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**Ravi Bhuriya**  
Rural Horticulture Extension  
Officer, Horticulture and Food  
Processing Department,  
Barwani, Madhya Pradesh, India

**Ankita Pandey**  
Senior Technical Officer, Krishi  
Vigyan Kendra, Dewas, Madhya  
Pradesh, India

**Shikha Awasthi**  
Ph.D. Research Scholar, Faculty  
of Agricultural Science,  
Mansarovar Global University,  
Bilkisganj Sehore, Madhya  
Pradesh, India

## Performance of high yielding new chilli variety Mahy 453 and Mahy 456 in Barwani district of Madhya Pradesh

Ravi Bhuriya, Ankita Pandey and Shikha Awasthi

### Abstract

Chilli, a quintessential spice in Indian cuisine, plays a pivotal role in the agricultural economy of Madhya Pradesh. In pursuit of increased agricultural productivity and economic upliftment of farmers, two new chilli varieties, Mahi 453 and Mahi 456, have emerged as potential game-changers. This research paper aims to comprehensively evaluate the performance of these new chilli varieties in Barwani district, known for its diverse agro-climatic conditions and vibrant farming community. In this study, the performance of two chili pepper varieties, Mahy 453 and Mahy 456, was evaluated over three consecutive years, encompassing fruit and plant characteristics, as well as total yield. Mahy 456 consistently outperformed Mahy 453 in terms of fruit weight, length, diameter, plant height, pericarp thickness, number of seeds per fruit, seed yield, and total yield. These results indicate that Mahy 456 tends to produce larger, longer, and wider chili peppers with more seeds, thicker skin, and taller plants, ultimately resulting in higher total yield. This information is crucial for agricultural decision-making, especially in the Barwani district, where the adaptability of these varieties to specific agro-climatic conditions, as well as their resistance to common diseases, must also be considered for comprehensive variety selection.

**Keywords:** Chilli, fruit characteristics, plant characteristics, variety, yield

### 1. Introduction

The cultivation of chilli peppers, a versatile and economically significant crop, plays a pivotal role in the agricultural landscape of India (Kammara *et al.*, 2023; Salaria *et al.*, 2023) [2, 6]. Chilli peppers, renowned for their pungency and diverse culinary applications, have been a staple ingredient in countless Indian dishes, adding flavor and spice to the nation's cuisine (Ramkumar and Karuppusamy 2021; Karmakar *et al.*, 2023) [4, 3]. In the context of Madhya Pradesh, the cultivation of chillies has been a traditional practice, providing livelihoods to a substantial portion of the farming community and contributing significantly to the state's agricultural economy (Bisht *et al.*, 2022; Ravi Kumar *et al.* 2023) [1, 5].

With a keen emphasis on increasing agricultural productivity and enhancing the income of farmers, ongoing research and development efforts have aimed to introduce new and improved chilli varieties that can thrive in diverse agro-climatic conditions while delivering high yields and superior quality. Among the new entrants in this endeavour, Mahy 453 and Mahy 456 are promising chilli varieties that have generated considerable interest within the farming community.

The Barwani district in Madhya Pradesh, endowed with a range of microclimates and soil types, presents an ideal testing ground for the evaluation of these new chilli varieties. Farmers in the region have shown an eagerness to adopt innovative agricultural practices, and the introduction of high-yielding chilli cultivars has the potential to transform their farming practices and economic well-being. It is against this backdrop that this research paper sets out to comprehensively assess the performance of Mahy 453 and Mahy 456 chilli varieties in Barwani district, examining various aspects such as yield, disease resistance, and adaptability to local agro-climatic conditions.

This paper delves into the agronomic characteristics of Mahy 453 and Mahy 456, the challenges faced by local farmers, and the potential benefits that these new varieties offer in terms of improved yield and income generation. By analyzing the data and experiences gathered from this study, we aim to provide valuable insights that can guide farmers, agricultural extension services, and policymakers in making informed decisions to enhance the

**Corresponding Author:**  
**Ravi Bhuriya**  
Rural Horticulture Extension  
Officer, Horticulture and Food  
Processing Department,  
Barwani, Madhya Pradesh, India

chilli farming sector in Barwani district and, by extension, in Madhya Pradesh. Furthermore, the findings from this research may also serve as a model for similar studies in different regions across India, contributing to the sustainable growth of the nation's agricultural sector and the welfare of its farming communities.

## 2. Materials and Methods

### 2.1 Sample Selection

For this study, a representative sample of 10 chilli farmers in the Barwani district was selected. A systematic sampling approach was employed to ensure a balanced representation of different agro-climatic zones and soil types in the district.

### 2.2 Data Collection

Data collection involved both primary and secondary sources. Primary data was obtained through on-site surveys, where data on plant growth, yield, and incidence of diseases were collected. Secondary data was collected from agricultural records and historical climate data for the district.

## 3. Results and Discussion

The results of the study will be presented, analyzed, and discussed in this section. This will include a detailed examination of the yield performance of Mahi 453 and Mahi 456, their resistance to common diseases, and how well they adapt to the specific agro-climatic conditions of Barwani district.

The table 1 provides data on the performance of two chilli pepper varieties, Mahy 453 and Mahy 456, over three

consecutive years (2019-20, 2020-21, and 2021-22) in terms of various fruit and plant characteristics, as well as their total yield. The data is then averaged across these years. Mahy 453 exhibited an average fruit weight of 5.41g, while Mahy 456 had slightly heavier fruits with an average of 5.68g. This indicates that Mahy 456 produced larger chilli peppers compared to Mahy 453. Mahy 456 had a slightly higher average fruit length of 80.23mm, whereas Mahy 453's fruits measured 76.7mm on average. Mahy 456 appears to produce longer chilli peppers. Mahy 456 had a slightly greater average fruit diameter (12.20mm) than Mahy 453 (11.67mm). This indicates that Mahy 456's fruits are slightly wider. Mahy 456 consistently exhibited taller plants, with an average height of 701.7mm, while Mahy 453 had an average plant height of 657.8mm. Mahy 456, therefore, tended to produce taller chilli plants. Mahy 456 had a thicker pericarp, averaging 1.12mm, compared to Mahy 453's average pericarp thickness of 0.97mm. This suggests that Mahy 456's chilli peppers had thicker skin. Mahy 456 produced chilli peppers with a higher average number of seeds per fruit, with an average of 45.54 seeds, compared to Mahy 453's average of 41.84 seeds. Mahy 456's fruits had more seeds. Mahy 456 produced a slightly higher average seed yield, with 2.44g per 10 fruits, while Mahy 453 yielded 2.17g on average. This means that Mahy 456 provided a slightly better seed yield. Mahy 456 consistently outperformed Mahy 453 in terms of total yield, with an average of 21.92 t/ha compared to Mahy 453's 20.58 t/ha. Mahy 456 demonstrated a higher overall yield in terms of chilli production.

**Table 1:** Performance of chilli varieties Mahy 453 and Mahy 456 for important fruit and plant characteristics and total yield

Varieties	2019-20	2020-21	2021-22	Average
<b>Fruit weight (g)</b>				
Mahy 453	5.56	5.23	5.44	5.41
Mahy 456	5.89	5.49	5.67	5.68
<b>Fruit length (mm)</b>				
Mahy 453	77.9	75.6	76.6	76.7
Mahy 456	80.6	81.2	78.9	80.23
<b>Fruit diameter (mm)</b>				
Mahy 453	11.92	11.76	11.34	11.67
Mahy 456	12.21	12.41	11.98	12.20
<b>Plant height (mm)</b>				
Mahy 453	652.0	648.9	672.6	657.8
Mahy 456	701.2	689.8	714.1	701.7
<b>Pericarp thickness (mm)</b>				
Mahy 453	0.89	1.09	0.95	0.97
Mahy 456	1.13	1.21	1.02	1.12
<b>Number of seeds per fruit</b>				
Mahy 453	41.23	40.97	43.34	41.84
Mahy 456	45.45	42.99	45.20	45.54
<b>Seed yield (g) 10 fruits</b>				
Mahy 453	2.34	1.98	2.21	2.17
Mahy 456	2.55	2.39	2.40	2.44
<b>Total yield (t/ha)</b>				
Mahy 453	21.20	19.98	20.57	20.58
Mahy 456	22.34	21.56	21.87	21.92

The results suggest that Mahy 456 generally outperformed Mahy 453 in several important characteristics and total yield. Mahy 456 produced chilli peppers with a larger weight, length, diameter, and a higher number of seeds per fruit. Additionally, it exhibited taller plants with thicker pericarps and a higher seed yield.

While the differences in some characteristics may be

relatively small, such as fruit weight and fruit diameter, they can collectively contribute to a higher total yield. Farmers and growers looking to maximize their chilli pepper production might find Mahy 456 to be a more promising variety. However, other factors such as environmental adaptability, disease resistance, and market demand should also be considered when choosing a chilli pepper variety for

cultivation.

(*Capsicum annuum* L.) to sudden wilt syndrome. *Physiological and Molecular Plant Pathology*. 2023;126:102038.

#### 4. Conclusion

This research contributes to the knowledge base on chilli cultivation in the Barwani district of Madhya Pradesh by comprehensively evaluating the performance of Mahi 453 and Mahi 456 varieties. The findings have the potential to inform decisions that can enhance the agricultural practices and economic well-being of farmers in the region. Communities. The comprehensive assessment of chili pepper varieties Mahy 453 and Mahy 456 over a three-year period revealed notable differences in their performance. Mahy 456 consistently demonstrated superior characteristics, including larger fruits with greater length, diameter, and pericarp thickness, along with taller plants, more seeds per fruit, and higher total yield. These findings underscore the potential of Mahy 456 as a preferred choice for chili pepper cultivation, particularly in the Barwani district. However, it is essential to consider additional factors such as disease resistance and adaptability to the local agro-climatic conditions when making planting decisions. Longer-term studies may provide further insights into the sustainability and adaptability of these varieties, enabling more informed choices for chili production in this region.

#### 5. Conflicts of interest

The authors have no conflicts of interest.

#### 6. Acknowledgments

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