0 and 437.0 kg ha⁻¹, respectively). Application of 3.00 t ha⁻¹ of Bhumilabh recorded higher availability of N and P₂O₅ (252.0 and 26.0 kg ha⁻¹, respectively) compared to 100% RDF (243 and 25 kg ha⁻¹ respectively).

Application of 3.00 t ha⁻¹ of Bhumilabh slightly reduced the soil pH and electrical conductivity and increased the organic carbon content of the soil.

Application of 100 per cent RDF with 2.25 t ha⁻¹ of Bhumilabh recorded the highest net returns. This treatment combination is therefore, considered the best. Even the lowest dose of Bhumilabh (0.75t ha⁻¹) has proved superior over 10 t ha⁻¹ FYM..

Effect of Split Application of NPK Through Drip Irrigation on water, Salt and Nutrient Movement in Soil and Yield of Cotton

M.P. VENUGOPAL

2002

MAJOR ADVISOR: Dr. V.S. DODDAMANI

A field experiment was conducted at the Agricultural Research Station, Dharwad, during 2000-01 in black soil, to study the effect of split application of NPK through drip irrigation on water, salt and nutrient movement in soil and yield of cotton. The treatment consisted of recommended practice, 10-per cent NPK as basal remaining NPK through drip and 20 percent N +100 per cent P and K basal remaining N through drip. The fertigation was done in 7, 10 and 19 equal splits. The experiment was laid out in a randomized block design. Treatments replicated thrice.

Irrespective of method of fertilizer application, growth stages and distance from emitter, soil moisture content was lowest in surface layer and it increased upto second layer and then again decreased. Soil moisture was higher at 30 cm than 45cm radial distance from the emitter.

Higher salt concentration was recorded at the surface (0-15 cm) layer and lowest salt concentration was

noticed in 15-30 cm layer and it increased with depth from second layer onwards in all the treatments 60, 90 and 150 DAS. Application of 10 per cent NPK as basal + 90 per cent NPK through fertigation in 7 splits recorded higher soil EC compared to all other treatments.

Application of 10 per cent NPK as a basal + 90 per cent NPK through fertigation in 19 splits recorded higher availability of NPK in, all layers compared to soil application of NPK. Availability of NPK was higher at 30 cm than 45cm radial distance for the emitter. Similar trend was observed at all the growth stages.

Nitrogen, phosphorous, potassium uptake, total dry matter and kapas yield of cotton (2797 kg ha⁻¹) was significantly higher with application of 10 per cent NPK as basal + 90 per cent NPK through fertigation in 19 splits compared to soil application of NPK (2184 kg ha⁻¹), at all growth stages.