

Journal of Plant Development Sciences

(An International Monthly Peer Reviewed Journal)

Volume 13

Number 2

February 2021

Contents

REVIEW ARTICLES

Recent advancements for reclamation of problematic soils

— **Mohinder Singh, Ajay, Babli, Meenakshi Devi and Sonia Goel**----- 45-53

A review on processing of Turmeric rhizome

— **Ranjeet Kumar** ----- 55-58

RESEARCH ARTICLES

Effect of soil pH, types and temperature on the persistence of ready-mix formulation of Sulfosulfuron and Metsulfuron-methyl

— **Yogander Kumar, Vedpal Singh, Ashok Yadav and M.D. Parihar** ----- 59-72

Effect of Nitrogen (N) and Sulphur (S) on the growth and yield of mustard

— **Bharti Rathor and Suvarna Namdeo**----- 73-78

Survey, collection and isolation of isolates *Fusariumudum* incitant of Pigeonpea wilt from major Pigeonpea growing areas of Andhra Pradesh and Telangana for characterization

— **Arunodhayam K., Sarada Jayalakshmi Devi R., Bhaskara Reddy B.V., Prasanthi L., Sudhakar P. and Mamta Sharma**----- 79-83

Management of Banda (*Dendrophthoe falcata*), a phanerogamic plant parasite of Mango and Sapota

— **Attar Sanjay Kumar and Kumar Navneet**----- 85-88

Sustainable extraction of biopolymer using various gum enhancer in Rohina (*Soymida febrifuga* Roxb.) tree from Mungeli region of Chhattisgarh

— **Manendra Kumar Ghrilahare and Pratibha Katiyar**----- 89-92

RECENT ADVANCEMENTS FOR RECLAMATION OF PROBLEMATIC SOILS

Mohinder Singh*, Ajay, Babli, Meenakshi Devi and Sonia Goel

Faculty of Agricultural Sciences, SGT University-Gurugram

Email: soniabansalsgt@gmail.com

Received-05.02.2021, Revised-16.02.2021, Accepted-27.02.2021

Abstract: Sustainable agricultural development and food security will be one of the key challenges for India in this century. Around 65% of the India's population is living in rural area with agriculture as their livelihood support system. The vast majority of Indian farmers are small and marginal. Their farm size and the quality is deteriorating due to increase nutrient withdrawal, soil erosion, higher insect pest outbreak, adverse impacts of climate and accumulation of toxic elements in soil and water resources. All of these factors combined with increased rate of land degradation are contributing in declining in agricultural productivity leading to threat of food security. Since land resources are limited and decreasing due to diversified land uses, appropriate measures are required to reclaim degraded and wastelands, so that areas going out of cultivation due to social and economic reasons are replenished by reclaiming these lands and by checking further loss of production potential. The present review will through light on the existing and future problems related to soil practices and appropriate measures to overcome soil degradation problem.

Keywords: Conservation agriculture, Land degradation, Nutrient management

A REVIEW ON PROCESSING OF TURMERIC RHIZOME

Ranjeet Kumar*

RMD College of Agriculture and Research Station, Ambikapur, C.G. (India)

Email: ranjeet29330@gmail.com

Received-28.01.2021, Revised-17.02.2021, Accepted-25.02.2021

Abstract: Turmeric is the most ancient medicinal species found in the world. It is grown in most of the Asian countries. The quality of turmeric powder depends upon the initial quality of rhizomes and processing of turmeric rhizomes which effects curcumin content, organoleptic characteristics, size and general appearance of the dried turmeric rhizomes. Processing of turmeric rhizome is done 2 or 3 days after harvesting. Maintaining the curcumin content in turmeric is important during processing and it depends upon the methods used for processing the turmeric. Curing is a process of cooking the raw rhizomes in hot water to obtain attractive colour, characteristic aroma, destroy the viability of the fresh rhizomes and remove the raw odour, reduces the time of drying, ensures an even distribution of colour in the rhizomes and gives a better quality product. Conventionally rhizomes are boiled in water which results in less retention of curcumin content and essential oil. Also there is no engineering and thermal background in designing of conventional turmeric boiling system due to this system was very bulky and there is large amount of heat losses. Processing time of turmeric rhizome is also very large in conventional system. Hence modification is done and improved system has been developed for processing of turmeric. Improved systems are smaller in size and time required for the processing is also less. When turmeric is processed with improved systems higher turmeric curcumin is retained as compare to conventional system. Various methods are used to cure the turmeric effects its quality. Processing of turmeric rhizome involves curing, drying, polishing, grinding and packaging. For drying of turmeric rhizome, solar dryer was evaluated which reduces the drying time for turmeric. It is reported that solar drying is the most efficient method for the processing of turmeric rhizome.

Keywords: Processing, Rhizome, Solar drying, Turmeric

EFFECT OF SOIL PH, TYPES AND TEMPERATURE ON THE PERSISTENCE OF READY-MIX FORMULATION OF SULFOSULFURON AND METSULFURON-METHYL

Yogander Kumar¹, Vedpal Singh², Ashok Yadav³ and M.D. Parihar*

^{1,2,3}Department of Agronomy, CCHAU, Hisar (India)

Department of Soil Science, CCHAU, Hisar (India)

Email: mdparihar1205@gmail.com

Received-01.02.2021, Revised-11.02.2021, Accepted-23.02.2021

Abstract: The present laboratory and pot experiment was conducted in during winter season of 2005-06 and 2006-07 at the Chaudhary Charan Singh Haryana Agricultural University, Hisar (India). To generate any sound and viable herbicidal recommendation for effective weed management in a crop, it is very important to explore the effect of different soil types, soil pH and temperature on the persistence of ready-mix formulation of sulfosulfuron and metsulfuron-methyl. The experiment was conducted in completed randomized design (CRD) with four replications. In the first experiment, two soil pH e.g., acidic and alkaline soils were used and four concentration (0, 20, 40, 80 g ha⁻¹) of ready-mix formulation of sulfosulfuron and metsulfuron-methyl were used at incubation period of 0, 10, 20, 40, 80 and 160 days. In the second experiment to access the effect of temperature on persistence of this ready-mix formulation, three temperature regimes including 15, 25, and 35 °C were used at the same concentration and incubation period. In third experiment, two soils were used i.e., sandy and clay loam. In the first experiment, the growth indices viz., dry weight of shoot per plant and shoot length of maize decreased as the sulfosulfuron + metsulfuron-methyl concentration increased from 0 to 80 g ha⁻¹. Both these parameters increased with increase in incubation period. In acid soil, dry weight of shoot per plant was more than that recorded in alkaline soil at each concentration of sulfosulfuron + metsulfuron-methyl. The mean value showed that acidic soil produced 14 per cent more dry weight of shoot as compared to alkaline soil. The phytotoxicity decreased significantly with corresponding increase in incubation period, and the phytotoxicity decreased from 65 to 47 percent as incubation period increased from 0 to 160 days. Alkaline soil exhibited higher phytotoxicity in maize than that in acidic soil. In the second experiment, the germination percent of maize increased from 43% at 15°C to 54% at 35°C temperature. Visual phytotoxicity significantly increased with successive increase in sulfosulfuron + metsulfuron-methyl concentration. However, it decreased significantly as temperature increased from 15°C to 35°C and incubation increased from 0 to 160 days. The dry weight of maize shoot increased by 25 percent at 35°C compared to 15°C temperature significantly incubation period resulted in 17, 37, 50, 63 and 73 percent increase in dry weight of shoot at 10, 20, 40, 80 and 160 days, respectively in comparison to 0 day incubation. The growth parameters of maize viz., dry weight of shoot per plant and shoot length decreased with corresponding increase in sulfosulfuron + metsulfuron-methyl concentration and these both parameters increased with each successive increase in temperature and incubation period. In the third experiment, visual phytotoxicity increased with increase in sulfosulfuron + metsulfuron-methyl concentration and decreased with increase in incubation period in both types of soil. Visual toxicity was more in sandy soil as compared to clay loam. Various growth parameters of maize viz. dry weight of shoot per plant decreased significantly as sulfosulfuron + metsulfuron-methyl concentration increased from 0 to 80 g ha⁻¹. Whereas, all parameters increased significantly as incubation period increased from 0 to 160 days in both soil types.

Keywords: Concentration, Ready-mix, Soil pH, Soil type, Temperature

EFFECT OF NITROGEN (N) AND SULPHUR (S) ON THE GROWTH AND YIELD OF MUSTARD

Bharti Rathor and Suvarna Namdeo*

Institute of Agriculture Sciences, SAGE University Indore (M.P) 482020

Email: suvarnaagro2@gmail.com

Received-02.02.2021, Revised-13.02.2021, Accepted-26.02.2021

Abstract: An experiment was conducted in the experimental field of SAGE University, Indore, Madhya Pradesh during the period from 2019-2020 to “Effect of Nitrogen and Sulphur on Growth and Yield of Mustard at Institute of Agriculture Sciences, SAGE University, Indore (M.P.) nutrient content and their uptake by mustard plants. The experiment consisted of two factors. Factor A: Nitrogen (4 levels) i.e. 0 kg N ha⁻¹ (N₀), 40 kg N ha⁻¹ (N₁), 80 kg N ha⁻¹ (N₂) and 120 kg N ha⁻¹ (N₃);

Factor B: Sulphur (4 levels) i.e. 0 kg S ha⁻¹ (S₀), 8 kg S ha⁻¹ (S₁), 16 kg S ha⁻¹ (S₂), 24 kg S ha⁻¹ (S₃) On indian Hybrid Mustard NRCHB-101 is mustard (*Brassica juncea* L. Czern & Coss) There were 16 treatments combinations. The experiment was laid out in the two factors Randomized Complete Block Design (RCBD) with three replications. After emergence of mustard seedlings, various intercultural operations were accomplished for better growth. Data were collected in respect of the plant growth characters and content and uptake by seed, strove, plant and available nutrients in soil for different levels of nitrogen and sulphur. The yield attributes like no.of siliqua per plant ,No. of seed per plant, test weight of seed, and as well as stover yield significantly increased with the application of 120 kg Nitrogen ha⁻¹ and 24 kg Sulphur ha⁻¹. The interaction effects of nitrogen and Sulphur (N₂S₃) gave the best results. For application of nitrogen 120 kg N ha⁻¹ and Sulphur 24 kg S ha⁻¹ gave the best result showed is most effective combination in respect on Growth and Yield of mustard.

Keywords: Nitrogen, Sulphur, Nutrient content, Yield, Oil content

Journal of Plant Development Sciences Vol. 13(2)

SURVEY, COLLECTION AND ISOLATION OF ISOLATES *FUSARIUMUDUM* INCITANT OF PIGEONPEA WILT FROM MAJOR PIGEONPEA GROWING AREAS OF ANDHRA PRADESH AND TELANGANA FOR CHARACTERIZATION

**Arunodhayam K.^{1*}, Sarada Jayalakshmi Devi R.¹, Bhaskara Reddy B.V.², Prasanthi L.²,
Sudhakar P¹ and Mamta Sharma³**

¹S.V. Agricultural college, Tirupati, ¹ANGRAU, Lam, ²Regional Agricultural Research Station, Tirupati, ³International Crops Research Institute for the Semi Arid Tropics

Received-03.02.2021, Revised-14.02.2021, Accepted-27.02.2021

Abstract: Pigeonpea [*Cajanuscajan* (L.) Millspaugh] is the prominent drought tolerant pulse crop in the tropics and subtropics of the world (Okiror, 1986). Pigeonpea is an often cross pollinated (20-70%) crop with 2n = 2x = 22 diploid chromosome number. It is the fourth important pulse crop in the world and predominantly cultivated in the developing countries of tropics and sub-tropics (FAO, 2014). India is considered as the native of pigeonpea (Van der Maesen, 1980) because of its natural genetic variability available in the local germplasm and the presence of its wild relatives in the country. Pigeonpea wilt caused by *Fusariumudum* is the most important soil borne disease and was first described in 1906 from Bihar state in India (Butler, 1906). The disease appears in kharif (June) sown young seedlings during august but the highest mortality occurs at flowering and podding stage from November onwards. The yield loss of the crop depends on the stage at which the wilt disease appears. The disease can cause yield loss up to 100, 67 and 30 per cent when wilt occurs at pre-pod, maturity and pre-harvest stages, respectively (Kannaiyan and Nene, 1981). This study includes survey and collection and isolation of isolates for morphological and molecular characterization.

Keywords: *Fusarium udum*, Isolation, Pigeonpea, Survey

Journal of Plant Development Sciences Vol. 13(2)

MANAGEMENT OF BANDA (*DENDROPHTHOE FALCATA*), A PHANEROGAMIC PLANT PARASITE OF MANGO AND SAPOTA

Attar Sanjay Kumar* and Kumar Navneet¹

College of Agriculture, Sri Karan Narendra Agriculture University, Fatehpur, Rajasthan-332301
¹*College of Agriculture, Navsari Agricultural University, Waghai (Dangs), Gujarat -394 730*

Received-04.02.2021, Revised-15.02.2021, Accepted-25.02.2021

Abstract: A study was conducted during 2013-14 at Agriculture Experimental Station, Navsari Agricultural University, Paria, Gujarat to find out the most suitable treatment to control the hemiparasitic plant, *Dendrophthoe falcata* (L.f.) Etting, known as Loranthus infesting mango and sapota. The experiment was laid out in completely randomized design (CRD) with six treatments replicated five times. The treatments consisted of T₁: Spraying Metribuzin (Sencor) (0.1% a.i.); T₂: Spraying Paraquat (Gramoxone) (0.1% a.i.); T₃: Spraying 2-4 D (0.1%); T₄: Spraying CuSO₄ (0.1%); T₅: Spraying of CuSO₄ (0.1%) + 2-4 D (0.1%) and T₆: Cutting affected portion 1 inch below burrs to remove houstoria and application of Bordeaux paste/copper oxychloride. The results revealed that metribuzin and paraquat sprays showed phytotoxicity on both vanda and host plants whereas CuSO₄ & 2-4 D were not effective at these concentrations. So, it is suggested that the spray concentration

of metribuzin and paraquat should be reduced to (.01%, .02% and .05% a.i.), while that of CuSO₄& 2-4 D may be increased to (.05%, 1% and 2% a.i) for further studies.

Keywords: *Dendrophthoe falcata*, Haustoria, Hemiparasite, Loranthus, Mango, Sapota

Journal of Plant Development Sciences Vol. 13(2)

SUSTAINABLE EXTRACTION OF BIOPOLYMER USING VARIOUS GUM ENHANCER IN ROHINA (*SOYMIDA FEBRIFUGA* ROXB.) TREE FROM MUNGELI REGION OF CHHATTISGARH

Manendra Kumar Ghritlahare* and Pratibha Katiyar

*Department of Plant Physiology, Agricultural Biochemistry, Medicinal and Aromatic Plants
Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, 492012
Email: manendralahare@gmail.com*

Received-03.02.2021, Revised-12.02.2021, Accepted-22.02.2021

Abstract: Gums are natural substances that exude *via* process of gummosis from trees as a response to injury, and collected by tapping, picking, or cutting the tree. *Soymida febrifuga* (Roxb.) is a large Meliaceous tree distributed mainly in the tropical areas of Asia and one of the most popular traditional medicines in India. A clear gum from the bark forms good adhesive mucilage. The commercial tapping of *Soymida febrifuga* is done by blazing, peeling, or by making deep cuts at the base of the bole using an axe. The harvesting methods currently used are traditional and injurious due to which often obtained inferior quality of products. Hence, the study was undertaken in ICAR Network Project to develop the scientific tapping technique for sustainable harvesting in major gum producing tree of Chhattisgarh state to enhance the livelihood of the rural areas as well as to protect the plant and generate the revenue of the government. The various gum Enhancer are used for tapping purpose, the experiment was laid out in three replications and five treatments *i.e.* Control (distilled water), Ethephon, H₂SO₄, ethephon with H₂SO₄, HCl was used for potential gum exudation. The ethephon with H₂SO₄ was found significantly effective for maximum gum. Ethephon was found useful in inducing gummosis and also the physiochemical properties of exudated gums were investigated pH, solubility (cold water, Hot water, ethanol, acetone) viscosity, protein (1.78%), Fat (%) was obtained in gum of chemical method (ethephon with H₂SO₄) as compared to other gum enhancers.

Keywords: Ethephon, Gum enhancer, H₂SO₄, HCl, *Soymida febrifuga*