

**CHARACTERIZATION AND PERFORMANCE ASSESSMENT
OF EXOTIC BELL PEPPER VARIETIES UNDER POLYTUNNEL
CONDITIONS**



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ABSTRACT

Bell pepper (*Capsicum annuum*) belongs to the family Solanaceae is a popular commercial vegetable grown all over the world. This study aimed to characterize and assess the performance of exotic bell pepper varieties under polytunnel conditions. The experiment was conducted in a polytunnel at the Regional Agriculture Research and Development Center, Bandarawela during November 2024 to February 2025. The performances of eight new exotic bell pepper varieties (Tibetzi, Carnival, Lirica, Star No.01, NS280, Adonis, Karveri and Mecong) were compared with two control varieties Indra and Polaris. The experiment was laid in Completely Randomized Design (CRD) with three replicates as a pot experiment on soilless media. A total of 150 plants were in the experiment. Growth parameters, including plant height, number of leaves, days to first flowering, days to 50% flowering and morphological traits were recorded and analyzed. As a yield parameters number of fruits, fruit weight and fruit quality parameters were recorded and analyzed at first harvesting. The results indicated significant variations ($p < 0.05$) among the varieties in plant height, number of leaves and flowering observations. Polaris showed the highest plant height (59.56 cm), while NS 280 recorded the lowest plant height (47.10 cm). Mecong recorded the highest number of leaves (39.10), while NS 280 had the lowest number of leaves (19.85). Mecong showed early flowering 47.93 days and NS 280 showed late flowering in 53.5 days. Morphological assessment recorded that most varieties had erect growth habits, oval shaped dark green leaves and blocky fruit shapes except Tibetzi and Carnival, which had triangular fruit. In terms of yield, Mecong recorded the highest number of fruits per plant (7.80), whereas Indra produced the heaviest individual fruits (185.6 g) at first harvesting. Tibetzi and Carnival showed distinct triangular fruit shapes, differing from the blocky fruit types observed in other varieties. According to the growth parameters Mecong and the control variety Indra, demonstrate a better growth potential under controlled polytunnel conditions, making them suitable candidates for commercial cultivation. However, the varietal selection primarily based on the yield performance and fruit quality characteristics. The yield data recording to be continued to make the decision on selection of the best varieties for commercial recommendation.

Keywords: Bell pepper, Exotic varieties, Growth, Polytunnel condition, Yield and Quality

TABLE OF CONTENT

DECLARATION	iv
DEDICATION.....	v
ACKNOWLEDGEMENT	vi
ABSTRACT.....	vii
TABLE OF CONTENT	viii
LIST OF FIGURES	xii
LIST OF TABLES	xiii
ABBREVIATIONS AND SYMBOLS.....	xiv
CHAPTER 1	1
1.1 INTRODUCTION.....	1
1.2 OBJECTIVES	3
CHAPTER 2	4
LITERATURE REVIEW	4
2.1 Bell pepper	4
2.2 Genus of Bell pepper.....	5
2.3 Scientific Classification.....	6
2.4 Anatomy of Bell pepper	6
2.5 Morphology of Bell pepper	7
2.5.1 Macro Morphology of Bell pepper.....	8
2.5.2 Micromorphology of Bell pepper	8
2.6 Bioactive Components of Bell pepper	8
2.7 Nutritional value of Bell pepper.....	9
2.8 Medical and Health Benefits of Bell Pepper	10
2.9 Economic Importance of Bell pepper.....	10
2.10 Major Diseases of Bell pepper	11

2.10.1 Bacterial Spot Disease	11
2.10.2 Leaf Curl Disease	11
2.10.3 Phytophthora Blight Disease	11
2.10.4 Soft Rot.....	11
2.10.5 Powdery Mildew Disease	12
2.11 Insect pests of Bell pepper	12
2.11.1 Thrips.....	12
2.11.2 White Fly	12
2.11.3 Pepper Weevil.....	13
2.12 Polyunnel Cultivation.....	13
2.13 Effect of Polyunnel Cultivation on Vegetable Crops.....	15
2.14 Varietal Performance in Different Growing Environments	15
2.15 Growth Media Use in Polyunnel Cultivation.....	17
2.15.1 Coco Peat.....	18
2.15.2 Paddy husk.....	18
2.16 Different Fertilizers Used in Polyunnel Cultivation	19
2.16.1 Albert Fertilizer	19
CHAPTER 3	20
MATERIALS AND METHODOLOGY	20
3.1 Experimental Location	20
3.2 Materials.....	20
3.2.1 Planting Materials.....	20
3.2.2 Fertilizers	20
3.2.3 Other Equipment.....	21
3.3 Methodology	21
3.3.1 Treatments (Varieties)	21
3.3.2 Research Design	22

3.3.3 Agronomic Practices.....	23
3.4 Data Collection.....	27
3.4.1 Growth parameters	27
3.4.2 Morphological traits	27
3.4.3 Yield Parameters.....	28
3.4.4 Quality Parameters	28
3.5 Data Analysis	29
CHAPTER 4	30
RESULTS AND DISCUSSION	30
4.1 Results of Growth Parameters.....	30
4.1.1 Plant Height	30
4.1.2 Number of Leaves	31
4.1.3 Days to 1 st Flowering.....	32
4.1.4 Days to 50% Flowering	33
4.1.5 Mature Leaf Length.....	34
4.1.6 Mature Leaf Width	35
4.2 Morphological Traits.....	36
4.2.1 Vegetative Growth Traits	38
4.2.2 Flower Characteristics	38
4.2.3 Fruit Traits	38
4.3 Results of Yield Parameters	39
4.3.1 Number of Fruits	39
4.3.2 Fruit Weight.....	40
4.4 Quality Parameters	41
4.4.1 Fruit Height.....	41
4.4.2 Fruit Diameter.....	42
4.4.3 Pericarp Thickness.....	43

4.4.4 Number of Lobes of fruit.....	44
4.4.5 Fruit Shape.....	44
4.4.6 Fruit Color	44
CHAPTER 5	45
5.1 Conclusion.....	45
5.2 Recommendations for future outlook.....	45
6 References.....	46
7 Annexes/Appendices.....	51