



for the
Gardener

CENTER FOR AGROECOLOGY
& SUSTAINABLE FOOD SYSTEMS,
UC SANTA CRUZ

Asian Greens Offer Tasty, Easy-to-Grow Source of Nutrition

The Mustard/Cole family contains approximately 380 genera and 3,000 species of annual and perennial herbaceous plants. While members of the family have a cosmopolitan distribution, there are significant concentrations in the Mediterranean zones of the world as well as in southwest and central Asia. [Note: While the updated family name has been changes from *Cruciferae* to *Brassicaceae*, I prefer the old (Linnaeus) family name (*Cruciferae*), as it is visually descriptive of the cross-like, four-petaled flowers of most species.]

In addition to the many valuable ornamentals in this family (*Alyssum*, *Arabis*, *Aubrieta*, *Dentaria*, *Erysimum*, *Hesperis*, *Iberis*, *Lunaria*, *Mathiola*), the *Cruciferae* yield up some economically important and nutritionally valuable vegetable and oil crops. Undoubtedly, the genus *Brassica* is the largest natural grouping of these vegetable crops, and *Brassica oleracea* contains many significant sub groups (see below).

- Brassica oleracea acephala* (headless) – kale, collards
- B. o. botrytis* – cauliflower
- B. o. capitata* (head) – cabbage
- B. o. gemmifera* – brussel sprouts
- B. o. gongylodes* – kohlrabi
- B. o. italica* (branched) – broccoli

Brassica rapa (the turnip) and its sub groups are the nomenclatural home to many mild and slightly pungent Asian greens. These crops are among the most versatile yet under-appreciated and unsung leafy vegetables. They offer nutritious dark greens high in vitamins A and C, calcium, potassium, phosphorous, and iron. Leafy Asians can be included in salad mixes, where—along with their nutritional bonanza—they add a piquant, distinctive taste to mild

lettuce-based salads. At mid maturity (3"–6" leaf size) they contribute to stir fry dishes. And at full maturity, they offer an amazing amount of high-nutrition biomass. They are all fast maturing, at 30–80 days following transplant. Some examples: Mizuna Mustard – 3 to 4 full size plants can weigh 1 pound in 50 to 60 days; Napa Cabbages – 1 head can weigh up to 8–10 pounds in 60–80 days.

CULTURAL REQUIREMENTS

The Asian greens described here are biennial and annual plants. They are particularly sensitive to alternating warm-cool-warm weather patterns, especially in conjunction with the lengthening days of spring (>13–14 hours), which together induce bolting (a gardener's term for premature flowering and running to seed). As little as 10 days of cold weather with a good portion of the 24 hour cycle below 50°–55°F, followed by a warm period, will truncate the vegetative cycle of the plant and essentially cause crop failure.

There are two principal strategies to avert bolting: 1) pay attention to varietal descriptions for early spring bolt-resistant varieties; 2) delay sowings until early summer (June and July), with harvest coming in late summer-fall (a touch of frost on mature Asian greens increases sugar concentrations and reduces sulfur compounds, resulting in rich sweet flavors).

The Asian greens described here have an optimum germination temperature range of 60°–85°F (3 to 5 days) and are cool season crops, preferring to grow in a temperature range of 55°–75°F. Seeds will remain viable for 3–5 years.

Plants perform best if transplanted from speedling or plug trays as they have a primary tap root and weak, restricted fibrous roots. A seedling that is easily handled can be raised in 30–40

days and maturation takes place within 30–80 days after transplanting, depending on the species and variety.

Because the Brassicas have been bred to be out of balance (all top, very little root system), they respond to high nitrogen inputs and frequent, shallow waterings. As the heading Chinese cabbages approach maturity, they require a good dry down between irrigations to avoid a bacterial soft rot that rots the head from the inside out. Liberal spacing (15"–18") between plants contributes to better air circulation at the base of the plants and decreases the chance of bottom rot.

While Asian greens are versatile in terms of soil textural class, they grow optimally on rich loams high in organic matter. Because these crops grow and mature so rapidly, growers should amend the soil with a fully mature, particulate compost with quickly available nutrients. Nitrogen and potassium are especially critical; potassium contributes to the leaves' structural support and speeds maturation.

DRUM-HEADED CHINESE CABBAGES

Brassica rapa (turnip genus) *pekinensis*
Common names – Chinese Cabbage,
Napa Cabbage, Bok Choy, Wong Bok,
Pe Tsai

Types/Forms – squat barrel, loose headed, long cylindrical (torpedo shaped)

Heading Chinese cabbages or Wong Bok cabbages have been in cultivation for over 2,500 years. They are thought to be a natural cross between the non-heading Pak Choi of southern China and a wild northern turnip. As such, they are not as heat tolerant as Pak Choi.

The fleshy, succulent, overlapping leaves of this vegetable form a tight, dense head, and make it look a bit like a Romaine lettuce on steroids. The outer

leaves vary in color from light to mid green and tend to be tough and hairy (especially when young). The inner leaves are blanched, and thus extremely tender and succulent. These leaves exhibit a prominent network of blanched white veins radiating out from the base of the petiole*, giving it the appearance of a walnut shell.

The taste of Wong Bok's leaves offer a double dividend; the leaf blade has a light, peppery taste often associated with Brassicas and their sulfur compounds, while the petiole is the essence of sweet and juicy, with a measure of crunch thrown in. Wong Bok can be shredded into green salads (adding a distinctive flavor), marinated raw, lightly steamed, or added at the tail end of a stir fry.

With all the Chinese cabbages, breeding and particularly hybrids have resulted in substantial improvements in terms of uniform and rapid head formation, density, taste, disease resistance, resistance to bolting (open pollinated varieties have almost no bolt resistance), and interesting variations in color and form.

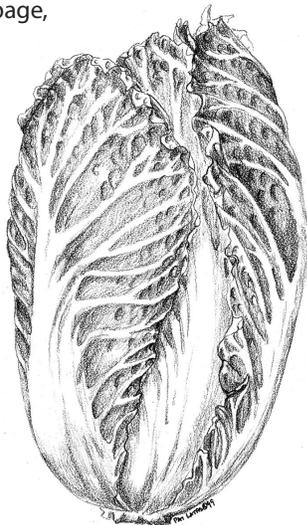
Types of Chinese Cabbages

Traditional Types

The traditional (Napa type) short, squat-barreled varieties feature broad, dense heads reaching 3-8 pounds and 12–18 inches tall. Like their European

*the petiole is a leaf stalk that connects the leaf blade to the stem or branch

Napa Cabbage,
Wong Bok



counterparts, Napa can be refrigerated for up to eight weeks (32°-40°F, 90% relative humidity). A Napa cabbage can yield considerably more weight and nutrition in about the same time from transplanting (50-60 days) as it takes to produce a head of Romaine lettuce.

Early Season Varieties

(note that # days=days from transplant to maturation)

- Nerva (50 days) – an extra-early hybrid for spring crops. Bolt-resistant, 10"-12" tall heads weigh 3-4 pounds. Light, succulent texture.
- Summer Top (43-50 days) – remarkably early but not particularly bolt resistant. Large, dense heads with deep green outer leaves.
- Blues (50 days) – one of the most bolt-resistant varieties. 3-5 pound heads are mild, juicy and sweet.
- Kasumi (60-65 days) – the most bolt-resistant variety to date, features short (10" wide, 12" tall), 5-8 pound heads.

Mid - Main Season Varieties

- China Pride (65-80 days) – good bolt resistance, excellent head uniformity. 4-5 pound heads with sweet taste.
- Orange Queen (80 days) – similar in appearance to Kasumi, but has distinctive, orange-colored interior leaves. More nutritional than any other variety, but it is bolt prone.

Loose-Headed Types

- Lettucey type (45 days) – taller and more open topped (much like a Romaine lettuce) than the Napa varieties. 12"-15" tall heads weight 2-3 pounds; the leaves have a distinctive, light-green, savoyed or ruffled look.

Long, Cylindrical or Michihli Types

This type of Chinese cabbage features tall, narrow, torpedo-shaped (18" x 8") heads that are slow to mature. Because they are bolt prone, they perform better in late summer - fall and are somewhat sweeter than Napa types.

- Michihli (78 days) – the standard open-pollinated variety. Somewhat bolt prone.
- Jade Pagoda (70 days) – 16" x 6" heads, medium green leaves with a distinctively white mid rib and beautiful yellow-creamy hearts.



Pak Choi

- Monument (80 days) – 20" tall heads with the best bolt resistance of any cylindrical type and uniform heading and size.

LOOSE-HEADED CHINESE CABBAGES

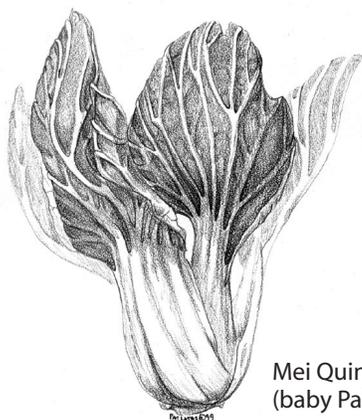
Brassica rapa chinensis

Common names – Pak Choi, Pac Choi

Pak Choi is a non-heading Chinese cabbage with dark green, slightly savoyed (ruffled) leaves and white veins that originated in the warmer, more humid areas of southern China. It is older than the heading Chinese cabbages and much more heat tolerant. The most distinctive feature of Pak Choi is its exaggerated white petiole; the petiole is sweet and juicy, while the leaves have a peppery taste with more bite than Napa leaves.

Pak Choi can be harvested all at once or leaf by leaf over a period of months. It is not as bolt prone as Napa cabbages. While there are many varieties of the Napa types, Pak Choi offers limited varietal selections.

- Pak Choi (Chinese Pak Choi; 40-50 days) – 16"-20" tall with pale green leaves, slightly more spicy than other varieties.
- Joi Choi (50 days) – a shorter, broader Pak Choi with extremely dark savoyed leaves and a thicker, almost pure white petiole. Features vigorous, fast growth – far superior to other varieties.
- Ching-Chiang (40 days) – an early dwarf Pak Choi tolerant to heat, rain and cold.
- Mei Quin (45 days) – a true baby Pak Choi. Crisp, sweet, 6" vase-shaped



Mei Quin
(baby Pak Choi)

© Pat Luns

plant with white-green coloration to the petiole.

- Shanghai Pak Choi – similar to Mei Quin but with a lime-green petiole.

ROSETTE PAK CHOI

Brassica rapa rosularis (narinosa)

Common Names – Tatsoi, Tah Tsai, Spinach Mustard

Tatsoi is one of the most cold tolerant Asian greens (15°-20°F). It grows in a rosette form 6"-10" across. While it is tolerant of cold or even light snow, it deteriorates in prolonged wet weather. The leaves are spoon-shaped, dark green, and waxy, with a short (1"-4") green petiole on the leaf stalk. Baby size Tatsoi has become a foundation ingredient for mesclun salad mixes because of its mild, sweet flavor. At maturation, the leaf stalk and blade can reach 10" long. Occasionally, Tah Tsai features a white petiole.

MUSTARDS (HOT AND SWEET)

Brassica juncea (no sub groups)

Common Names – Red Leaf Mustard, Mustard Cabbage

Varieties – Osaka Purple and Giant Red

Giant Red and Osaka Purple mustards originated in the mountainous regions of Central Asia and are among the most valued vegetables in China, Japan, and Southeast Asia. Their spicy, Dijon mustard flavor and pungency actually decrease slightly with age. Small, tender leaves (1"-3") can be used whole in salad mixes, slightly larger leaves (3"-6") can be used in stir fry dishes, and mature leaves can achieve 3" x 10" and are best steamed (cooking tones down the peppery flavor). Un-

like the Chinese cabbages and Tatsoi, the mustards can tolerate heat and humidity. Nutritionally, the mustards are a valuable source of phosphorous, calcium, iron, potassium, and vitamins A and C.

Brassica rapa nipposinica (japonica)

Common Name – Mizuna Mustard

Varieties – Kyona, Tokyo, Sakata

Mizuna (pronounced meezuna) features upright growth and tolerates both heat and cold. This mustard has pencil-thin white stalks and deeply cut-serrated, light green leaves. Its best quality is that it is mild flavored (even innocuous) and can be used as mustard at almost any stage.

FLOWERING BROCCOLIS

Brassica rapa and *B. oleracea alboglabra*

Common Names – Choy Sum, Gai Lon, Hon Tsai Tai

This distinctive group of Asian greens presents both the cook and the market gardener with a unique opportunity to broaden their edible vegetable horizons. Basically, the Choy Sum types are small plants that quickly (40-50 days) send up a thick, succulent flower stalk topped with delicate, yellow, four-petaled flowers. The edible flower stalk can be steamed lightly so as to preserve both flavor and texture or stir fried whole or chopped, and combines well with glazes and sauces. The Choy Sums are best sown in mid spring - mid summer to reduce the incidence of premature bolting.

- Bouquet Choy Sum (45 days) – slightly savoyed, spinach-like leaves send up a thick flower stalk. Mild mustard taste.
- Gai Lon (50 days) – this variety is a cut above all other Choy Sum types. A variation on the European broccoli, it originated in the Mediterranean Basin. Gai Lon is more robust than other flowering broccolis, growing to 15"-18", with a thicker stem of pale blue green.
- HonTsai Tai (the name means red vegetable) – this Choy Sum has a purple hue to the green leaves, with bright purple veins, a purple stalk, and yellow flowers.
- Autumn Poem (35 days) – similar to HonTsai Tai except it is bigger, green, sweeter in taste and offers repeat harvests.

– Orin Martin

References

Oriental Vegetables: The Complete Guide for Garden and Kitchen, by Joy Larkcom. Tokyo, New York: Kodansha International, 1991.

World Vegetables, by Mas Yamaguchi. Van Nostrand Reinhold, 1983.

Seed Sources

Johnny's Selected Seeds
955 Benton Ave.
Winslow, ME 04901
(877) 564-6697
www.johnnyseeds.com

Renee's Garden
7389 W. Zayante Rd.
Felton, CA 95018
(888) 880-7228
www.reneesgarden.com

Territorial Seed Co.
P.O. Box 158
Cottage Grove, OR 97424
(800) 626-0866
www.territorial-seed.com

This material was written, produced, and distributed by staff of the Center for Agroecology and Sustainable Food Systems at the University of California, Santa Cruz.

The Center manages the Alan Chadwick Garden and the UCSC Farm on the UCSC campus. Both sites are open to the public daily from 8 am to 6 pm. For more information on the Center and its activities, call 831.459-3240, email casfs@ucsc.edu, or write to the University of California, CASFS, 1156 High St., Santa Cruz, CA 95064.

Visit our web site at casfs.ucsc.edu to find out more about the Center and to download or order additional publications.

Other publications in the “For the Gardener” series –

- A Garlic Primer
- Apple Trees for Every Garden
- Apple Trees of the UCSC Farm Orchard
- Asian Greens Offer Tasty, Easy-to-Grow Source of Nutrition
- Building Fertile Soil
- Choosing and Growing Stone Fruits
- Citrus Offers Year-Round Options
- Controlling Codling Moth in Backyard Orchards
- Controlling Small Animal Pests
- Cover Crops for the Garden
- Garden Beans Offer Year-Round Source of Great Flavor, Nutrition
- Growing Onions and Leeks in the Home Garden
- Growing Peas in the Home Garden
- Growing Spinach, Beets and Chard
- Let Worms Make your Compost: A Short Guide to Vermicomposting
- Lettuce Offers a Palette of Tastes, Textures, and Colors
- Non-Chemical Snail and Slug Control
- Peppers—From Sweet to Fiery
- Potatoes in the Home Garden
- Salad Mixes for the Home Garden
- Seed Sources
- Water Conservation Tips