PEPPER

Vegetable Cultivation Handbook
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1. Introduction

Botanical name - *Capsicum annuum* L.
English name - Chili pepper, Hot pepper, Sweet pepper
Country of origin - Mexico, Central and parts of South America.

The hot pepper belongs to the *Capsicum* species, in Solanaceae. Central East Mexico gave birth to the domesticated hot pepper.

Chili pepper originated in the Americas. After the Columbian Exchange, many cultivated species of chili pepper spread across the world, it is used in both food and medicine.

Chili peppers were brought to Asia by Portuguese navigators during the 16th century.

Especially, India is one of the largest country of production, consumption and export of pepper. Guntur in Andhra Pradesh produces 30% of all the chilies produced in India, and the state of Andhra Pradesh contributes 75% of India’s chili exports.
2. Cultivative features

■ Temperature
- Growth optimum temperature: 15(nighttime)~30°C(daytime)
- Growth disorder temperature: A growth retard and off-type of fruit setting.

■ Soil
- Soil: good drainage and rich in organic matter.
- Soil acidity: pH 6.0 ~ 6.5 slightly acid.

■ Light adaptability
- Light saturation point: approximately 30,000 lux.
- Light compensation point: 2~3,000 lux.

■ Fertilizer
- Fertilizer application: The fertilizer should be applied in cultivation period but many of fertilizers can be impoverished the soil at one time.
3. Cropping Pattern

General pattern

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Spring plant</td>
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<tr>
<td>Autumn plant</td>
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※ ○ : Seeding ○ : Planting ● : Harvesting

**Seeding**: 40-45 days before planting time. Sow a pepper seed in each cell 1/4-inch deep in sowing plug.

**Nursery seedling**: you need to grow seedling for about 60 days. When the main leaf grows up to about 2-4 leaves, you should transplant it in 24 or 36 cells plug.

**Transplanting**: you have to check the temperature and weather (below 18 °C for 5 days, they will be stalking). Irrigate enough for rooting well after transplanting.

**Pruning**: Leaves of main stem are removed for better air circulation around plants, keeping them healthier when the canopy with leaves at upper of main stem is formed.

**Staking**: Pepper plants need to be staked to help support the growth and weight of the plant.

**Harvesting**: peppers are ready to pick up fruits between 75-90 days from planting. Usually, the fruits are picked up by hand when they are matured and turned to red.
4. Scoville scale

Pepper Heat Index

Chili peppers lab tested and ranked using the Scoville Heat Unit (SHU) show the bhut jolokia burning the competition.

- **Extreme**
  - 2,000,000-5,000,000: Standard Pepper Spray
  - 1,041,427: Bhut Jolokia
  - 500,000-1,000,000: Scotch Bonnet, Red Savina Habanero
  - 250,000-500,000: Long Slim Cayenne
  - 100,000-250,000: Tabasco
  - 50,000-100,000: Thai Hot, Chinese Kwangsi
  - 5,000-25,000: Jalapeño, Cayenne, Serrano, Arbol
  - 100-5,000: Guajillo, Louisiana hot sauce
  - 0: Bell
5. How to plant

5-1. Seedling technology

5-1-1. Seeding and management

(a) Check seed disinfection or infection. If it is not sterilized, dipping the seeds in the solution of Na$_3$PO$_4$ 10% an hour.

(b) Seeding after 40~45 days before transplanting. Sow paprika seeds in each cell 1/4-inch deep. Watering to the sowing part just after sowing and continue to keep the soil moisture. *check soil moisture every day.

(c) Amount of sowing seeds convert into standard of 2.0~3.2 stems. (stem density : 6.6 per)
5-1-2. Seedling boxes

- Seedling soil: mix with vermiculite(3) : perlite(2) : peatmoss(1)
- Remove weeds of the seedling boxes.
- Soil pH & EC: pH 5.5 and 7.5 / EC 1.5~2.0 dS/m (culture solution)
- Temperature of seedling boxes: daytime 25°C, nighttime 23~25°C, air humidity 80%
5-2. Ridge making

- The total amount of manure (kg/10a)
  
  - Urea : 41
  - Lime : 150
  - Compost : 3,000
  - Potassium chloride : 25
  - Fused phosphate : 56

- Before making the ridge of pepper, put the basal fertilizer and manure in the soil.

- Mixing a compost, lime well can help to harvest better pepper.

- Two lines cultivation is good for keeping a soil moisture, one line cultivation is good for water draining of soil.
5-2. Ridge making

- 100 ~ 150 cm ridge width and 20 ~ 30 cm ridge height for 2 lines cultivation.
- Cover the soil with a black plastic film for mulching.
  - Keeping soil temperature warm.
  - Preventing soil from weeds growth.
  - Keeping soil moisture.
- 40 ~ 50 cm space between ridges and make alluring rope to prevent wind damage.
5-2. Ridge making

♦ Mulching guide for farmer

Step 1. Tilling the field by machine.
5-2. Ridge making

♦ Mulching guide for farmer

Step 2. Install the irrigation plastic pipe on the soil.

Step 3. Cover the soil with a black mulching plastic film

Step 4. Make holes at regular intervals on the vinyl for transplanting.
5-3. Transplanting

→ Pepper seedlings at 2 weeks old

- Transplant the seedling when 2 leaves of main leaf appear.
- Transplanting your seedlings to the outdoors around 3-4 weeks after germinating.
6. Growth management

6-1. Pruning

Pruning and maintenance

Pepper plants are pruned to
- Maximizing the efficiency of photosynthesis.
- Minimizing the risk of disease. (get stronger plants)
- Allow for better air circulation around plants, it is keeping them healthier.
- Prevent plant from the spread of disease through fungal and soil born pathogens.
- Make it easier to standing and results in a healthier plant.
6-2. Staking

-Pepper plants need to be staked to help support the growth and weight of the peppers.
- Peppers are easily damaged when the plant is laden with fruit.
- For support, tie the plants to stakes using nylons.
6-3. General management

❖ Watering
- After transplanting, plant needs enough water.
- If the weather is so hot and dry, you need to irrigate to the soil once or twice a week.

❖ Soil management
- If soil is so humid, hot pepper may get Phytophthora blight.
- So it is very important to put good natural drainage soil.
- Cover the soil with a black mulching film to control weeds.

❖ Planting tip
- Do not plant the seedling by deep and shallow in the soil.
- Speed up the rooting by watering to the plants well after transplanting.

If the weather is so hot, a few kinds of harmful insects such as Mite or Aphid will appear.
So you need to spray agricultural pesticide in advance.
7. How to control diseases and insect

7-1. Diseases

Anthracnose

- Main component of chemicals
  kasugamycin 4.35% thiophanate-methyl 45%
- When will the chemicals are used?
  Within 3 times before harvesting.
- How often the chemicals are used?
  Every 10 days in the early disease occurrence of the plant.
- How many chemicals are used? 20g per 20L.
7-1. Diseases

Phytophthora blight

- Main component of chemicals
  Dimethomorph 8% Dithianon 30%
- When will the chemicals are used?
  Within 4 times before harvesting.
- How often the chemicals are used?
  Every 10 days in the early disease occurrence of the plant.
- How many chemicals are used? 20g per 20L
7-2. Insect

Aphid

- **Main component of chemicals**
  diazinon 5% thiamethoxam 1%

- **When will the chemicals are used?**
  To the soil before planting or plants around 5 times.

- **How often the chemicals are used?**
  To the soil before planting or every 10 days in the early aphids occurrence of the plant.

- **How many chemicals are used?** 3kg per 10a.
7-2. Insect

Mite

- **Main component of chemicals?**
  
bifenazate 9% pyridaben 13%

- **When will the chemicals are used?**
  
  In the early disease occurrence of the plant.

- **How often the chemicals are used?**
  
  Within 3 times before harvesting.

- **How many chemicals are used?** 20g per 20L.
8. Harvesting
Time to harvest: Generally 40 days (Green fruit) or 50 days (Red fruit) after flowering.

- Dry the harvested red fruit under sunshine.
- You must manage the fruit well from raining and dew.
9. Nutritive substance

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<tr>
<th></th>
<th>Energy (kcal)</th>
<th>Water (g)</th>
<th>Protein (g)</th>
<th>Carbohydrates (g)</th>
<th>Fibrin</th>
<th>Ca (mg)</th>
<th>P (mg)</th>
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<tbody>
<tr>
<td>RED</td>
<td>39</td>
<td>84.6</td>
<td>2.6</td>
<td>10.3</td>
<td>5.0</td>
<td>16</td>
<td>56</td>
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<tr>
<td>GREEN</td>
<td>41</td>
<td>85.7</td>
<td>2.3</td>
<td>6.9</td>
<td>-</td>
<td>12</td>
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<table>
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<tr>
<th></th>
<th>Fe (mg)</th>
<th>Na (mg)</th>
<th>K (mg)</th>
<th>Vitamin A (mg)</th>
<th>Vitamin B (mg)</th>
<th>Vitamin C (mg)</th>
<th>Niacin (mg)</th>
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<tr>
<td>RED</td>
<td>0.9</td>
<td>12</td>
<td>284</td>
<td>1,078</td>
<td>0.34</td>
<td>116</td>
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<tr>
<td>GREEN</td>
<td>1.0</td>
<td>11</td>
<td>370</td>
<td>-</td>
<td>-</td>
<td>170</td>
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-Red and green fruit of fresh hot pepper has a rich source of vitamin-C.
-Regular consumption of foods with rich vitamin C helps protect body from scurvy; develop resistance against infectious agents and scavenge harmful, pro-inflammatory free radicals.
-They are also good in other antioxidants like vitamin A, and flavonoids like β-carotene, α-carotene, lutein, zeaxanthin, and cryptoxanthin. These antioxidant substances in capsicum help to protect the body from injurious effects of free radicals generated during stress AND diseases conditions.
References

RDA www.rda.go.kr Pepper nursery, Pepper cultivation technology, Pepper fertilizer

Pictures

Scoville scale - http://www.pinterest.com
Seedling soil - http://4.bp.blogspot.com
Ridge making, Staking – KOPIAALGERIA CENTER, INRAA Disease, Insect – Agricultural Research Service http://www.gba.go.kr
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