

Performance of Cucumber (*Cucumis sativa* L.) cv. Kumud under Naturally Ventilated Polyhouse

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Protected cultivation has emerged as an efficient technology for increasing vegetable productivity and quality. The present study was conducted to evaluate the growth, flowering, fruiting, and yield performance of cucumber (*Cucumis sativa* L.) variety Kumud under naturally ventilated polyhouse conditions. The crop was grown in an experimental area of 30.8 m² during February–May 2026. Healthy seeds were sown at a spacing of 50 × 65 cm on raised beds. Organic nutrient management practices, including farmyard manure and humic acid, were adopted along with regular irrigation and plant training. Germination reached 90–95%, indicating favorable growing conditions. The crop exhibited vigorous vegetative growth, timely flowering (37–46 DAS), and fruiting (44–53 DAS). A total yield of 310 kg was recorded from the experimental area, which corresponds to an estimated productivity of 100.65 t ha⁻¹. The findings demonstrate that cucumber cultivation under naturally ventilated polyhouse conditions can significantly enhance crop growth, yield, and resource-use efficiency.

Keywords: Cucumber, Polyhouse, Protected Cultivation, Kumud Variety, Yield, Organic Farming, Vegetable Production

Introduction

Cucumber (*Cucumis sativa* L.) is one of the most important vegetable crops belonging to the family Cucurbitaceae. It is widely cultivated for its tender fruits, which are consumed fresh as salad and are rich in vitamins, minerals, and water content. In recent years, protected cultivation technologies such as polyhouses have gained importance due to their ability to provide favorable environmental conditions for crop growth and productivity. Polyhouse cultivation protects crops from adverse climatic conditions and allows better control over temperature, humidity, irrigation, and nutrient management. Cucumber responds particularly well to protected cultivation because of its rapid growth, high market demand, and ability to produce higher yields under controlled environments. Therefore, the present investigation was undertaken to study the growth performance and productivity of cucumber variety Kumud under naturally ventilated polyhouse conditions.

Materials and Methods

Experimental Site

The experiment was conducted in a naturally ventilated polyhouse during February–May 2026. The total experimental area was 30.8 m².

Crop Details

- Crop: Cucumber
- Scientific Name: *Cucumis sativa* L.
- Family: Cucurbitaceae
- Variety: Kumud (VNR)

- Crop Duration: 85–95 Days
- Date of Sowing: 04 February 2026
- Spacing: 50 × 65 cm
- Seed Rate: 8 g (equivalent to 2.59 kg ha⁻¹)

Land and Bed Preparation

The polyhouse area was cleaned thoroughly before cultivation. Weeds, stones, and crop residues were removed, and the soil was loosened to improve aeration and root development. Well-decomposed farmyard manure (FYM) was incorporated into the soil. Raised beds measuring approximately 14 m × 2.2 m were prepared to facilitate drainage and intercultural operations. Drip irrigation lines were installed for efficient water management.

Sowing and Crop Management

Healthy seeds of Kumud variety were sown manually at a depth of 2.5 cm. Adequate soil moisture was maintained for uniform germination. Organic nutrient management was followed through FYM application and periodic fertigation with humic acid. Training and pruning operations were carried out regularly to maintain vertical growth and improve light interception.

Plant Protection

Eco-friendly plant protection measures were adopted. Neem Ark and Dashparni Ark were used for managing aphids, whiteflies, and mites. Proper sanitation, ventilation, and humidity management helped minimize disease incidence.

Data Collection

Observations were recorded on germination percentage, plant height, number of leaves, number of nodes, flowering, fruiting, and yield. Data were collected at different growth stages and analyzed descriptively.

Results and Discussion

Germination Performance

Seed germination was satisfactory under polyhouse conditions. Approximately 70% germination was recorded on 07 February 2026, which increased to 90–95% by 09 February 2026. The high germination percentage may be attributed to favorable temperature, adequate soil moisture, and the use of quality seed.

Vegetative Growth

The crop showed continuous vegetative development throughout the growing period. Plant height increased substantially from 30 DAS to 90 DAS, with maximum heights reaching up to 250 cm. Similarly, the number of leaves and nodes increased steadily, indicating vigorous growth and enhanced photosynthetic activity.

The favorable microclimate within the polyhouse, combined with proper nutrient and water management, contributed significantly to improved vegetative growth.

Flowering and Fruiting

The first flowering was observed at 37 DAS, while 50% and 100% flowering occurred at 41 and 46 DAS, respectively. Fruiting commenced at 44 DAS and reached complete fruiting by 53 DAS.

Uniform flowering and fruit set indicate that the crop experienced minimal environmental stress and received adequate nutrition during reproductive development.

Yield Performance

Harvesting was carried out at regular intervals based on fruit maturity. A total yield of 310 kg was obtained from the 30.8 m² experimental area.

The estimated productivity on a hectare basis was calculated as:

- Yield = 100,647 kg ha⁻¹
- Equivalent Yield = 100.65 t ha⁻¹

The high productivity observed in the present study confirms the advantages of polyhouse cultivation in enhancing cucumber yield through better environmental control and efficient resource utilization.

Conclusion

The present investigation demonstrated that cucumber variety Kumud performs exceptionally well under naturally ventilated polyhouse conditions. High germination percentage, vigorous vegetative growth, timely flowering and fruiting, and excellent yield were observed throughout the crop cycle. The use of organic nutrient management, regular irrigation, training, pruning, and eco-friendly plant protection practices contributed significantly to crop performance. A total yield of 310 kg from 30.8 m², equivalent to 100.65 t ha⁻¹, was achieved, highlighting the potential of protected cultivation for commercial cucumber production. Therefore, naturally ventilated polyhouse cultivation can be recommended as a profitable and sustainable technology for increasing cucumber productivity and quality.

References

1. Anonymous. (2024). Package of Practices for Vegetable Crops. Indian Council of Agricultural Research (ICAR), New Delhi, India.
2. Choudhary, B.R., Fageria, M.S., and Dhaka, R.S. (2021). Protected Cultivation of Vegetable Crops. Scientific Publishers, Jodhpur, India.
3. Kumar, P., Singh, M.C., and Prakash, S. (2020). Advances in Protected Cultivation of Vegetables. Journal of Horticultural Sciences, 15(2): 95–105.
4. Singh, B. and Sharma, R.R. (2019). Protected Cultivation Technology for Vegetable Production. Indian Horticulture, 64(3): 22–27.
5. Thamburaj, S. and Singh, N. (2018). Textbook of Vegetables, Tuber Crops and Spices. ICAR Publication, New Delhi.
6. VNR Seeds Pvt. Ltd. (2025). Technical Information Sheet of Cucumber Hybrid Kumud. VNR Seeds, Raipur, India.