



## Short communication

# Phenological development and production potential of parthenocarpic cucumber hybrids under polyhouse environment

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### ABSTRACT

Experiment was conducted to screen cucumber hybrids for fruit yield and physical quality parameters under polyhouse environment. Seeds of four parthenocarpic cucumber hybrids were sown using plastic pro-trays technique in the month of December during both the years. Seedlings were raised under naturally ventilated poly-tunnels. Seedlings were transplanted in the mid of January. Transplanted seedlings were irrigated through drip irrigation mode. Plants were trained vertically upward using jute thread after pruning and pinching of axillary branches. Maximum fruit yield was recorded from Hilton (22.8 kg/sq. m), followed by NVH-2-26 (20.5 kg/ sq. m) and Isatis (21.2 kg/ sq. m), which were at par with each other. However, minimum fruit yield was noticed from Phule Prachi (16.1 kg/ sq. m). Fruits had better quality being parthenocarpic in nature than Phule Prachi when grown in polyhouse.

**Key words:** Cucumber, polyhouse, gynoecious, parthenocarpic, yield.

Cucumber (*Cucumis sativus* L.) is one of the most valuable cucurbitaceous crops and is generally grown for its immature tender fruits. It is a warm season vegetable crop grown throughout the year in India. Cucumber is one of the most important greenhouse crops particularly because it can be grown round the year. As many as three crops under sub-tropical conditions do make it economically very profitable (Sabir Naved *et al.*, 5). It is grown in northern plains as off-season crop under polyhouse for maximum yield. Increasing demand of high quality cucumber in big cities and particularly during off-season (Fig. 1) bring very high prices. Normally in northern India, cucumber cannot be grown in open field during October to March because of prevailing low temperatures. However, polyhouse grown cucumber can be harvested and marketed during December to February. Singh *et al.* (7) reported that low cost naturally ventilated polyhouse is suitable and economical for year round production of cucumber for northern plains of India. It needs a temperature between 25-29°C and plenty of sunlight (Hochmuth, 2). Greenhouse cucumber production is very popular in many areas of the world. It is a warm season crop. Among the various advance technologies used to achieve breakthrough in yield potential of cucumber, cultivation of gynoecious cucumber in protected environment has proved to increase the yield manifold. Parthenocarpic/gynoecious cucumber hybrids are much productive and produce fruits with smoother skin than the monoecious type.

The present investigation was carried out in polyhouse area of Department of Vegetable Science, CCS, Haryana Agriculture University, Hisar (29°10' N latitude and 75°46' E longitude, 215 masl) during the period from December to April for two years. Soil of the experimental field was sandy loam with slightly high in pH. The soil was poor in organic carbon and available nitrogen, medium in phosphorus and high in available potash. Seeds of four parthenocarpic/gynoecious cucumber hybrids Hilton, NVH-2-26, Isatis and Phule Prachi were sown in plastic pro-trays using soil-less culture media, *viz.* cocopeat,



Fig. 1. Cucumber cultivation in plastic greenhouse.

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vermiculite and perlite in the ratio of 3:1:1 (v/v) in first week of December in both the years. Seedlings were grown in naturally ventilated polyhouse for 20-25 days. Mist irrigation was practiced until seedlings were ready for transplanting. Twenty-two day-old seedlings of four cucumber hybrids were transplanted on flat seed bed with four replications in a randomized block design at spacing of 60 cm x 30 cm during mid of January every year under the zero energy polyhouse covered with ultra violet stabilized low density polythene sheet having 200 micron thickness. Crop was fertigated using water-soluble fertilizer throughout the growing period in polyhouse. Plants were vertically trained upward using jute thread after pruning and pinching of axillary branches, allowing main stem to grow upward. Observations were recorded on plant height, days to 50% flowering, days to first harvest, number of fruits/plant, fruit length and diameter and fruit yield kg/sq. m and q/ha. Air and soil temperatures were high inside the polyhouse though relative humidity showed opposite trends with that of air temperature. Maximum and minimum temperature inside the polyhouse and open field conditions were recorded during the crop growth period and are shown in figure given below.

The air temperature both within and outside the polyhouse followed a set pattern, *i.e.* from early higher values gradually decreased and reaches minimum values during the month of January, thereafter increased and these trends were similar during both the years of experimentation (Fig. 2). Air temperature inside the polyhouse was distinctly 5-8°C higher about than that of outside. The better growth, development and yield of cucumber were achieved under polyhouse due to the higher (optimum) temperature during the winter months (December to February), which positively influenced the morpho-phenological and physiological events of cucumber plants. The growth and development of cucumber plants becomes restricted during cold winter months of December

& January because of its season bound nature. Therefore, if cucumber is planted under polyhouse, it will have also with good stands that mature earlier and fruiting period extended, ultimately giving good yield.

Significant difference in plant height was noticed among the different hybrids. Maximum plant height was recorded in Phule Prachi (252.3 cm), which was followed by Hilton. Both the hybrids were found at par with each other but significantly superior to all other hybrids, whereas, Sharma *et al.* (6) reported the maximum vine length in Hilton when compared with Kian and Isatis under polyhouse environment. Minimum number of days taken to 50% flowering (24.0) was noticed in Hilton followed by Isatis (26.0) and NVH-2-26 (26.7), whereas, Phule Prachi took comparatively more days to flower (Table 1). Significant difference among the gynoecious hybrids was observed for number of days to first harvest. Hilton took minimum number of days to first harvest (43.7), which was followed by Isatis, NVH-2-26 and Phule Prachi. This may be due to earliness in flowering of the hybrids.

Significant difference for number of fruits harvested per plant was found among hybrids. Maximum number of fruits per plant (24.5) was recorded in Hilton followed by Isatis (22.3). This might be due to profuse female flowering throughout the vegetative growth. Minimum number of fruits per plant was recorded in Phule Prachi. Sharma *et al.* (6) reported maximum number of fruits per plant in Hilton when grown during the winter month under zero energy polyhouse conditions. Parvej *et al.* (4) explained significant differences in number of fruits per plant among different tomato varieties when grown inside the polyhouse. Fruit size (fruit length and diameter) showed that Hilton had significantly maximum fruit length (15.8 cm) and diameter (38.6 mm). Phule Prachi had minimum fruit length but minimum diameter was recorded in NVH-2-26 (Fig. 3). Fruit yield per square metre as well as quintal per hectare was recorded maximum

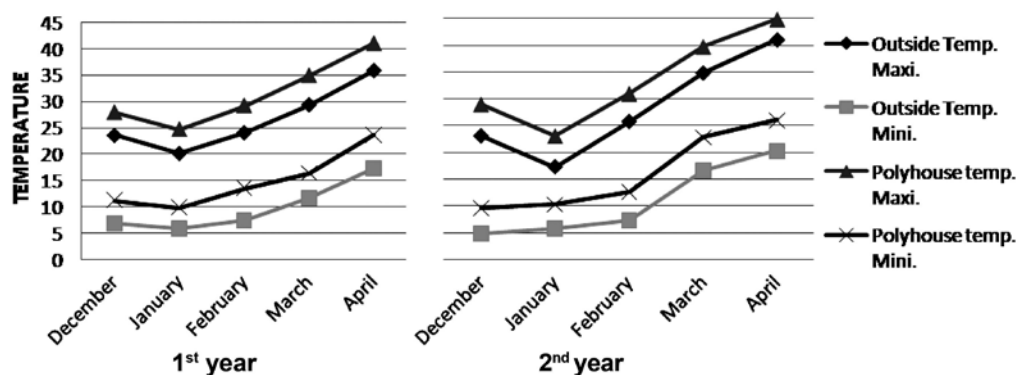
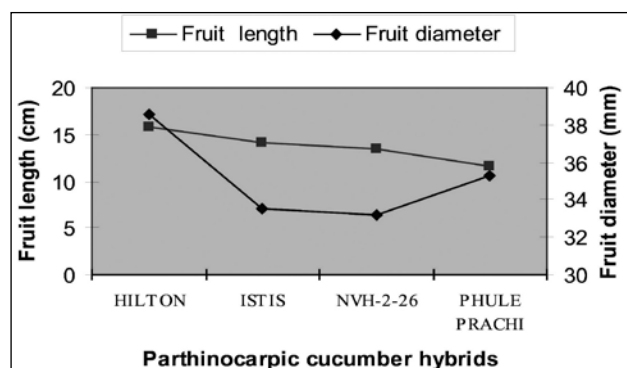


Fig. 2. Inside and outside polyhouse temperature during the crop growth period.

**Table 1.** Response of different gynoecious cucumber hybrids under plastic greenhouse.

Hybrid	Plant height (cm)	Days to 50% flowering	Days to first harvest	No. of fruits/ plant	Fruit length (cm)	Fruit dia. (mm)	Yield (kg/ sq. m)	Yield (q/ha)
Hilton	251.0	24.0	43.7	24.5	15.8	38.6	22.8	2280.0
Istis	240.4	26.0	44.3	22.3	14.1	33.5	21.2	2120.0
NVH-2-26	239.8	26.7	46.7	22.1	13.5	33.2	20.5	2050.0
Phule Prachi	252.3	31.7	56.0	17.0	11.6	35.3	16.1	1610.0
CD at 5%	5.0	3.0	2.5	1.4	1.5	2.1	1.8	32.5



**Fig. 3.** Fruit length and diameter of different parthenocarpic cucumber hybrids.

in Hilton (2280.0 q/ha), which was statistically higher than other hybrids. This was due to good vegetative growth, maximum female flowering and capacity of Hilton to produce maximum number of fruits per plant. Similar findings were recorded by Sharma *et al.* (6), Soleimani *et al.* (8) and Mohamedien *et al.* (3). Minimum fruit yield was noticed in Phule Prachi (1610.0 q/ha). Hybrid difference in term of growth and yield characteristics has been reported by Chaurasia *et al.* (1) under polyhouse.

From the present investigation, it may be concluded that parthenocarpic/ gynoecious cucumber hybrid Hilton produced the maximum number of fruits per plant, early and total fruit yield, which was followed by Istis when seedlings were transplanted during end of December in the polyhouse under north Indian plains.

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