

Journal of Plant Development Sciences

(An International Monthly Peer Reviewed Journal)

Volume 17

Number 5

May 2025

Content

RESEARCH ARTICLES

Impact of bio-inoculants and different levels of NPK fertilizers application on soil nutrient status and yield of Chrysanthemum in protected condition

—Chandana M., Hemla Naik B., Thippeshappa G.N., Champa B.V., Nandish M.S. and Kantharaj Y.----- 203-209

Life-form classification of plants growing along transition zones between grassland-woodland in Patnitop landscape of North-Western Himalaya

—Ritika Jamwal and Harish Chander Dutt----- 211-215

Bael fruit displayed significant potential against Lung & Renal Cancer cells

—Vikas Sharma, Navneet Kour, Komal Sudan, Shashank K Singh and Shivangi Sharma----- 217-220

Survey of common weed species with habitat range, invasiveness and ethnobotanical uses from Ghaziabad district

—Anupam Awasthi, Amar Singh Kashyap and Sandeep Kumar Pal ----- 221-233

Antioxidant efficacy of leaf part of some traditional Medicinal plants

—Komal Sudan and Vikas Sharma ----- 235-240

SHORT COMMUNICATION

Biodiversity of soil fungi from East Khandesh region with reference to Groundnut crop (Mah), India

—R.M. Bagul Jagruti J. Patil and K.B. Patil----- 241-243

IMPACT OF BIO-INOCULANTS AND DIFFERENT LEVELS OF NPK FERTILIZERS APPLICATION ON SOIL NUTRIENT STATUS AND YIELD OF CHRYSANTHEMUM IN PROTECTED CONDITION

Chandana M.^{1*}, Hemla Naik B.², Thippeshappa G.N.³, Champa B.V.⁴, Nandish M.S.⁶ and Kantharaj Y.⁷

¹Department of Horticulture, College of Agriculture, KeladiShivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga (Karnataka), India.

²Department of Horticulture, KeladiShivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga (Karnataka), India.

³Department of Soil Science and Agricultural Chemistry, College of Agriculture, KSNUAHS, Shivamogga (Karnataka), India.

⁴Department of Horticulture, College of Agriculture, KSNUAHS, Shivamogga (Karnataka), India.

⁵Department of Agricultural Microbiology, College of Agriculture, KSNUAHS, Shivamogga (Karnataka), India.

⁶Department of Post-harvest Technology, College of Horticulture, Mudigere, KSNUAHS, Shivamogga (Karnataka), India.

Received-25.04.2025, Revised-12.05.2025, Accepted-24.05.2025

Abstract: Alternatives to fertilizers are required due to the rising expense of fertilizers with lower nutrient usage efficiency. The availability of macro and micronutrients is influenced by the various chemical changes that soil microorganisms contribute to. This study evaluated the effectiveness of various microbial strains for enhancing plant nutrient availability in soil. The present investigation was conducted during 2021–2022 at the College of Agriculture, Shivamogga, Karnataka, to assess the effect of bio-inoculants and graded potassium levels on soil chemical properties, nutrient availability, and yield in chrysanthemum (*Chrysanthemum morifolium* Ramat.). The experiment was laid out in a Randomized Complete Block Design (RCBD) with ten treatments and three replications, using the variety 'Kolar Local.' Bio-inoculants including *Bacillus mucilaginosus* (KSB), *Aspergillus awamori* (KSF), *Azotobacter chroococcum*, *Pseudomonas striata* (PSB), and *Glomus fasciculatum* (VAM) were incorporated along with FYM and chemical fertilizers. Soil analysis post-harvest revealed that treatment T7 (100% N & P₂O₅ + 75% K₂O + KSB + KSF) recorded optimum soil pH (6.80), EC (0.36 dS/m), and significantly higher available nitrogen (292.13 kg/ha), phosphorus (85.67 kg/ha), and potassium (205.68 kg/ha). Flower yield (2.68 t/560 m²) and sucker yield (21,315.5 suckers/560 m²) were also highest in T7, showing 34.67% and 78.94% increases, respectively. The enhanced nutrient availability and yield were attributed to improved microbial activity, nutrient solubilization, and hormone production. This study confirms that integrated nutrient management using bio-fertilizers with reduced chemical fertilizers is a sustainable approach to enhance soil fertility, flower yield, and quality in chrysanthemum cultivation.

Keywords: Soil chemical properties, microbial inoculants, KSB, KSF

LIFE-FORM CLASSIFICATION OF PLANTS GROWING ALONG TRANSITION ZONES BETWEEN GRASSLAND-WOODLAND IN PATNITOP LANDSCAPE OF NORTH-WESTERN HIMALAYA

Ritika Jamwal and Harish Chander Dutt*

Ecological Engineering Lab.

Department of Botany, University of Jammu, Jammu

Email: harishchander@jammuuniversity.ac.in

Received-18.04.2025, Revised-08.05.2025, Accepted-20.05.2025

Abstract: The present study investigates the life-form classification across grassland–woodland transition zones in Patnitop Landscape in north-western Himalaya. These transition zones, where grassland merge with forested habitats, represent ecotonal regions of high ecological significance, characterized by sharp gradients in microclimate, soil properties, and

disturbance regimes. A total of 75 plant species were recorded from diverse microhabitats along the transition zones between Grasslands and Woodlands. These plant species were classified into different life-form categories as per the Raunkiaer's system. The transition zones in Patnitop Land scape are dynamic for biodiversity conservation, as they support species from both the adjacent communities, acting as refugia for many herbaceous and shrubby species. The dominance of low-lying perennials and disturbance-tolerant species reflects the impact of trampling, clearing, and edge effects. Life-form analysis in such zones provides valuable ecological indicators to assess vegetation structure, resilience, and ongoing shifts due to environmental and anthropogenic stressors. This study not only contributes to baseline data for the floristic and ecological understanding of transition zone but also underscores the need for sustainable management practices to protect these transitional habitats from degradation.

Keywords: Patnitop, Landscape, Grasslands, Woodlands

Journal of Plant Development Sciences Vol. 17(5)

BAEL FRUIT DISPLAYED SIGNIFICANT POTENTIAL AGAINST LUNG & RENAL CANCER CELLS

Vikas Sharma^{1*}, Navneet Kour¹, Komal Sudan¹, Shashank K Singh² and Shivangi Sharma³

¹*Natural Products Laboratory, Division of Biochemistry, Faculty of Basic Sciences, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, Main Campus Chatha, Jammu-180 009, J&K, India*

²*Cancer Pharmacology Division and Natural Product Chemistry Division, Indian Institute of Integrative Medicine, Canal Road Jammu-180001, J&K, India*

³*Department of Chemistry, Govt. Degree College, RS Pura -181102, Jammu, Jammu & Kashmir, India*

Email: vikas.skuast@gmail.com

Received-28.04.2025, Revised-14.05.2025, Accepted-27.05.2025

Abstract: In the search of potential anticancer agents from minor fruits, the present research work was carried out to examine the *in vitro* cytotoxic potential of *Aegle marmelos* (bael) against nine human cancer cell lines from eight different origins such as MCF-7 and T-47D (breast), SF-295 (CNS), HCT-116 (colon), A-549 (lung), MDA-MB-435 (melanoma), OVCAR-5 (ovary), PC-3 (prostate), A-498 (renal). Methanolic extract of bael fruit was prepared and *in vitro* anticancer activity was determined via SRB assay at 100 µg/ml. Cells were allowed to grow for 24 h on 96-well flat bottom tissue culture plates and cells were further allowed to grow in the presence of test material for 48 h. Cell growth was terminated by addition of 50% (w/v) tricarboxylic acid and cells were stained with SRB dye. Excess dye was removed by washing with 1% (v/v) acetic acid and bound dye was dissolved in Tris buffer. OD was taken at 540 nm. *Aegle marmelos* displayed *in vitro* cytotoxic effect against colon, lung, melanoma and renal cancer cells and at lower concentrations of 50, 30, 10 and 1 µg/ml, the fruit exhibit significant *in vitro* cytotoxic effect against lung cancer cells (A-549). Further, IC₅₀ value was calculated and it was observed that the bael fruit showed least IC₅₀ value in case of lung cancer cells. To conclude, bael, possess certain constituents with cytotoxic properties and isolation / characterization of active ingredients is required for the development of anticancer drugs.

Keywords: *Aegle marmelos*, Bael, Cancer Cells, SRB assay, *In vitro* cytotoxicity

Journal of Plant Development Sciences Vol. 17(5)

SURVEY OF COMMON WEED SPECIES WITH HABITAT RANGE, INVASIVENESS AND ETHNOBOTANICAL USES FROM GHAZIABAD DISTRICT

Anupam Awasthi^{1*}, Amar Singh Kashyap¹ and Sandeep Kumar Pal²

¹*Department of Botany, Multanimal Modi (PG) College, Chaudhary Charan Singh University, Meerut – 201204, India*

²*Department of Botany, Dayanand Brajendra Swarup (PG) College, Chhatrapati Shahu Ji Maharaj University, Kanpur – 208006, India*

Email: anupambotany@gmail.com

Received-25.04.2025, Revised-16.05.2025, Accepted-29.05.2025

Abstract: The present study provides a systematic documentation of commonly occurring weed species in the Ghaziabad district of Uttar Pradesh, India. A comprehensive field survey was carried out over a two-year period (2023–2024), resulting in the identification of 78 weed species belonging to 68 genera and 29 families. Among these, 37 species were associated primarily with Rabi crops and 28 with Kharif crops. The family Asteraceae emerged as the most dominant, followed by several other prominent families. Herbaceous species formed the bulk of the recorded flora, underscoring their ecological adaptability and prevalence in the region. Each species was further categorized based on origin and ecological behavior—classified as native, introduced, noxious, or interfering. This preliminary inventory not only enriches the floristic understanding of Ghaziabad's weed flora but also offers valuable insights into the invasiveness and ethno botanical relevance of commonly encountered weeds across the district's agrarian and peri-urban habitats.

Keywords: Weeds, Ethnobotany, Invasive, Taxonomy, Ghaziabad

Journal of Plant Development Sciences Vol. 17(5)

ANTIOXIDANT EFFICACY OF LEAF PART OF SOME TRADITIONAL MEDICINAL PLANTS

Komal Sudan¹ and Vikas Sharma^{1*}

¹Natural Products Laboratory, Division of Biochemistry, Faculty of Basic Sciences, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, Main Campus Chatha, Jammu-180 009, J&K, India
Email: vikas.skuast@gmail.com

Received-04.05.2025, Revised-16.05.2025, Accepted-28.05.2025

Abstract: The traditional medicinal plants have been an integral part of human health care system since ancient times as these plants exhibit pharmacological activities such as antioxidant, anti-inflammatory, antimicrobial and anticancer. The present research work was carried out to examine the phytochemical composition and antioxidant efficiency of four traditional medicinal plants of Jammu region, viz., *Bacopa monnieri* (brahmi), *Cannabis sativa* (bhanga), *Cordia dichotoma* (lasoda) and *Murraya koenigii* (kadipatta). Methanolic extract of leaf part of the above mentioned plants was used as test material and antioxidant efficiency was assessed via three different assays namely DPPH radical scavenging, ferric reducing antioxidant power and metal ion chelation. Results revealed that *Cordia dichotoma* showed maximum phenolic (138.88 ± 0.54 mg GAE/g), flavonoid content (62.91 ± 0.47 mg QE/g) and antioxidant activity via FRAP and metal ion chelation assay whereas Brahmi showed highest antioxidant activity via DPPH assay followed by lasoda, kadipatta and bhanga.

Keywords: Brahmi, Bhang, Lasoda, Kadipatta, Phenolics, Flavonoids, IC₅₀, DPPH, FRAP

Journal of Plant Development Sciences Vol. 17(5)

BIODIVERSITY OF SOIL FUNGI FROM EAST KHANDESH REGION WITH REFERENCE TO GROUNDNUT CROP (MAH), INDIA

R.M. Bagul¹ Jagruti J. Patil^{2*} and K.B. Patil²

¹Dept. of Botany, MGSM's Dadasaheb Dr. Suresh G. Patil College, Chopda, 425107, India.
²Department Arts, Science & Com. College, Songir, Dist. Dhule (MH), 424310, M.S. India.
Email: patiljh198@gmail.com

Received-25.04.2025, Revised-10.05.2025, Accepted-22.05.2025

Abstract: In the parts of East Khandesh region of Maharashtra groundnut is grown as Kharip and Rabbi Crop. The fruits are sold as fresh or in dried form and stored in houses of farmers. Fungi like *Absidia corymbifera*, *Aspergillus aculeatus*, *A. flavus*, *A. niger*, *A. terreus*, *A. astus*, *Curvularia lunata*, *Fusarium oxysperum*, *Humicola* sp., *Penicillium funiculosum*, *P. varians*, *Phytophthora undulate* and *Rhizoctonia bataticola* discover and damage. The kernels (Joffe and Borut, 1966; Gupta and Chohan, 1970). Seed borne fungi of groundnut (*Arachis hypogaea* L.) are responsible to deteriorate and degrade kernels quality during storage practices. In these studies, an attempt was made to note the biodiversity of dominant fungal organisms like *Aspergillus flavus*, *Rhizoctonia bataticola*, and *Penicillium* sps. *Fusarium* sps and so on.

Keywords: Groundnut seeds, Fungal biodiversity, East Khandesh, Soil fungi