



# CUCUMBERS

**NAANDANJAIN**  
A JAIN IRRIGATION COMPANY

## BACKGROUND

The cucumber may be grown in any conditions, outdoors or in a greenhouse. There are regular varieties with seeds, as well as parthenocarpic types.

The plant is an annual and excels in rapid growth. The first fruit appears after 5 weeks and fruit production continues for another 4–8 weeks, according to the variety and the season. The growing season is generally 3–4 months.

For proper germination, soil temperature should be at a minimum of 15 degrees. The optimum growing temperature is around 20–22° during the day and 19–20° at night, but the cucumber also grows under hot conditions. High temperatures induce quicker growth but over a longer period, temperatures above 35° cause the flowers to degenerate. The cucumber is sensitive to low temperatures, and also to changes in the length of the day. During short days, there are more female blossoms and more fruit.

In greenhouses, it is possible to have three growing cycles with a potential yield of 300 tons/ha/year.

The plant is sensitive to leaf diseases, mainly to mildew which develops in humid conditions



### SOIL

The cucumber is not sensitive to soil type and can grow in any kind of soil. In the winter, well-drained soil is naturally preferable, but this is mainly for technical reasons. The cucumber is sensitive to soil diseases, and therefore disinfecting the soil prior to cultivation is recommended.

Optimal pH: 6.0–6.5.

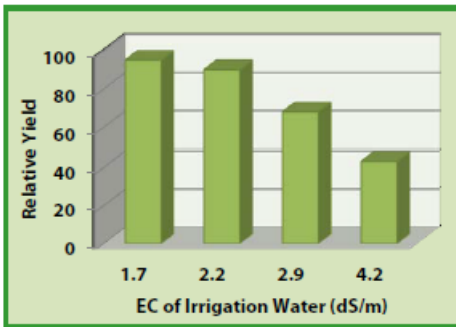
## IRRIGATION

Water consumption per season is 400–700 mm.

Although the root system is characterized by a tap root, which may reach a depth of 1 m, the overall root system is rather shallow—30 cm at the top. Therefore, frequent irrigation is recommended. In greenhouses, it is customary to irrigate regularly during sowing. After sowing, in a moderate climate, 3 mm should be provided daily until harvesting, followed by 5 mm daily for the duration of the harvest. More precise irrigation management should follow the daily ET and plant stage of growth.

The pH of the water is also critical and may need to be adjusted. The target pH of the nutrient solution supplied to the plants should be between 5.5 and 6.0. Nitric, sulfuric, or phosphoric acid are recommended for reducing the pH if it is above 7. If the water source is alkaline due to high bicarbonate concentrations, the pH should be adjusted before the fertilizer salts are added in order to prevent precipitation.

### Sensitivity to Water Salinity



**Figure 2.8:** The effect of salinity on cucumber yield (Ayers, 1977)

### Irrigation Intervals (Northern Hemisphere)

Season	Irrigation Cycles in Light Soil	Irrigation Cycles in Heavy Soil
October	1-2	1-4
November	3-5	5-7
December–January	4-5	7-8
February	3-4	5-7
March	2-3	4-5
April–May	1-2	2-3
June–August	1-2	2-3

### Crop Factors\* Range to be Used with Penman ET calculation

Growth stage		
Seedling to flowers	Pollination till harvest	Harvest till end of season
0.4-0.7	0.8-1.2	1.2-1.08

\*The crop factor multiplied by the daily ET represents the plant's water requirements.



## FERTILIZATION AND FERTIGATION

The given information should be considered only as a guideline.  
The amount of fertilizer depends on the variety, soil minerals and the expected yield.

The nutrient uptake rate by greenhouse cucumbers is very high.

One study indicates that cucumbers may require in the range of 28 kg/ha of nitrogen, 5 kg/ha of phosphorus, and 40 kg/ha of potassium per week during peak fruit production.

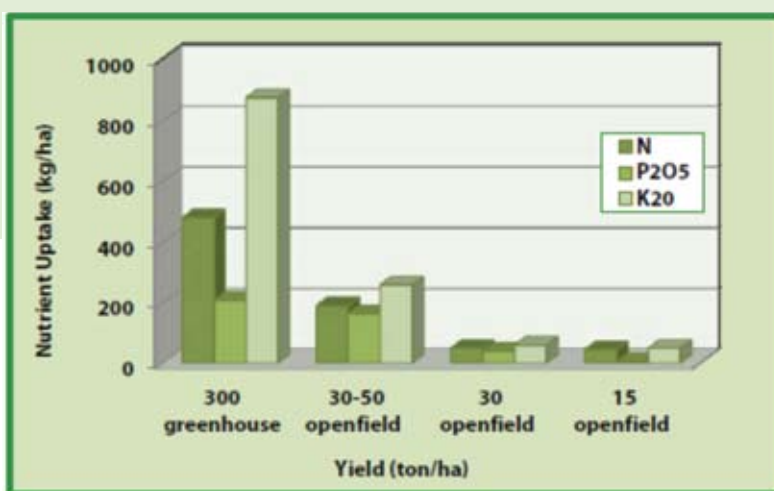


Figure 3.11: N-P-K uptake rates by cucumber crops at various growing conditions and yields

Indicative N-P-K ratios at various growing conditions (La Malfa, 1992)

	Open Field	Greenhouse
Expected yield (ton/ha)	15-30	120-300
Typical N:P:K ratio	1:0.5:1.5	1:0.5:2

Amount of Nutrients to Apply During the Season (kg/ha)

Month of growth	Stage of growth	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	MgO	CaO
0	Pre planting	200	140	184		
1	Planting and plant growth	30	30	15		
2	Flowering & fruit set	60	30	90		
3	Fruit development	60	30	90		
4	Harvest	60	30	90		
5	Harvest	60	30	90		
6	End of harvest	30	10	41		
<b>Total</b>		<b>500</b>	<b>300</b>	<b>600</b>	<b>130</b>	<b>300</b>

### Amount of Nutrients for Short Growing Season

Days after Planting	Daily Nitrogen Kg/ha	Daily Potash Kg/ha	Accumulated quantities kg/ha	
			N	K <sub>2</sub> O
Pre-plant			28	50
0-14	0.9	1.8	42	84
15-63	1.5	3.0	124	220
64-77	0.7	1.4	135	243
<b>Total</b>			<b>329</b>	<b>597</b>

The phosphorous fertilizer can be applied prior to sowing, according to soil test. Recommended pre-season compost application is 50-60 ton/ ha.

### SPACING

#### In Greenhouses

The distance between rows can vary from 1.3 cm to 1.5 cm. Plants spacing in the row is 30–50 cm.

In summer crops grown in high structure greenhouses, the double row concept can be used:

Distance between center to center: 180–200 cm

Distance between the couple rows: 50–60 cm

Distance between plants: 40–50 cm.

A dripline is provided for each row, as well as a dripper for each plant.



## DRIP IRRIGATION RECOMMENDATION

Single dripline per row with 0.3–0.5 m between the drippers. One dripper for each plant.  
Dripper flow rate: 1–2 l/hr

### Tif Drip

16 mm non-regulated drippers  
Traditionally used in greenhouses



TifDrip 16 mm

1.0/h

2.0/h

### PC Drippers

In large greenhouses the simple design of the 16 mm PC dripper is ideal, ensuring maximal uniformity.



NaanPC 16mm

1.1/h

1.6/h

2.2/h

### GRAVITY SYSTEM

For small greenhouses (250–500 m<sup>2</sup>) with flat surfaces, a gravity system with a water tank can be an economical solution.



Double row cultivation



### AmnonDrip

16 mm 1.0 l/hr every 30 cm, Single row, 140 ton/ha



Single row cultivation and Fogger system for pesticide spray



Trellising system assembly



Greenhouse for hot climate

- Insect-proof side curtains
- Plastic or net roof cover, depending on rain conditions
- Gutter drainage system





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NaanDanJain is committed to finding the ideal solution for your cucumbers crop, tailored to your local climatic conditions, soil, water properties and budget. Contact our office or your local dealer for further information.

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All information should be used only as a guideline.  
For specific recommendations contact your local agronomist.