

Pechay Production Guide

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Pechay (*Brassica rapa* L. cv group Pak Choi) is an erect, biennial herb, cultivated as an annual about 15-30 cm tall in vegetative stage. Ovate leaves are arranged spirally and spreading. The petioles are enlarged and grow upright forming a subcylindrical bundle. Inflorescence is a raceme with pale yellow flowers. Seeds are 1 mm in diameter and are reddish to blackish brown in color.

Pechay has many soft, thin, light green, broad to oblong ovate leaves. These are arranged spirally and spreading. Pechay are favorites by most Oriental people for it is always available in the market anytime of the year. It is also an important constituent of Filipino food such as "puchero" and "nilaga". It is a green leafy vegetable rich in calcium and other essential nutrients. Its nutritional values are as follows.

Nutrient	Amount
water	93.0
Protein	1.7 g
Fat	0.2 g
Carbohydrates	3.1 g
Fiber	0.7 g
Ash	0.8 g
B-Carotene	2.3 g
Vitamin C	53.0 mg
Calcium	102.0 mg
Phosphorus	46.0 mg
Iron	2.6 mg
Energy Value	86.0 kJ

Pechay is used mainly for its immature, but fully expanded tender leaves. The succulent petioles are often the preferred part. It is used as main ingredient for soup and stir-fried dishes. In Chinese cuisine, its green petioles and leaves are also used as garnish

Varieties

1. **Abaniko** (Condor) - It has a maturity period of 30 -40 days. It is fan shape and has green leaves and white petiole. It is grown year round. It is compact with wide and thick petioles.
2. **Black Behi All Grow**- It has a maturity period of 25 - 30 days with dark green leaves and petioles and is grown year round. It is fast growing with uniform maturity and with long succulent tender petioles.
3. **F1 Hybrid Cherokee** (Musashino) - It has a maturity period of 30 days. It is very uniform and has dark green leaves. It is grown year round. It has compact leaves allowing high density planting.
4. **Shanghai Pak Choi** (Sakata) - It has a maturity period of 40 days. It is broad oval in shape and has green leaves and petiole. It is grown year round and is the most popular variety during the rainy season. It is tight compact plant habit and has a good shipping quality.

5. **Pak choi Jolly Green Hybrid**- It has a maturity period of 22 days. It has dark green leaves. It is high yielding and an early variety. A favorite variety among farmers, hotels and restaurants.
6. **Pak Choy Green** - It has a maturity period of 40 days. It has green leaves. It is vigorous and has abundant yield in a short time. Do not sow early in cool areas to avoid bolting.

Climatic and Soil Requirements

Pechay can be grown from mid to low elevations throughout the year but makes their best growth and good quality produce are in cool conditions. However, during the dry season it can be grown with good irrigation in a sandy to clay loam type of soil with a pH ranging from 5.5 to 6.5.

Culture and Management

- A. **Land preparation.** Plowing and harrowing the soil thoroughly makes it more friable and more porous suited for good quality produce. Raised beds 1 meter wide with paths of about 20-25 cm width between the beds are a common practice.
- B. **Fertilization.** The use of organic fertilizer at 3 tons/ha in combination with inorganic fertilizer at 135-90-90 kg/ha are applied at planting. Split application of the inorganic fertilizer is recommended, half dose will be supplemented at planting and half dose as side dress at hilling up. When plants are transplanted, apply the seedlings with starter solution using urea (46-0-0) at the rate of 2 tablespoon/gallon of water. Side dress along the rows at the rate of 1 tbsp/plant one week after transplanting.
- C. **Planting.** Pechay can be planted directly or indirectly in the soil. Direct seeding is carried out by broadcasting or by sowing in rows. Cover the seeds to a depth of about 1 cm by raking or spreading additional top soil. Water is immediately after sowing. Plant spacing should be 10 cm between plants and 20 cm between rows. Sown seed can be transplanted 15 days after sowing.
- D. **Irrigation and Weed control.** Pechay crops grow rapidly. To obtain maximum growth and tenderness it must be supplied with adequate moisture. Water the plants every other day during dry season or as needed. Hoeing of the weeds may be necessary at early stage of weeds growth before the plants shade the spaces in between plants. These crops grow rapidly and are spaced closer than weeds normally not a problem.
- E. **Pest Management**
 1. **Damping -off (*Rhizoctonia*) and Wirestem (*Pythium*).** Pre-emergence damping off occurs when seeds are attacked and decay, as well as when plants germinate, but fail to emerge. Post-emergence damping off occurs when the stem of 2 to 5 cm tall plants are attacked. A water soaked area completely encircles the stem near the soil line and the seedling wilts and topples over. Wirestem results from an extension of the damping off process, but new infections may occur on plants 10-15 cm tall. The stem above and below the soil line darkens, and the outer cortex tissue decays and sloughs off in sharply

defined area encircling the stem. The stem is thin and wiry at the lesion but remains erect. The plant may survive, but will perform poorly.

Management

- a. Sterilized soil or soil that has not previously had brassicas for several years should be used.
 - b. Seeds should be hot water treated and also treated with a suitable fungicide.
 - c. Plant density should permit adequate light and air penetration.
 - d. Factors such as deep planting, reduced seed vigor and excessively cold, hot, moist or saline soils that delay seed emergence should be avoided.
 - e. Field rotation with non-brassica crops should be practiced for at least three years.
 - f. Avoid mounding of soil onto lower leaves when cultivating.
2. **Bacterial softrot.** Leaves turn yellow (chlorotic) beginning at margins and spreading inwards. Veins within area turn black. Infection enters main stem turning the inside black. Plants either die or are dwarfed when young, become defoliated if more mature.
- Management.** Plant resistant varieties and rotate crops from year to year.
3. **Clubroot (*Plasmodiophora brassicae* Wor.).** Clubroot is a soil borne disease which affects cauliflower. Early infections are difficult to detect as symptoms begin underground. Symptoms include small to large swellings and other malformations of the roots. As a result of these swellings, water and nutrient flow are restricted within the plant, which causes the above ground parts to wilt, turn color and look stunted. Wilting is most common on warm sunny days; plants may show little wilting early in the morning or late at night. The clubroot fungus enters the plant through the many fine hairs on the roots. The extent of the disease is affected by many factors. Moist, cool soils usually produce more diseased plants than dry, warm soil. The disease also thrives best in acid soils; that is when the pH is below 7. Once land becomes infested with this disease, it will remain so for several years. When clubbed plants rot and break down, the fungus spores are released into the soil, where they may live for 10-20 years, ready to infect any Cole crop subsequently planted. Since the fungus spores are in the soil, movement of the soil by any means (boots, tools, wheels or wind and water, etc.) also spread the disease.

Management

- a. Isolate (if possible) or avoid the use of infested fields for brassica crops for about seven years. The disease affects only the brassica crops so any other crop may be planted as long as brassica type weeds are not present.
- b. Do not apply clubroot infested manure on land to be used to grow brassicas. Cattle fed infected plant material can pass the fungus spores in manure, therefore it is best to put contaminated manure back on the field that contained the infected roots, thus preventing the spread of the disease to other fields.
- c. Rotate crops and fields as a preventative measure before club root occurs. Allow at least three years between growing susceptible crops.
- d. Clean and disinfect all equipment used on infested land before using on a non-contaminated field.
- e. Control susceptible weeds whenever possible.

- f. Apply lime to raise the pH of the soil to at least 7.2. Clubroot seems to thrive best in moist, acid soils, therefore wet, poorly drained land should be avoided or drainage improved.
 - g. Use clubroot free transplants.
4. **Flea beetles(*Phyllotreta*spp.).** Flea beetles are small shiny black beetles, about 2 mm in length. They are very active early in the growing season, especially during periods of dry sunny weather. Flea beetles can seriously damage seedlings and transplants, and to a lesser extent larger plants, by chewing small pinholes through the leaves. There is one generation per year. The larvae live in the soil and feed on roots.

Management

- a. Biological control options for flea beetle include using a braconid wasp that will parasitize and kill adult flea beetles, and using nematodes that attack the larvae.
 - b. Trap crops such radishes or collards can be used.
 - c. Living mulches or polycultures are other possibilities.
 - d. Covering young seedlings with floating row cover to prevent the insects from attacking the plants is another option.
 - e. Using white or yellow sticky traps every 4.5 - 9 m.
 - f. Making sure to destroy plant debris.
 - g. If using chemical controls, scout plants frequently and treat when the threshold has been reached. One flea beetle per plant (up to the sixth leaf stage) is the threshold number. After the 6 leaf stage, feeding will not interfere with plant growth.
5. **Diamondback moth (*Plutellaxylostella*)Damage/Symptom.**The Diamondback Moth is much smaller than the previous insects. Three to six generations of 1.1 cm yellow-green larvae may develop each year. The larvae squirm actively when disturbed and produce many small holes on the host plant. Adult moths migrate in throughout the growing season. There is therefore often an overlap in generations, and all stages may be present at one time.

Management

- a. There are many natural enemies that will help control these pests in fields. Ground beetles, spiders, damsel bugs, minute pirate bugs, assassin bugs, big eyed bugs, and lacewing larvae will all attack the caterpillars.
 - b. There are also some commercially available parasitic wasps that sting and parasitize eggs and larvae of caterpillars; these include *Trichogrammaspp.*, *Copidosomaspp.*, *Apantelesspp.*, *Diadegmaspp.*, and *Hyposoterspp.*
 - c. Cultural controls include pheromone emitters to disrupt mating.
 - d. Evening overhead sprinkler irrigation.
 - e. Placement of floating row covers over young crops to exclude egg-laying females.
 - f. If using chemical controls, scout plants frequently and treat when the threshold level has been reached. For broccoli, the threshold guidelines are 20-30% before heading and 5-10% after heading.
6. **Aphids (*Brevicorynebrassicae*).** The cabbage aphid, is a major pest of Cole crops worldwide. Aphids are small, soft bodied, slow moving insects. A colony consists of

winged and wingless adults and various sizes of nymphs. Aphids may be black, yellow or pink, but mostly are various shades of green. They are often found in large colonies on the undersurface of leaves; however, aphids will feed on heads, flower stalks as well as leaves, resulting in unmarketable produce. Aphids feed by piercing plants and sucking out plant sap, resulting in distorted plant parts and a slowing of plant growth. The plants may be covered by a sticky substance, called honey dew, which is excreted by the aphids.

Management

- a. There are many natural enemies that will feed on aphids, thus helping to reduce the populations of this pest in the field. Natural enemies that produce larvae which will feed on aphids include syrphid flies, lacewings and the predaceous midge. Adults and larvae of minute pirate bugs, big eyed bugs, lady beetles, soldier beetles and parasitic wasps like *Diaeretiellarapa* will also consume aphids.
- b. Cultural controls include using high pressure sprinkler irrigation to knock the insects off of plants, as well as using living mulch such as clover interplanted with the crop.
- c. If using chemical controls, check plants frequently and treat when damage is first observed.

F. Harvesting

1. **Fresh Vegetable.** Harvest as early as one month after planting or 30-40 days after sowing. Harvest preferably early in the morning or late in the afternoon to minimize postharvest losses. Wash harvested plants after trimming to maintain fresh quality produce for market.
2. **Seed production.** Extending the plant growth to certain days when the plants starts to flower and pods developed. These will be harvested from 3-4 months after planting. Harvest dry pods when plants turns yellow or dark brown color showing the mature seeds ready for picking. These should be cut early or late in the afternoon to prevent shattering of the pods in the field. Let it dried, threshed and clean up for seed production. Packed and stored.

**PECHAY SEED PRODUCTION
COST AND RETURN PER
HECTARE**

A. LABOR COST

	Man-Day (P250/day)	Value (P)
1. Land Preparation		
Cleaning the area	40	10,000.00
Digging & Plot Preparation	50	12,500.00
Making holes/furrows	20	5,000.00
Fertilizer application	20	5,000.00
Mixing fertilizer	20	5,000.00
2. Planting	25	6,250.00
3. Care & Maintenance		
Irrigation (7 times)	10	17,500.00
Crop Protection (9 times)	10	22,500.00
Weeding	25	6,250.00
Side-dressing and hilling-up	40	10,000.00
Rouging (3 times)	3	2,250.00
4. Harvesting (3 times)	5	3,750.00
5. Seed drying (3 times)	3	2,250.00
6. Threshing (3 times)	5	3,750.00
7. Cleaning (3 times)	5	3,750.00
8. Seed packing (3 times)	3	2,250.00
Sub-total		118,000.00

118,000.00
(Seeds)

109,750.00
(Fresh)

B. MATERIAL COST

FARM SUPPLIES	QUANTITY	UNIT PRICE (P)	VALUE (P)
1. Seeds	1.0kg	500/kg	500.00
2. Fertilizers			
* Chincken dung	100 sacks	120/sack	12,000.00
* Triple 14	17 bags	800/bag	13,600.00
3. Insecticide	10 liters	1000/liter	10,000.00
4. Fungicide	10 kg	800/kg	8,000.00
Sub-total			44,100.00

C. FIXED COST

1. Land rent - P300/m ²	30,000.00
2. Depreciation on tools & equipment	985.00
Sub-total	30,985.00

D. MISCELLANEOUS

1. Packing Mateiral	1,500.00
2. Transportation	10,000.00
Sub-total	15,000.00

TOTAL COST OF PRODUCTION **P208,085.00**

208,085.00
(Seeds) **194,835.00**
(Fresh)

E1. GROSS INCOME (Fresh)

YIELD LEVEL	Average Yield/hectare (kg)	Prices (P)	VALUE (P)
a. Level 1	20,000.00	10.00	200,000.00
b. Level 2	20,000.00		

		15.00	300,000.00
c. Level 3	20,000.00	20.00	400,000.00

E2. NET INCOME

YIELD LEVEL	Gross Income (P)	Production Cost (P)	VALUE (P)
a. Level 1	200,000.00	194,835.00	5,165.00
b. Level 2	300,000.00	194,835.00	105,165.00
c. Level 3	400,000.00	194,835.00	205,165.00

F1. GROSS INCOME (Seeds)

YIELD LEVEL	Average Yield/hectare (kg)	Prices (P)	VALUE (P)
a. Level 1	700.00	320.00	224,000.00
b. Level 2	700.00	400.00	280,000.00
c. Level 3	700.00	500.00	350,000.00

F2. NET INCOME

YIELD LEVEL	Gross Income (P)	Production Cost (P)	VALUE (P)
a. Level 1	224,000.00	208,085.00	5,165.00
b. Level 2	280,000.00	208,085.00	105,165.00
c. Level 3	350,000.00	208,085.00	141,915.00

References

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Pictures



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By Niño Manaog



SCHOOL
VEGETABLES
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