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PLANT ADAPTATIONS TO SALINITY STRESS AND VARIOUS AGRONOMIC MEASURES TO OVERCOME SALINITY STRESS

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Abstract: Salinity poses a significant challenge to plant productivity, particularly in arid and semi-arid regions, impacting approx. 1125 mha of land are affected by salinity at the present time, of which 76 mha are affected by human-induced salinization and sodification, and 1.5 mha become unsuitable for agricultural production each year due to rising salinity levels. Salt stress affects plant growth through mechanisms such as water stress, ion toxicity, and oxidative damage. Plants respond to salinity through morphological adaptations like Root System Architecture (RSA), leaf anatomy modifications, and the presence of salt glands. Physiological adaptations include osmotic adjustment, ion homeostasis, and antioxidant defense systems. Understanding these adaptations is vital for developing effective agronomic measures, including soil management, crop rotation, genetic improvement, and water management. Employing these strategies can mitigate the negative effects of salinity stress, improving crop productivity and sustainability in saline environments. However, the escalating risk of soil salinization underscores the importance of interdisciplinary research and innovative approaches to address this global agricultural challenge.

Keywords: Adaptations, Management, Mitigation, Salinity, Stress

MORPHOLOGICAL EVALUATION OF F4 PROGENIES OF CHILLI (*CAPSICUM ANNUM* L.) UNDER KONKAN CONDITIONS

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Abstract: Chilli (*Capsicum annum* L.) holds significant economic importance and is extensively cultivated. The chilli genotypes, sourced from traditional agricultural systems, underwent a thorough assessment of their morphological characteristics. The experiment focused on the F4 generation of chilli, cultivated under Konkan conditions in Maharashtra. Sixteen genotypes were included in the study, organized in a Randomized Block Design (RBD). All progenies exhibited a 'Solitary' flowering habit and a 'Pendent' position habit for the fruits, influenced by the strong genetic behavior of the genotypes. Fruit shapes were categorized into three ranges: short, medium, and very long. The fruit colors ranged from light green to dark green, and physical parameters such as fruit length varied from 9.86 cm (Jwala x Pant C-3) to 4.49 cm (DPL-C-5 x Pant C-3). Similarly, the diameter of fruits spanned from 1.08 cm (DPLC-5 x BC-28) to 0.73 cm (Jwala x DPL-C-5). Counting the number of seeds per fruit revealed that the progeny DPLC-5 x BC-28 exhibited the highest seed count at 68.10, while the lowest count was observed in LCA-206 x Jwala at 29.04. Additionally, the study found that capsaicin content in fruits ranged from 0.222 to 0.814 mg/100 g. These diverse characteristics within the progenies make them valuable for potential use in future breeding programs.

Keyword: F4 progenies, Physical parameter, Fruit length, Pungency

ASSESSMENT OF YIELD GAPS AND ECONOMICS THROUGH FRONTLINE DEMONSTRATION ON MOTH BEAN [*VIGNA ACONITIFOLIA* (JACQ.) MARECHAL] CULTIVATION IN THE ARID REGION OF WESTERN RAJASTHAN

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Abstract: Performance analysis in terms of gap analysis, yield enhancement and economic viability of improved production technologies of moth bean vis-a-vis farmer's practices was evaluated through frontline demonstrations at farmer's field during *khariif*, season 2021 and 2022. The Krishi Vigyan Kendra, Jodhpur-II has carried out frontline demonstrations on moth bean crop covering an area of 30 ha of farmer's field to exhibit latest production technologies and compared it with farmer's practice. The study in total 45 frontline demonstrations were conducted on farmer's fields in villages viz. Vijaynagar and Kheechan of Jodhpur district of Rajasthan, to demonstrate production potential and economic benefit of improved technologies comprising sowing method, nutrient management and chemical weed management and adoption of whole package of practices for crop. The findings of the study revealed that the demonstrated technology recorded a mean yield of 438 kg/ha which was 28.67 % higher than obtained with farmers practices (340 kg/ha). In per cent terms, scaling in productivity following improved technologies ranged from 27.94 to 29.41 %. Moreover, average yield gap for extension, technology and technology index were 98, 263 kg/ha and 37.49 per cent, respectively. Demonstrated technology also fetched average gross return of (₹ 23511/ha), net return (₹ 13091/ha), and additional return (₹ 4037/ha) in comparison to farmers practices. Demonstration of improved technologies also resulted in realizing higher incremental cost benefit ratio (5.34) with a Benefit: cost ratio of (2.22) compared to the farmers practice (1.97) during two years of study period. The frontline demonstrations conducted on moth beancrop at farmers field revealed that the adoption of improved technologies significantly increased the yield as well as the net returns higher than the farmers practices. So, there is a need to disseminate the improved technologies among the farmers with effective extension methods like training and demonstrations. The farmers should be encouraged to adopt the recommended package of practices realizing for higher returns.

Keywords: Cluster, Frontline demonstration, Moth bean, Profitability

CORRELATION ANALYSIS OF YIELD-RELATED ATTRIBUTES, GROWTH PARAMETERS AND BIOCHEMICAL TRAITS IN ONION (*ALLIUM CEPA* L.) CULTIVAR GAWO-2

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Abstract: Onion (*Allium cepa* L.) is a significant commercial vegetable crop cultivated across diverse climatic regions globally, including tropical, subtropical, and temperate zones. In India, it holds agricultural and medicinal significance, being utilized for culinary purposes and as a component in traditional medicine formulations. This study aimed to investigate the interrelationship between various morphological and physiological traits in onion plants. The experiment was conducted using a Randomized Block Design (RBD) with twelve treatments and three replications. The analysis of the results indicated a highly significant positive correlation between marketable yield and growth parameters such as plant height, number of leaves, and leaf length. Additionally, there was a positive correlation with yield components including polar diameter, equatorial diameter, and average bulb weight, as well as various quality parameters such as TSS, reducing sugars, total soluble sugars, total phenols, and pyruvic acid. Plant height in onions was positively correlated with different growth parameters, such as the number of leaves, leaf length, and total dry matter. It also showed a positive correlation with yield

components like polar diameter, equatorial diameter, average bulb weight, and marketable yield. Furthermore, the polar diameter of the bulb was positively correlated with TSS, total sugars, and total phenols.

Keywords: Correlation, Onion, Marketable yield, TSS

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DECIPHERING GENETIC DYNAMICS: A STUDY OF VARIABILITY, CORRELATION, AND PATH ANALYSIS IN SUGARCANE CULTIVARS

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Abstract: Genetic variability, correlations and path coefficients were studied in sugarcane taking nineteen phenotypically diverse midlate clones along with three checks, which were planted in randomized block design. The study revealed highly significant differences among the 19 clones for all the characters studied. All the characters under study indicated the ample variation of these characters. Maximum heritability coupled with high genetic advance observed for stalk diameter (cm) and germination% (45 days) indicated the presence of additive gene action and direct selection may be highly effective. Correlation coefficient revealed that cane yield was found to be significantly and positively correlated with CCS (t/ha), number of millable canes at harvest (000/ha), number of shoots (000/ha) at 240 days, number of tillers (000/ha) at 120 days, germination % (45 days), stalk length (cm) and single cane weight (kg). Path coefficient analysis indicated the highest positive direct effect of number of millable canes at harvest (000/ha) on cane yield. The findings presented herein aimed at developing cultivars with superior performance, resilience and adaptability to meet the growing demands of the sugarcane industry in a changing agricultural landscape.

Keywords: Correlation, Genetic variability, Heritability, Path analysis, Sugarcane