Onion Varieties Selection and Technology of High Yield

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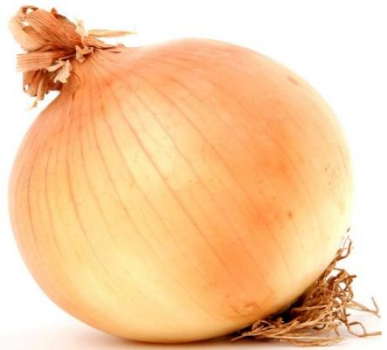
Outline

- General introduction and key concepts related
- Onion varieties selection
- How to grow the onion

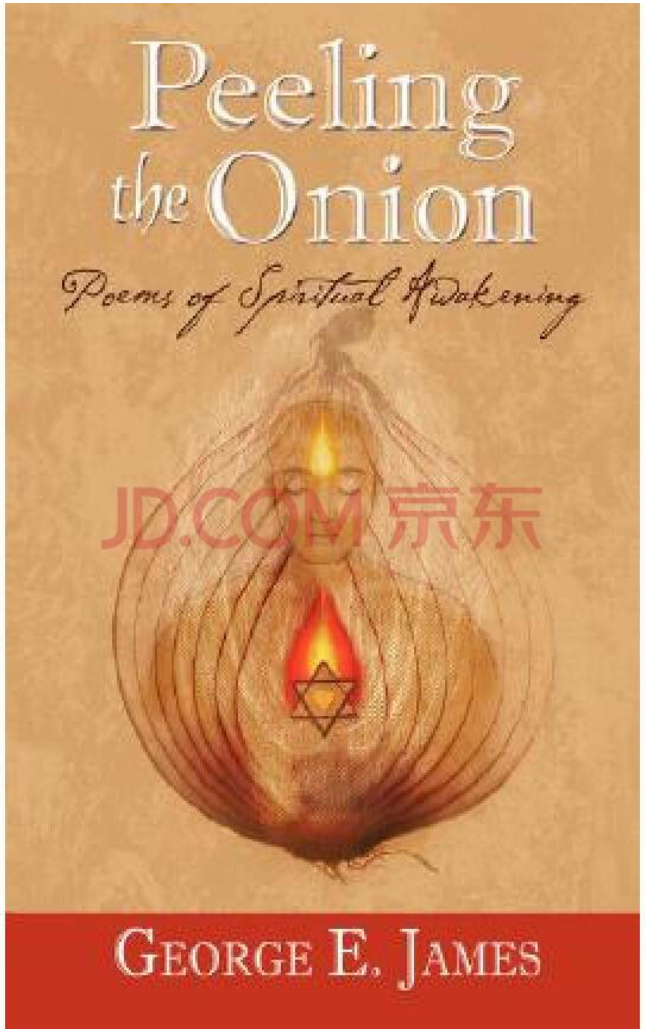


1. General introduction and key concepts related

What is onion?

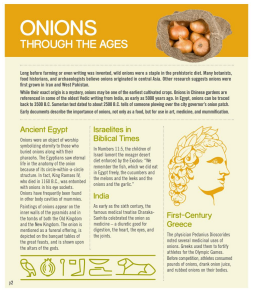
- Peeling the Onion

- It is presumed our predecessors discovered and started eating wild onions very early – long before farming or even writing was invented. Very likely, this humble vegetable was a staple in the prehistoric diet.



1. General introduction and key concepts related

What is onion?

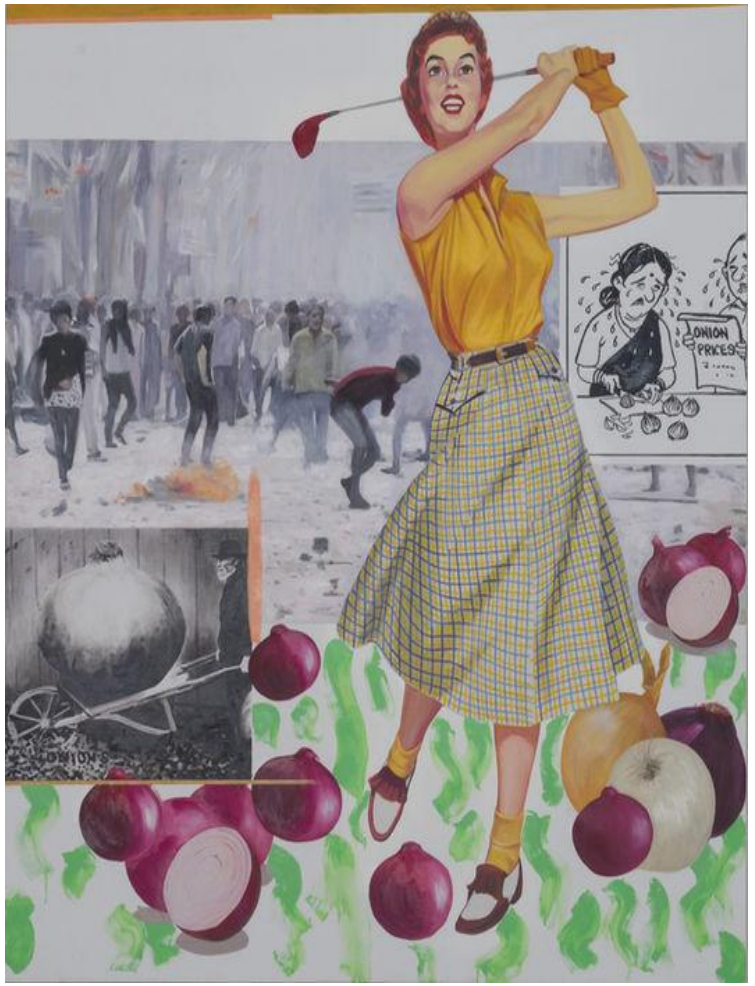


◆ Mummification have been found in the bandages and coffins from Dynasty 22, and even as early as Dynasty 13. Onion skins were sometimes placed over the eyes of the dead. Onions have also been placed in the pelvis, in the thorax, and in the external ears.

1. General introduction and key concepts related

What is onion?

- It has also been employed in art. Tie dyeing technology of onion

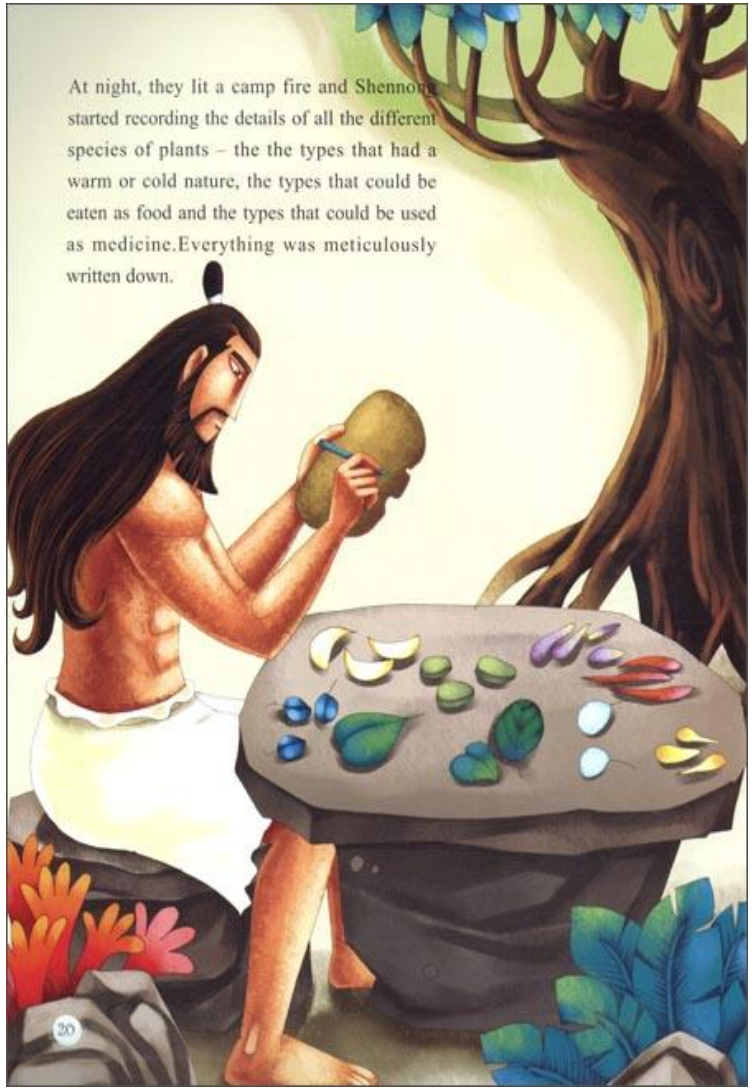


Pictures from intenet

1. General introduction and key concepts related

What is onion?

- It has also been employed in traditional medicines since ancient times for its health-promoting and curative properties.



1. General introduction and key concepts related

What is onion?

- Hair loss (alopecia areata). Early research suggests that applying onion juice to the scalp for 8 weeks might improve hair growth in people with hair loss due to a condition called alopecia areata.
- Diabetes. Early research suggests that adding onion three times daily to a specific diet for 8 weeks might reduce blood sugar in people with diabetes.

S . A . E

Support Advocate Educate

Diabetes Awareness

1. General introduction and key concepts related

What is onion?

- High blood pressure. Early research suggests that taking a specific product containing onion, olive oil, grape skin extract, L-carnitine, vitamin E, vitamin C, lycopene, and folic acid daily for one week might lower systolic blood pressure (the top number) but not diastolic blood pressure (the bottom number) in people with high blood pressure.

1. General introduction and key concepts related

What is onion?

- Onion is one of the oldest edible food ingredients known to humankind used in a bewildering array of recipes and preparations, be it your favorite salad or a mouth-watering gravy or curries!

1. General introduction and key concepts related

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1. General introduction and key concepts related

Health Benefits of Onions

- Onion is used for treating digestion problems including loss of appetite, upset stomach, and gallbladder disorders; for treating heart and blood vessel problems including chest pain (angina) and high blood pressure; and for preventing “hardening of the arteries” (atherosclerosis). It is also used for treating sore mouth and throat, whooping cough, bronchitis, asthma, dehydration, intestinal gas, parasitic worms, and diabetes. Some people use it as a diuretic to increase urine output.

1. General introduction and key concepts related

Health Benefits of Onions

- Onions are very low in calories and fats. 100 grams carry just 40 calories. However, rich in soluble dietary fiber.
- Laboratory studies show that allicin reduces cholesterol production by inhibiting HMG-CoA reductase enzyme in the liver cells. Further, it also found to have antibacterial, antiviral, and anti-fungal activities
- The phytochemical compounds allium and Allyl disulfide in the onions convert into allicin by the enzymatic reaction when its bulb (modified leaves) are distorted (crushing, cutting, etc.). Studies have shown that these compounds have anti-mutagenic (protects from cancers) and anti-diabetic properties (helps lower blood sugar levels in diabetics).

1. General introduction and key concepts related

Health Benefits of Onions

- Allicin also decreases blood vessel stiffness by facilitating the release of nitric oxide (NO) and thereby bring a reduction in the total blood pressure. Altogether, it helps decrease in overall risk of coronary artery disease (CAD), peripheral vascular diseases (PVD), and stroke.
- Onions are a rich source of chromium, a trace mineral that helps tissue cells respond appropriately to insulin levels in the blood. It thus helps facilitate insulin action and control sugar levels in diabetes.
- They are also a good source of antioxidant flavonoid quercetin, which is found to have anti-carcinogenic, anti-inflammatory, and antidiabetic functions.

1. General introduction and key concepts related

Health Benefits of Onions

- They are also good in antioxidant vitamin, vitamin-C and mineral manganese. Manganese is essential as a co-factor for the anti-oxidant enzyme, superoxide dismutase. Also, isothiocyanate antioxidants in them help provide relief from cold and flu by exerting anti-inflammatory actions.
- Onions are also good in the B-complex group of vitamins like pantothenic acid, pyridoxine, folates, and thiamin. Pyridoxine or vitamin B-6 helps keep up GABA levels in the brain, which works against neurotic conditions.

1. General introduction and key concepts related

Health Benefits of Onions

Onion nutrition(Allium cepa), raw, value per 100 g. (Source: USDA National Nutrient data base)

Principle	Nutrient Value	% of RDA
Energy	40 Kcal	2%
Carbohydrates	9.34 g	7%
Protein	1.10 g	2%
Total Fat	0.10 g	0.5%
Cholesterol	0 mg	0%
Dietary Fiber	1.7 g	4.5%

1. General introduction and key concepts related

Health Benefits of Onions

Onion nutrition(Allium cepa), raw, value per 100 g. (Source: USDA National Nutrient data base)

Principle	Nutrient Value	% of RDA
Folates	19 µg	5%
Niacin	0.116 mg	1%
Pantothenic acid	0.123 mg	2.5%
Pyridoxine	0.120 mg	9%
Riboflavin	0.027 mg	2%
Thiamin	0.046 mg	4%
Vitamin A	2 IU	0%
Vitamin C	7.4 mg	12%
Vitamin E	0.02 mg	0%

1. General introduction and key concepts related

Health Benefits of Onions

Electrolytes		
Sodium	4 mg	0%
Potassium	146 mg	3%
Minerals		
Calcium	23 mg	2%
Copper	0.039 mg	4%
Iron	0.0.21 mg	3%
Magnesium	10 mg	2.5%
Manganese	0.129 mg	5.5%
Phosphorus	29 mg	4%
Zinc	0.17 mg	1.5%

1. General introduction and key concepts related

Health Benefits of Onions

Phyto-nutrients		
Carotene-β	1 μg	--
Cryptoxanthin-β	0 μg	--
Lutein-zeaxanthin	4 μg	--

1. General introduction and key concepts related

Where are the onion from and to?

- Many archaeologists, botanists, and food historians believe onions originated in central Asia. Other research suggests onions were first grown in Iran and West Pakistan.

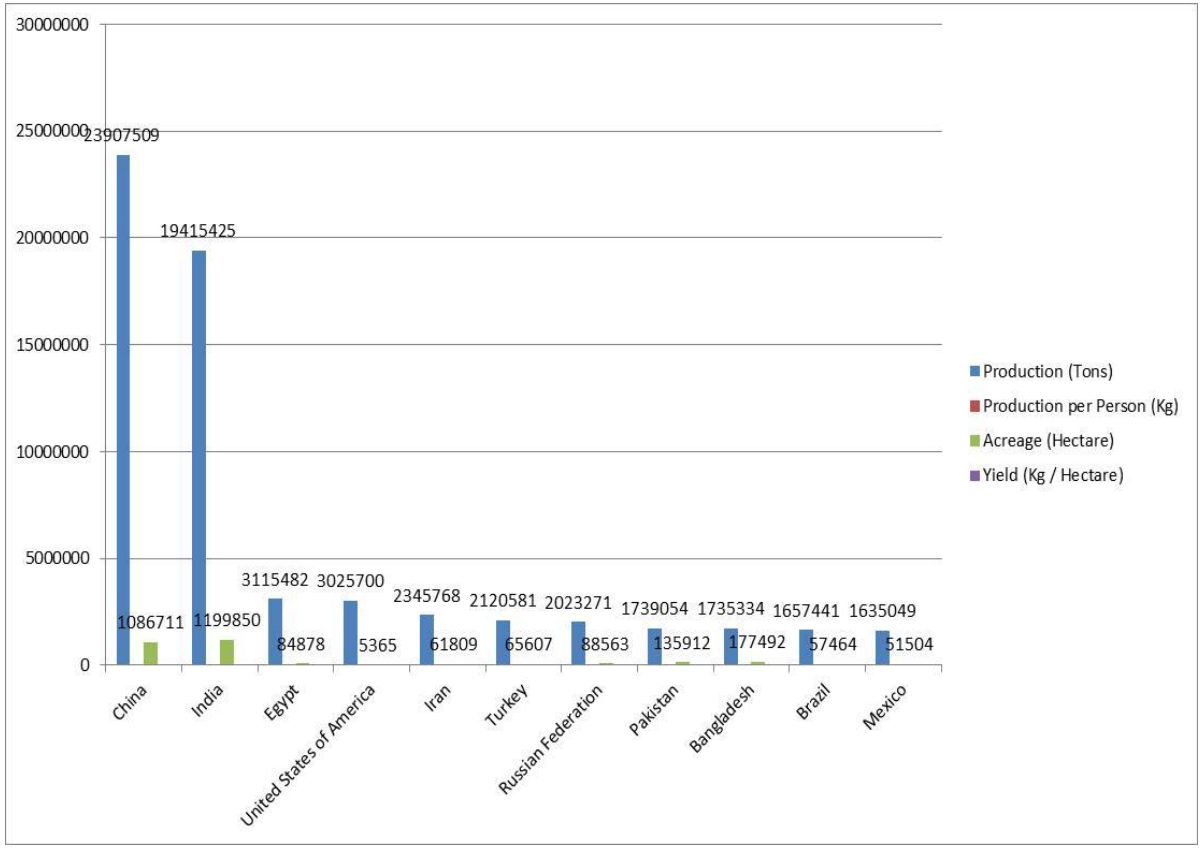
1. General introduction and key concepts related

Where are the onion from and to?

Annual production of onions in China. Ranked #1, the country accounts for 24.92% of total world onion production. Cultivated over 1,127,609 hectares. Yield: 220,89.6 kg/ha.

Annual production of onions in India. Ranked #2, the country accounts for 22.83% of total world onion production. Cultivated over 1,220,000 hectares. Yield: 187,04.1 kg/ha.

Annual production of onions in United States of America. Ranked #3, the country accounts for 3.17% of total world onion production. Cultivated over 52,370 hectares. Yield: 605,36kg/ha.



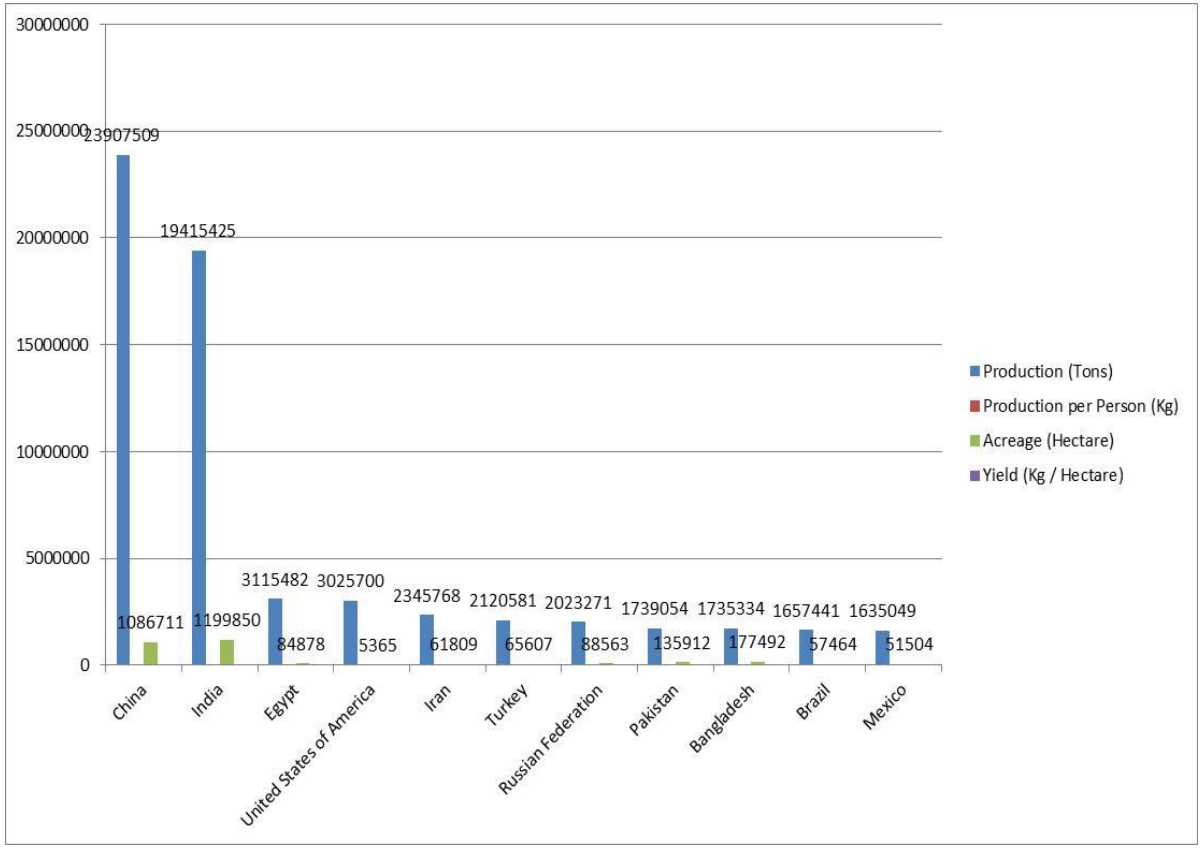
1. General introduction and key concepts related

Where are the onion from and to?

Annual production of onions in Egypt. Ranked #4, the country accounts for 3.08% of total world onion production. Cultivated over 87,948 hectares. Yield: 350,326 hg/ha.

Annual production of onions in Turkey. Ranked #5, the country accounts for 2.20% of total world onion production. Cultivated over 68,713 hectares. Yield: 320,172 hg/ha.

Annual production of onions in Pakistan. Ranked #6, the country accounts for 2.08% of total world onion production. Cultivated over 148,272 hectares. Yield: 140,255 hg/ha.



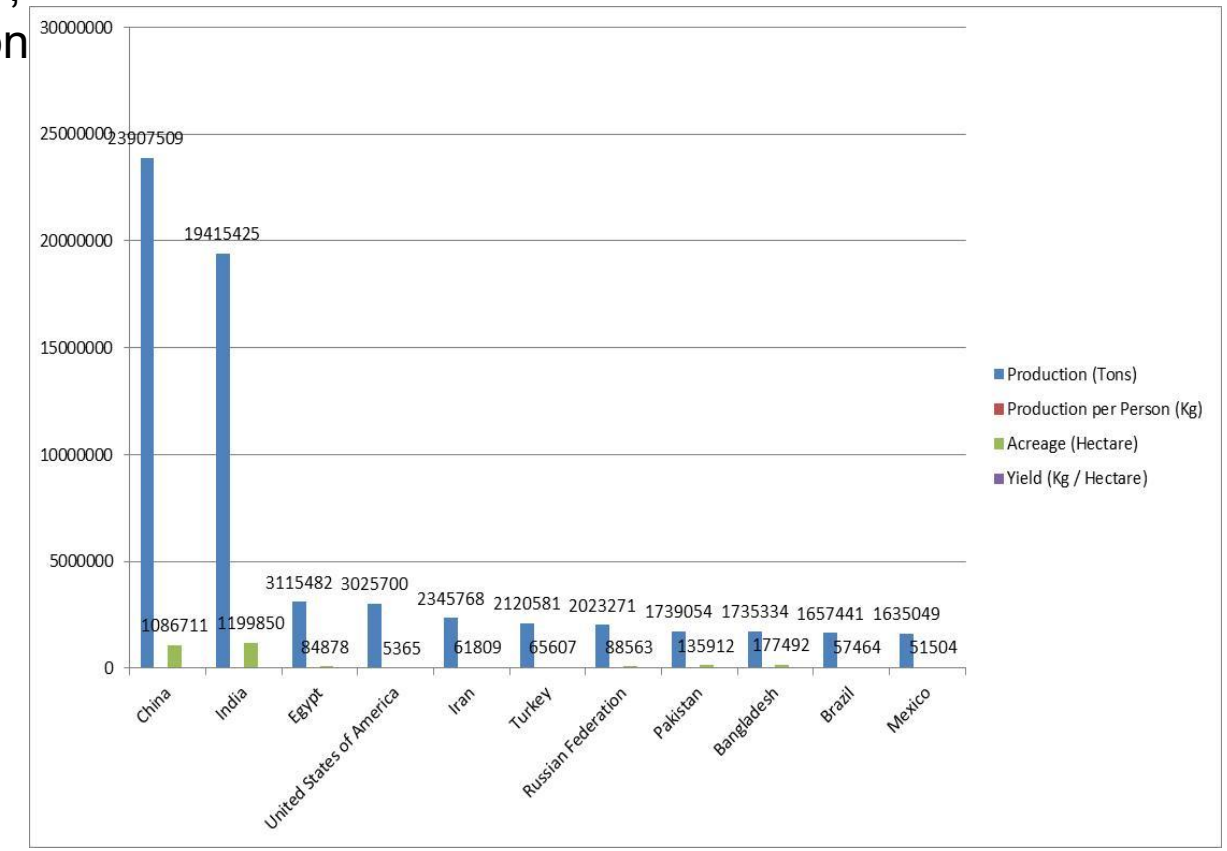
1. General introduction and key concepts related

Where are the onion from and to?

Annual production of onions in Sudan. Ranked #7, the country accounts for 1.92% of total world onion production. Cultivated over 104,463 hectares. Yield: 183,731 hg/ha.

Annual production of onions in Bangladesh. Ranked #8, the country accounts for 1.80% of total world onion production. Cultivated over 172,456 hectares. Yield: 104,541 hg/ha.

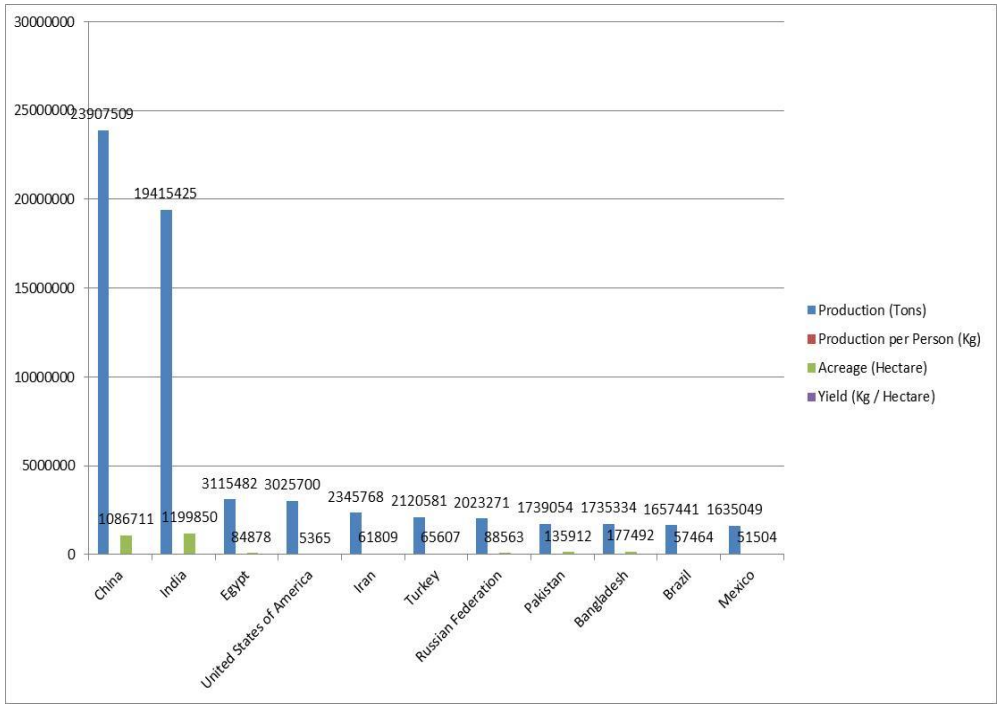
Iran. Ranked #9, the country accounts for 1.78% of total world onion production. Cultivated over 45,417 hectares. Yield: 391,804 hg/ha.



1. General introduction and key concepts related

Where are the onion from and to?

Russia. Ranked #10, the country accounts for 1.67% of total world onion production.
Cultivated over 58,226 hectares.
Yield:286,836 hg/ha.

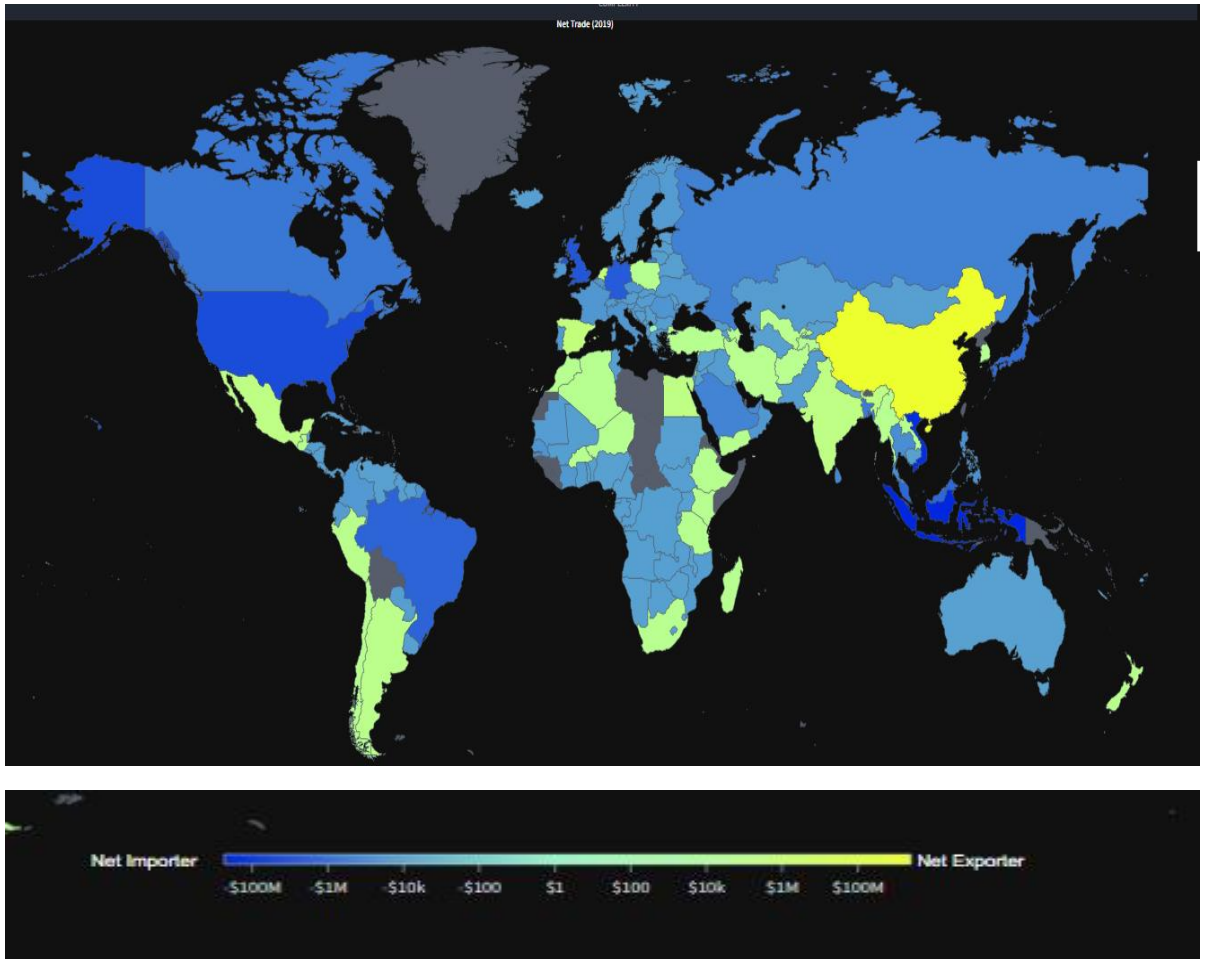


99,968,016 tonnes
Annual production of onions worldwide. Cultivated over 5,192,651 hectares. The top 10 producing countries account for 65.45% of global production.

1. General introduction and key concepts related

☐ Where are the onion from and to?

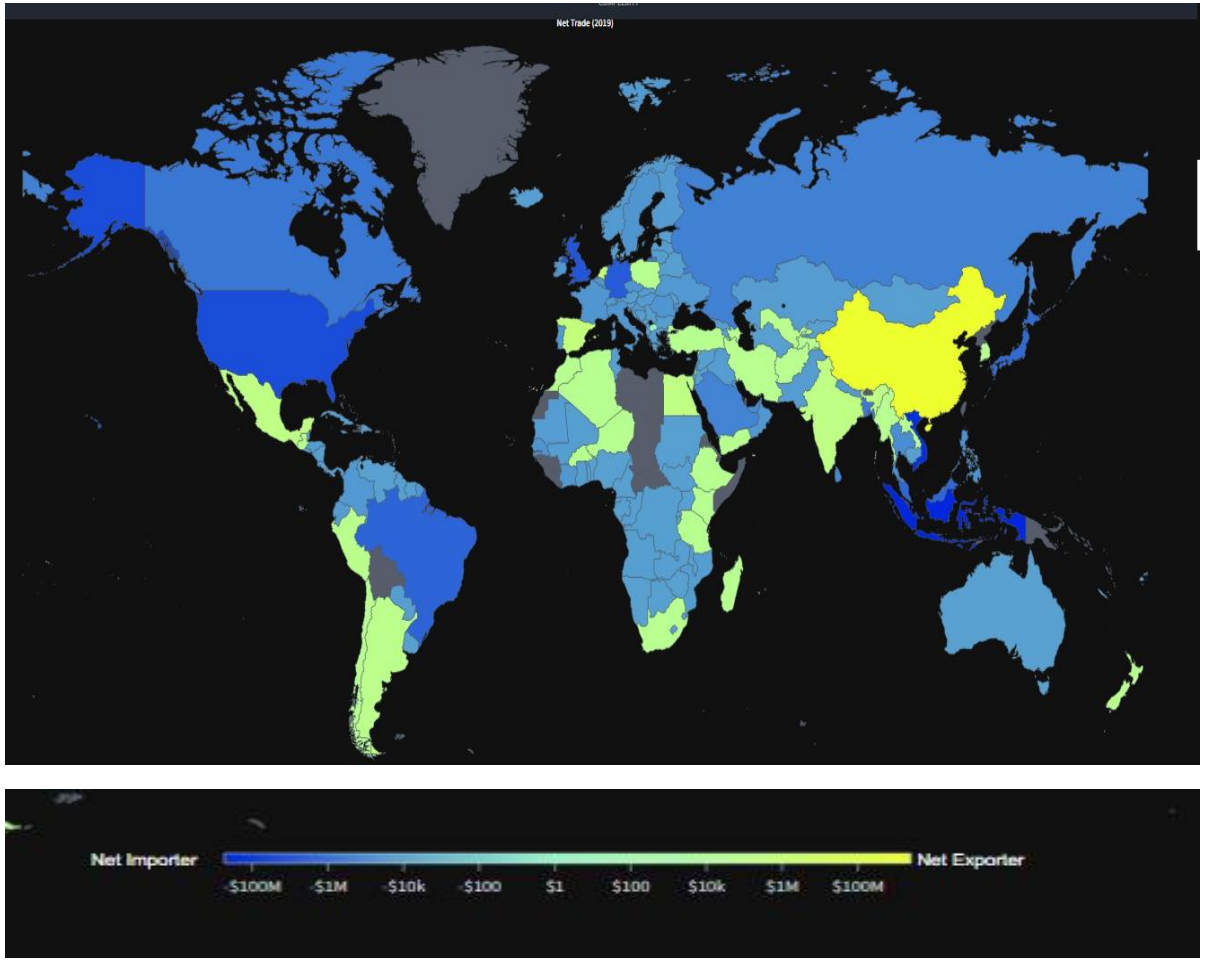
- This map shows which countries export or import more of ***Onions***. Each country is colored based on the difference in exports and imports of ***Onions*** during 2019.
- In 2019, the countries that had a largest trade value in exports than in imports of ***Onions*** were China ($2.52B), Netherlands ($607M), Spain ($530M), India ($334M), and Egypt ($326M).



1. General introduction and key concepts related

☐ Where are the onion from and to?

- In 2019, the countries that had a largest trade value in imports than in exports of ***Onions*** were Indonesia ($546 M), Vietnam ($516M), United States ($381M), United Kingdom ($335M), and Germany ($314M).
- Data from BACI HS6 REV. 1992 (1995 - 2019).



1. General introduction and key concepts related

☐ Where are the onion from and to?

- Chinese onions take Nepali markets after India imposes export ban
- Since India imposed export ban on its onion on Sept. 29, the Himalayan country has been receiving limited quantity of smuggled Indian onions through the porous border between the two countries.
- As a result, prices of Indian onions have soared, heralding the entry of Chinese onions in the Nepali market.
- Nepal imported 400 000 tonnes of onions from China.

1. General introduction and key concepts related

Some concepts

- Long day vegetables.It is a kind of vegetable whose daily sunshine length exceeds the critical daily length (generally 12 ~ 14 hours) before bolting and flowering. If in short sunshine, bolting and flowering will be delayed, or even no flowering. It includes many vegetables originated from temperate zone and bolting and flowering in the next spring, such as cabbage, cabbage, mustard, radish, spinach, peas, onions, celery, etc





1. General introduction and key concepts related

Some concepts

- Short day vegetables. It is a kind of vegetable that can bolt and blossom only when the daily sunshine length is shorter than the critical day length (generally 12 ~ 14 hours). Appropriately prolonging the dark period can promote bolting, flowering and fruiting; If light conditions were prolonged, flowering would be delayed or not. Most of them originated in low latitudes near the equator, such as water spinach, amaranth, perilla, sweet corn and late maturing soybeans




1. General introduction and key concepts related

Some concepts

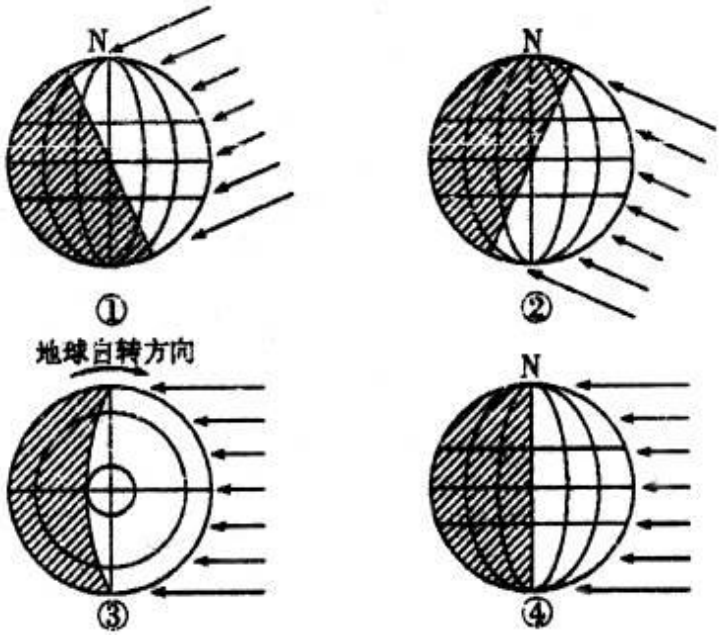
- Day Netrual Vegetabls，It is a kind of vegetable that does not have strict requirements on the length of light and can bloom under any length of sunshine. For example, tomatoes, cucumbers and kidney beans can be cultivated in open fields in spring and autumn and in Greenhouse in winter

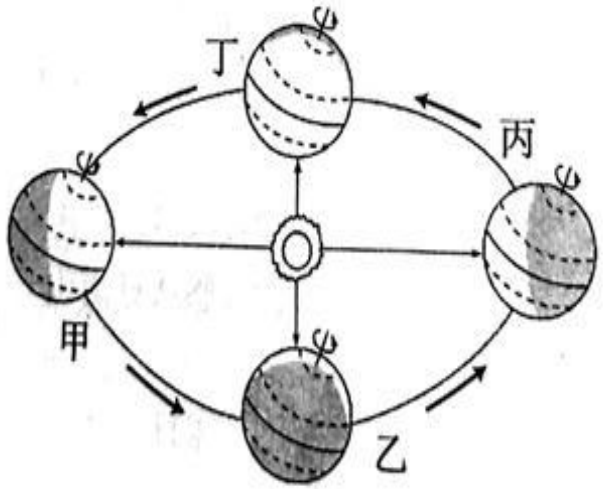


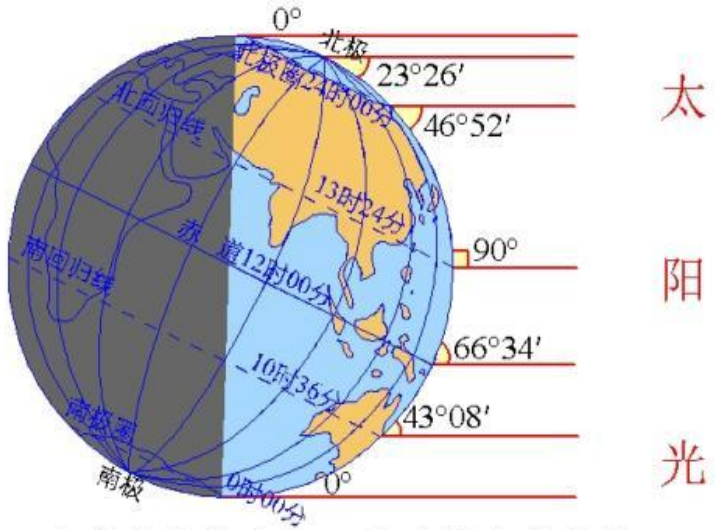

1. General introduction and key concepts related

Some concepts

Equinox







北半球昼长夜短，纬度越高昼越长，
北极圈内为极昼；南半球则相反。

the 24 solar terms

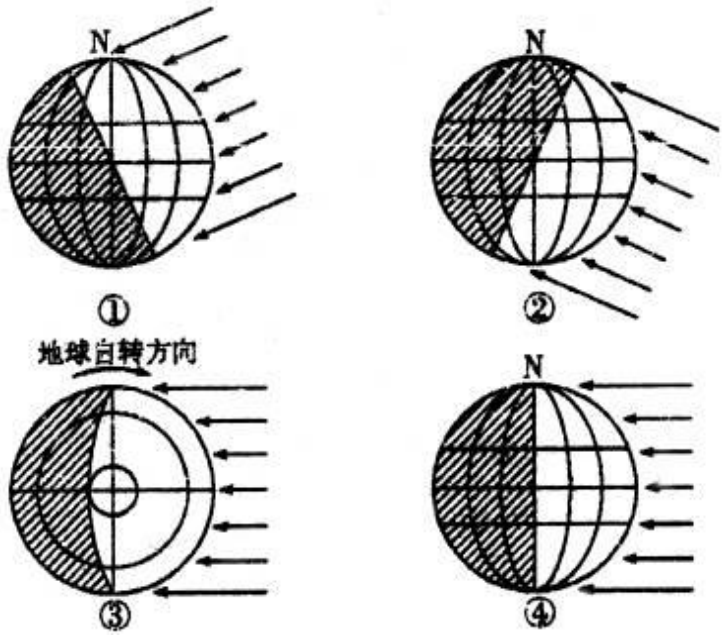
① **Spring(Vernal) equinox:(march** 19-22)

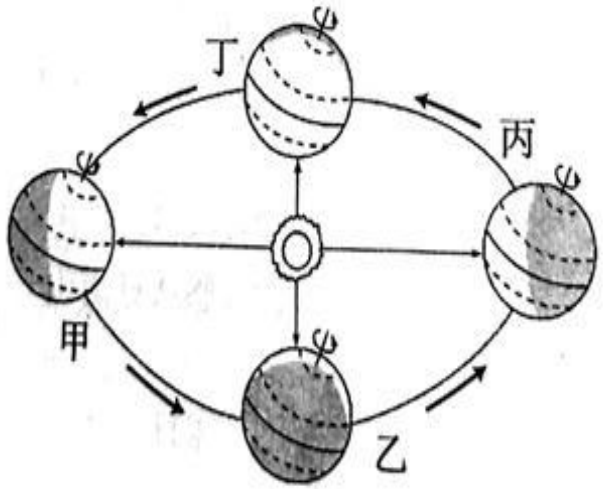
After the spring equinox, days are getting longer and nights shorter in the northern hemisphere;
the nights are getting longer and days shorter in the southern hemisphere;
At the spring equinox, there is no polar day or polar night in the world;
After the spring equinox, the polar day begins near the Arctic, and the range becomes larger and larger;
Near the south pole, the polar day ends and the polar night begins, and the range becomes larger and larger.

1. General introduction and key concepts related

Some concepts

Equinox





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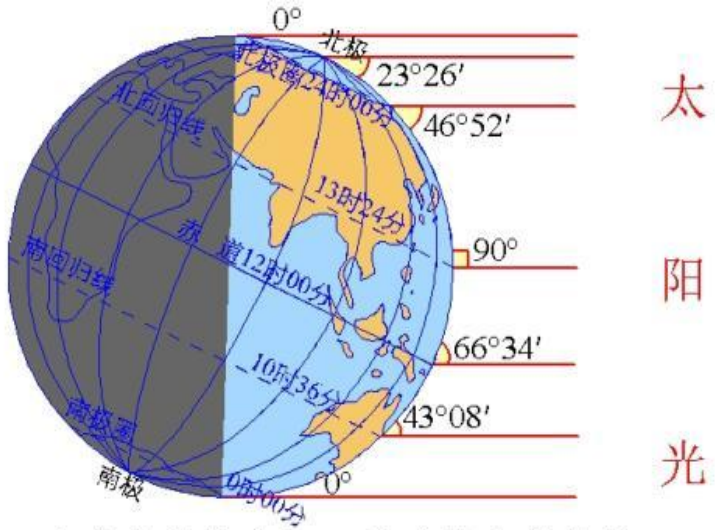

北半球昼长夜短，纬度越高昼越长，
北极圈内为极昼；南半球则相反。

② Autumnal equinox :(sep22-24)

After the spring equinox, days are getting longer and nights shorter in the southern hemisphere;
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At the equinox, there is no polar day or polar night in the world;
After the equinox, the polar day begins near the Antarctica, and the range becomes larger and larger;
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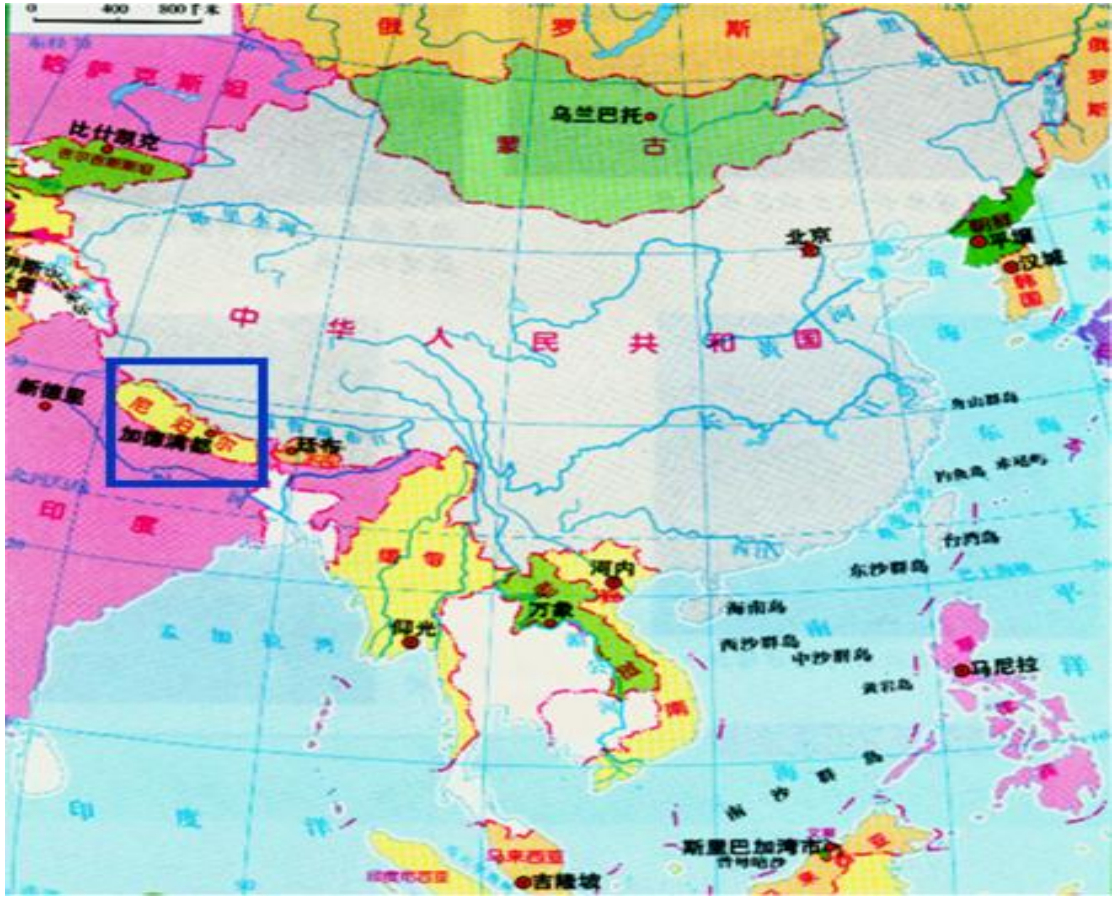
1. General introduction and key concepts related

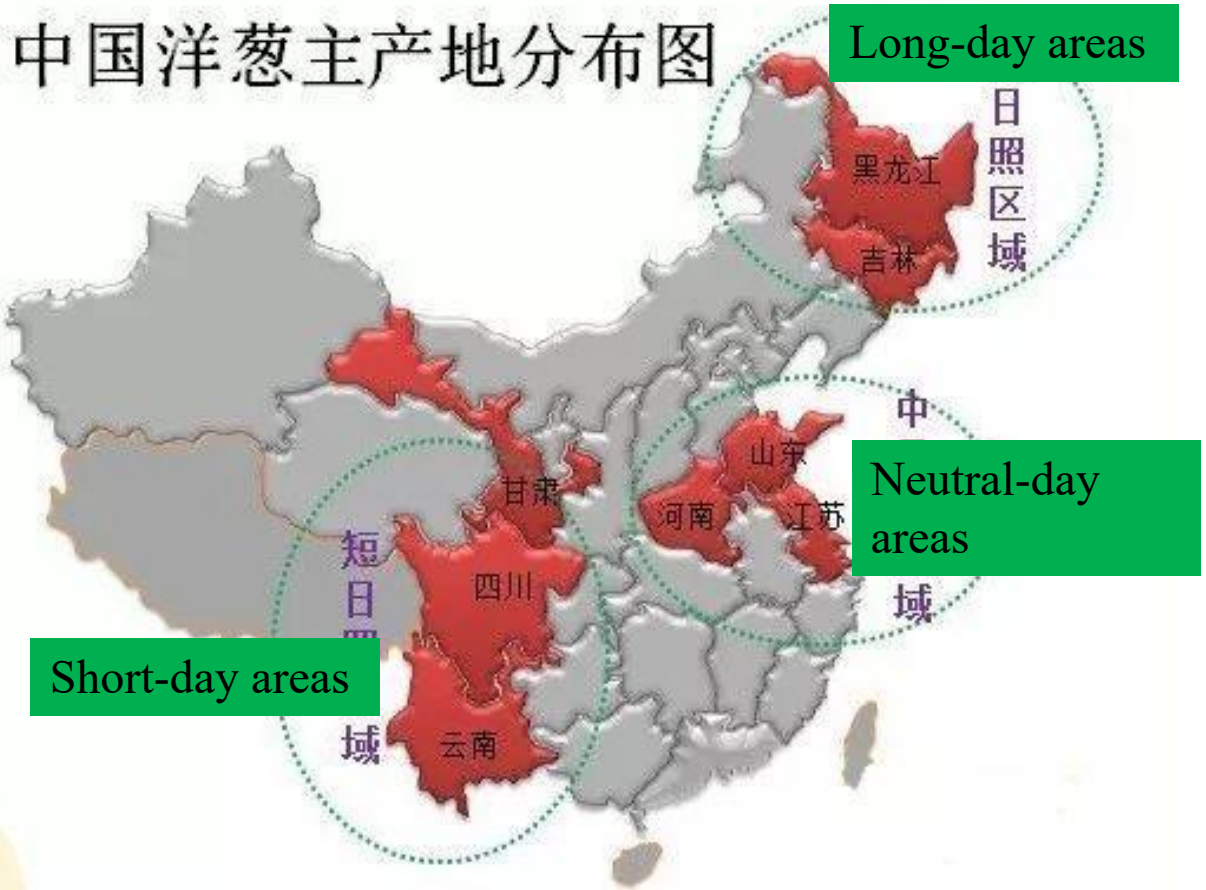
Some concepts



1. General introduction and key concepts related

Where are the onion from and to?

- Long-day areas，Heilongjiang, Jilin.
- Neutral-day areas, Shandong, Henan and Jiangsu.
- Short-day areas，Gansu, Sichuan and Yunnan.



2. Onion varieties and selection

Genernal

Onion is a small herb plant that grows to about 2 feet tall. In the botany, its underground globular bulb is a stem that consists of fleshy, modified leaves arranged in whorls. There are many cultivar varieties of onions grown around the world. On average, the crop takes about three to four months from seedlings to harvest. Top greens or scallions and flower heads are also eaten all around the world.

2. Onion varieties and selection

There are many kinds of varieties

- ***Red:*** 'Benny's Red' (112 days); 'California Wonder Red' (85 days); 'Giant Red Hamburger'; 'Lucifer' (106 days); 'Mars'; 'Mercury'; 'Red Baron'; 'Red Burgermaster'; 'Red Dutch'; 'Red Globe'; 'Red Mac'; 'Redman' (105 days); 'Rio Kyda Von'; 'Southport Red Globe' (120 days); 'Stockton'; 'Wethersfield'.
- ***Yellow or White:*** 'Alisa Craig' (110 days); 'Bingo' (100 days); 'Blanco Duro' (120 days); 'Buffalo' (88 days); 'Burgos'; 'Capable'; 'Celebrity'; 'Condor'; 'Copper King' (95 days); 'Copra' (111 days); 'Duration' (110 days); 'Early Yellow Globe' (114 days); 'Eskimo' (85 days); 'Fiesta'; 'First Edition' (105 days); 'Frontier'; 'Gazette'; 'Giant Zittau'; 'Granex' (110 days); 'Gringo'; 'Headliner'; 'Joint Venture'; 'Kelsae Sweet Giant' (110 days); 'Legacy' (108 days); 'Lisbon White'; 'New York Early' (98 days); 'Norstar' (85 days); 'Prince' (106 days); 'Reliance' (110 days); 'Riverside Sweet Spanish'; 'Simcoe' (110 days); 'Southport White Globe' (110 days); 'Sweet Sandwich'; S'weet Spanish Hybrid' (110 days); 'Tarmagon'; 'Texas Yello Grano', 'Valiant'.
- ***Sweet-Eating:*** 'Walla Walla' (110-300 days), 'Yellow Sweet Spanish' (110 days), 'Vidalia' (110 days).
- ***Green Onions-Scallions:*** Any of the above before bulbs are fully developed.

2. Onion varieties and selection

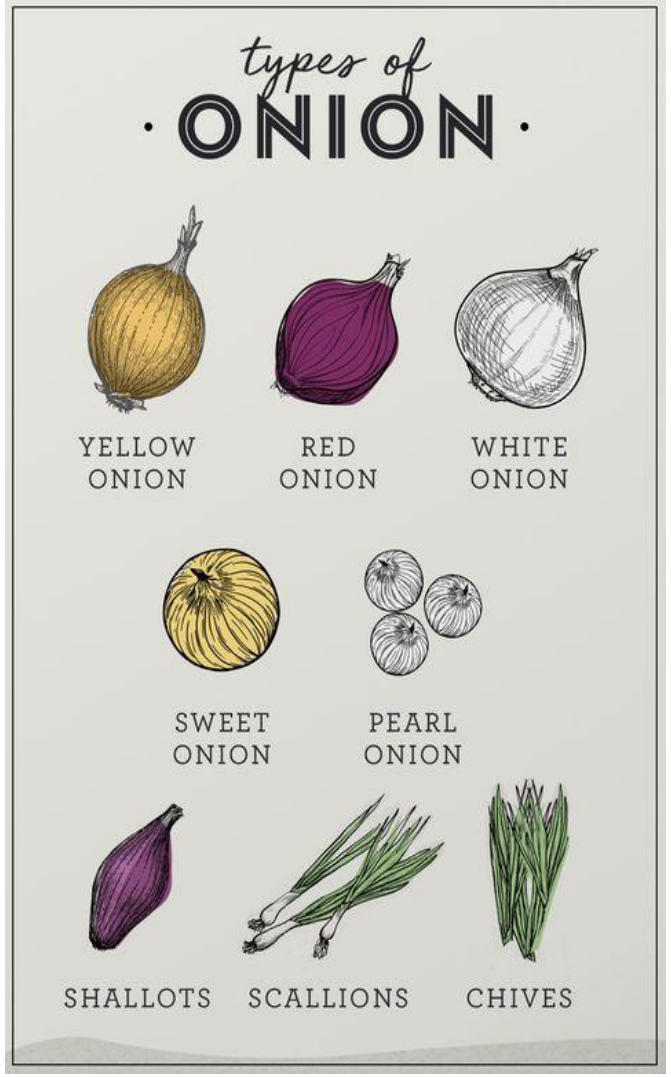
Varieties of onions: widly and general

Onions come in a wide variety of shapes, sizes, and colors. The white, yellow, or red bulbs range in size from small pickling onions to large Spanish cultivars; they can be globe-, top-, or spindle-shaped.

Most types can be pulled young as green onions, but there's also a perennial bunching type called *Allium fistulosum* that's practically disease- and insect-proof and produces superior scallions.

Each bulb of the multiplier or potato onion (*A. cepa* Aggregatum group) multiplies into a bulb cluster. So with every harvest, you'll have bulbs to replant for a continual supply.

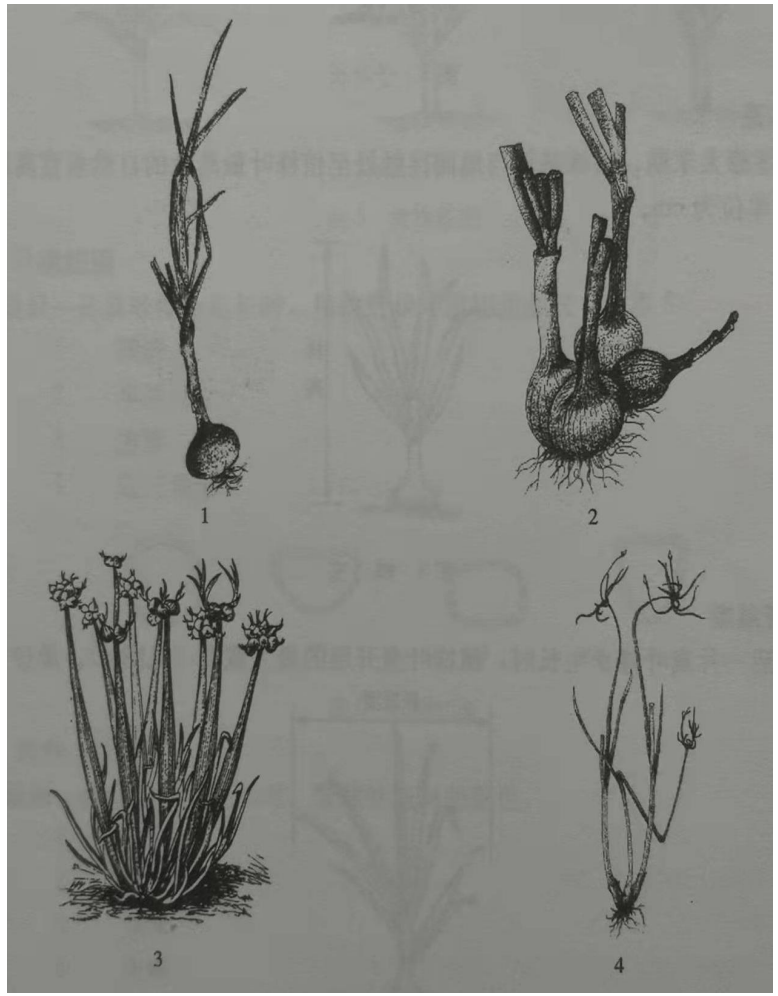
The Egyptian or top onion (*A. cepa* Proliferum group) produces a bulb cluster at the end of a long stem with a second cluster frequently forming on top of the first. It also has an underground bulb, which is often too pungent to eat.
Other tasty plants include chives (*A. schoenoprasum*), garlic chives (*A. tuberosum*), and shallots (*A. cepa* Aggregatum group



2. Onion varieties and selection

Varieties of onions: botantic

1. Common onion (*A. cepa* L.)
2. Multiplier onion (*A. cepa* var. *Aggregatum* Don.)
3. Top onion (*A. cepa* var.*viviparum* Merg.)
4. Red Top onion (*A. cepa* var.*proliferum* Regel.)



2. Onion varieties and selection

☐ Varieties of onions: botantic

◆ Common onion （*Allium cepa* L.）

Each plant usually forms only one bulb.

Seeds propagate, and a few varieties form aerial bulbs on inflorescence under special environment.

Common onion can be divided into oblate, round, oval and spindle shape according to the shape of its bulb. It can also be divided into early maturity, medium maturity and late maturity.

In the south of the Yangtze River, most of them are middle and early maturing species. It can also be divided into three types according to different geographical latitudes:

3. Onion varieties and selection

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2. Onion varieties and selection

Varieties of onions: botantic

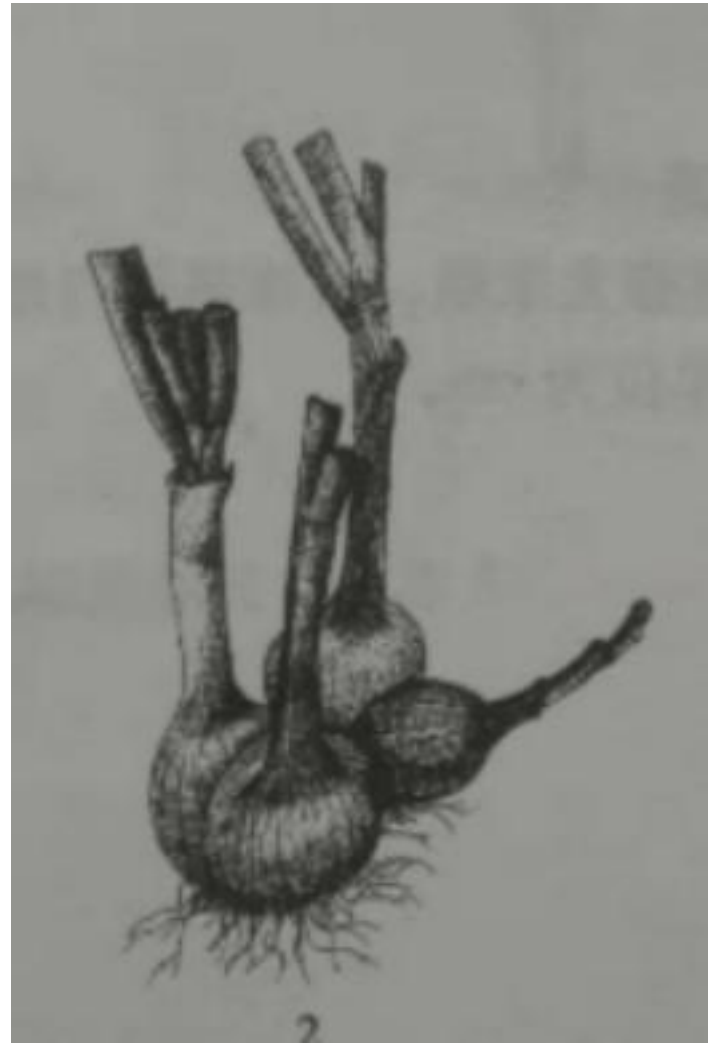
- "Short day" type: it is suitable for the south of the Yangtze River in China and the latitude is 32 ° ~ 35 ° north latitude. Most of these varieties are sown in autumn and harvested in spring and summer.
- "Long day" type: it is suitable for all parts of Northeast China, and the latitude is 35 ° ~ 40 ° north of north latitude. This kind of variety is sown or planted in early spring (with bulb bulbs) and harvested in autumn.
- Intermediate type: suitable for the Yangtze River and Yellow River Basin, between 32 ° and 40 ° n. These varieties are sown in autumn and harvested in late spring and early summer of the next year.

2. Onion varieties and selection

☐ Varieties of onions: botantic

- Multiplier onion （*Allium cepa* L.var.aggregatum G.Don）

It can tiller, and each plant tillers into multiple to more than 10 bulbs with irregular size, usually without seeds. Bulbs can be formed at the base of each tiller and propagate with the small bulbs of tillers. The variety has poor quality and low yield, but it has strong storage resistance and cold resistance



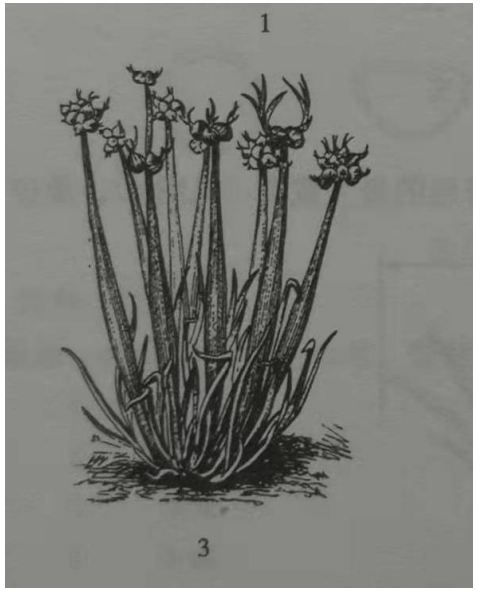
2. Onion varieties and selection

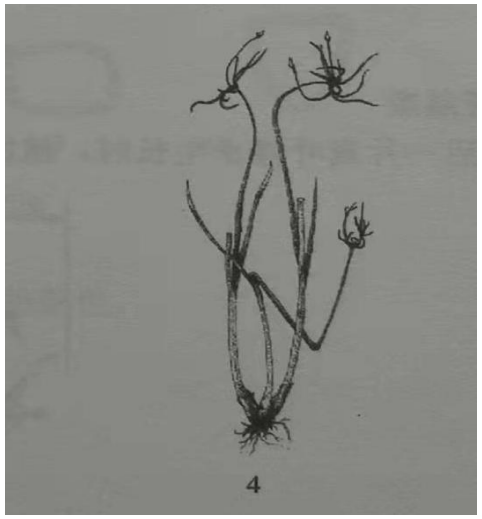
Varieties of onions: botantic

Top onion (*A. cepa* var.*viviparum* Merg.)

Many aerial bulbs grow on the inflorescence. Aerial bulbs can be used to reproduce without seeds. It is mainly used for pickling. Like tillering onion, terminal onion has low economic value and is rarely cultivated except for special purposes.

（*Allium cepa* L.var.viviparum Metz.）





2. Onion varieties and selection

☐ Varieties of onions: commercial pupurs

- **Yellow onions**

Common kitchen items are the normal yellow onions that you find in most supermarkets when shopping. They are also called “brown onions” because of their skin color. You often find them in mesh bags at an inexpensive price.

These onions are the staples of the kitchen when it comes to onion varieties. They are an all-purpose onion and probably one that you use most of the time

2. Onion varieties and selection

Varieties of onions: commercial pupurs

- **White onions**

If you are looking for an onion with a more pungent flavor, try using white onions. These onions have thinner skins and a more papery skin. Often the green stalk is still attached.

White onions have a high water content. The makes them very crisp. This texture makes them great for salsas, chutney recipes and other raw onion ideas.

It's common to use white onions in Mexican cuisine. Check out this ground turkey chili for a low fat Mexican recipe using white onions.

Since white onions are good used raw, they are often used in guacamole and salsa recipes like this pineapple salsa.

2. Onion varieties and selection

Varieties of onions: commercial pupurs

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2. Onion varieties and selection

Varieties of onions: commercial pupurs

- **Red onions**

Another good choice for recipes where raw onions are called for are red onions. These onions have a mild flavor and deep purple skin.

Red onions are less meaty and also less tender than yellow onions. They can be cooked but if you do so, you'll lose the lovely red color which becomes washed out during the cooking process.

Use red onions in salads, salsas and as topping on burgers and sandwiches to enjoy their mild flavor. Their use always adds a splash of color to the dishes you use them in.

2. Onion varieties and selection

☐ Varieties of onions: commercial pupurs

Sweet Onions

This type of onions has a pale yellow skin. They are larger than yellow onions and their skin is less opaque. Some common varieties of sweet onions include Walla Walla, Vidalia onions and Maui Onions.

Sweet onions are missing the sharp pungent taste of other onions and really do taste quite sweet. They taste best when thinly sliced and used on top of salads or in layers on sandwiches.

This type of onion sometimes has a squashed or flattened appearance. Since sweet onions are more perishable, you should store them in the refrigerator.

3. Onion varieties and selection

- **Varieties of onions: commercial pupurs**

Common types of Sweet Onions:

Vidalia onions

Vidalia onions are a type of sweet onion. They lack the sharp taste of normal onions and are great on sandwiches. If you want to use raw onions in a dish, vidalia onions are the way to go.

2. Onion varieties and selection

- **Varieties of onions:** commercial pupurs

Common types of Sweet Onions:

Walla Walla Onions have a complex, sweet flavor. Use them on sandwiches and salads, or even pizzas. They can be eaten raw or just lightly cooked.

2. Onion varieties and selection

- **Varieties of onions:** commercial pupurs

Common types of Sweet Onions:

Maui Onions are sweet and juicy and are great sliced and made into onion rings. You can also use them in salads and on sandwiches and they are great caramelized as well.

These onions are named because they are a smaller onion grown on the Hawaiian island of Maui.

2. Onion varieties and selection

☐ Varieties of onions: commercial pupurs

Common types of Sweet Onions:

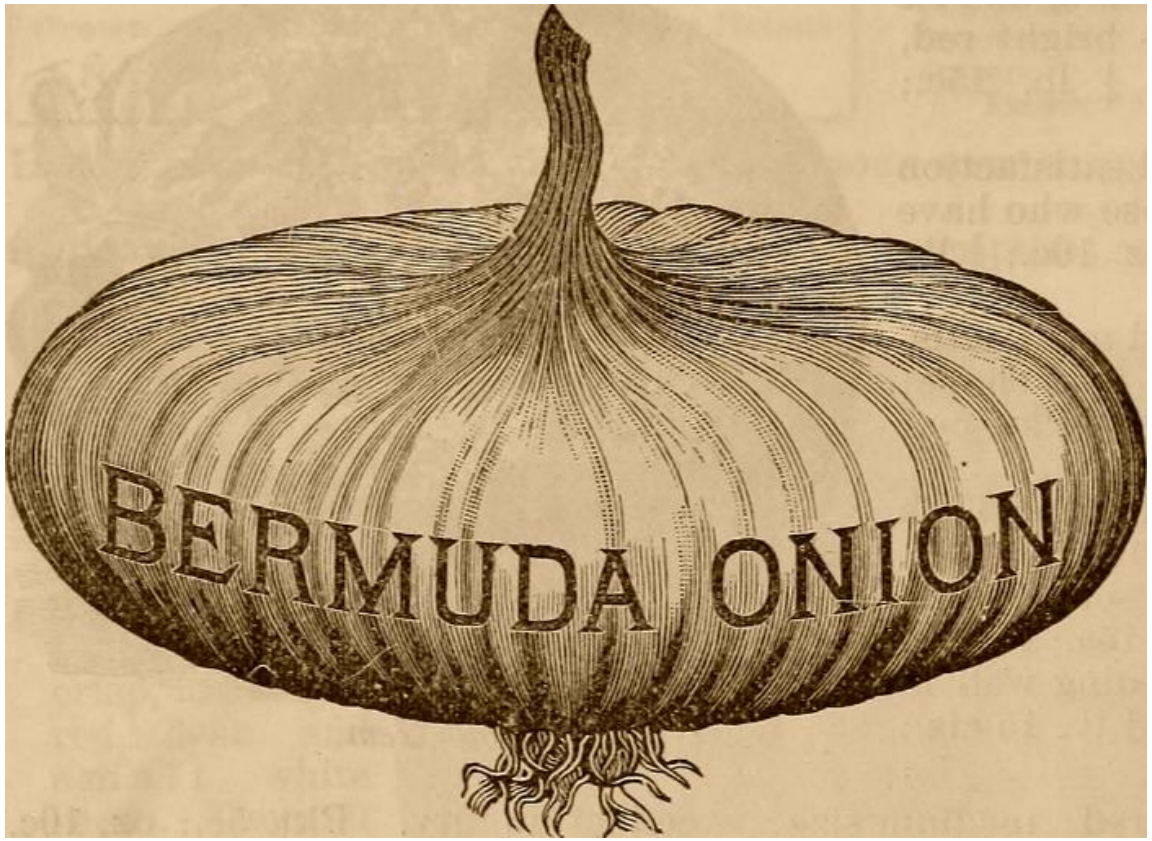
Bermuda Onions

There are a few types of Bermuda onions. Contrary to popular opinion, they are not red onions, OR a sweet Spanish onion. They are a type of sweet onion grown on the Island of Bermuda.

Bermuda onions used to be one of the most popular onions in the USA but sweet onions from Texas have displaced them in use.

Bermuda onions have a flat top and a sweet flavor and they can have either a white or yellow skin. Some newer varieties also have a red skin.

These onions are great in grilled recipes and their flavor is very mild.



3. Onion varieties and selection

- **Varieties of onions:** commercial pupurs

Common types of Sweet Onions:

Spanish Onions

Spanish onions are a particular type of yellow onion that are slightly sweeter and more delicate in flavor than normal yellow onions.

They are more tender than normal yellow onions and have a thinner and more papery looking skin.

Use Spanish onions in any recipe that calls for onions. They are great in Italian sauces and perfect for onion rings. Spanish onions are a good substitute for Bermuda onions.

2. Onion varieties and selection

Varieties of onions: commercial pupurs

The onion varieties above are the most commonly known and used ones, but there are many other types as well.

Specialty Types of Onions:

- **Torpedo Onions**

An Italian heirloom variety of onions, favored because of their unusual shape, torpedo onions are one of the most famous varieties of onions from Italy. The onion is originally from Tropea, a Calabrian town.

This onion is used to enhance the flavor of recipes and has a delicate and mild flavor with a slightly sweet taste. Not surprisingly, they are often used in Italian Cooking.

2. Onion varieties and selection

☐ Varieties of onions: commercial pupurs

Specialty Types of Onions:

- **Scallions**
- Are also known as salad onions, bunching onions, Welsh onions and spring onions. In fact, each type has minor differences.
- These onions produce long edible green tops instead of the normal large heads that we think of for onions. Some have heads that never bulge and others have a more pronounced head, but still nothing like a normal onion.
- Scallions are great in salads because they have a less intense flavor. They can be eaten raw or cooked. The majority of the onion flavor is in the white head.

2. Onion varieties and selection

☐ Varieties of onions: commercial pupurs

Specialty Types of Onions:

- **Pearl onions**
- Mild and sweet, these small onions are perfect for pickling. They are delicious eaten whole and and can be roasted or glazed and are nice used in stews.
- They are normally 1/2 to 1 1/2 inch in size. Most pearl onions are white but you can also find them with yellow and red skins. One of the best things about pearl onions is that no chopping (and no crying) is necessary. Just peel and use whole.
- Pearl onions are also the perfect size to use in cocktails as a garnish. A cocktail onion is a pearl onion that has been pickled in brine with small amounts of paprika and turmeric.

2. Onion varieties and selection

☐ Varieties of onions: commercial purpose

Specialty Types of Onions:

- **Shallots**
- A shallot has a similar flavor to an onion but it is richer, and sweeter. Instead of forming one bulb, it grows in clusters like garlic does. Shallots often have several bulbs attached to a base.
- Some shallots have coppery colored skins and off white flesh, tinged with purple. Others have deep purple skins. Shallots look like small elongated onions.
- The flavor of shallots has a hint of garlic to it and it lacks the bite that you get with onions. This makes them perfect in salads and dressings.
- If you can't find shallots at your grocery store, there are several substitutes that you can use for them.

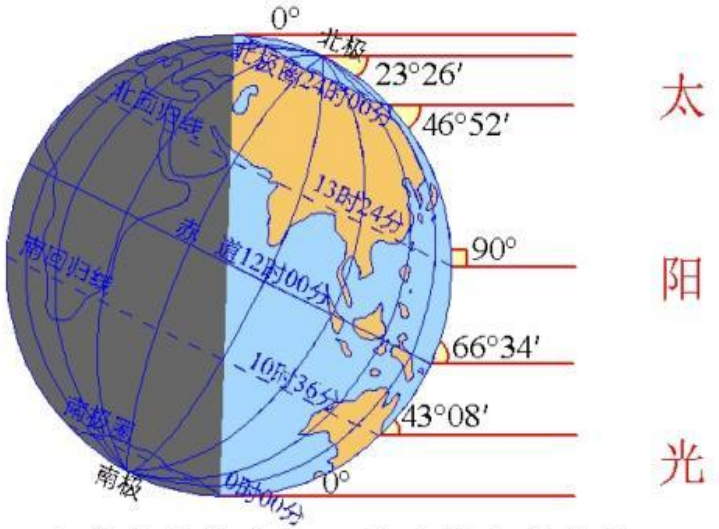
3. How to plant onions

You can grow onions from transplants, sets, or seeds. You can buy transplants, which are seedlings started in the current growing season and sold in bunches, from nurseries or through the mail. They usually form good bulbs over a short period of time (65 days or less), but they're subject to diseases. The choice of cultivars is somewhat limited.

3. How to plant onions

Always check a cultivar's day-length requirement or recommended latitudes

- Always check a cultivar's day-length requirement or recommended latitudes before you buy, because day length affects how and when onions form bulbs. Short-day onions, such as 'Red Hamburger', will form bulbs as soon as days reach 10 to 12 hours long. They're suitable for southern latitudes only. Long-day types, like 'Sweet Sandwich' and 'Southport Red Globe', need 13 to 16 hours of summer daylight in order to form bulbs. They're the type to grow in more northern latitudes.



北半球昼长夜短，纬度越高昼越长，北极圈内为极昼；南半球则相反。

3. How to plant onions

Sets

- Sets are immature bulbs grown the previous year and offer the most limited cultivar choices. They're the easiest to plant, the earliest to harvest, and the least susceptible to diseases. However, sets are also more prone to bolting (sending up a flower stalk prematurely) than are seedlings or transplants

- If you plant onion sets, the sets may be identified only as white, red, or yellow rather than by variety name. Most growers prefer white sets for green onions. When buying sets, look for 1/2-inch-diameter bulbs because they're the least likely to bolt.

3. How to plant onions

Seed offers

- Growing onions from seed offers the great advantage of a wide choice in cultivars. The challenge with starting from seeds is that your crop will take up to four months to mature. Gardeners in cold-winter areas will need to start their onion seedlings indoors.

- Plant onion seeds four to six weeks before the last average frost — or even earlier indoors or in a cold frame. When indoor seedlings are 2 to 3 inches tall, harden them off by exposing them to above-freezing night temperatures.

3. How to plant onions

Seed offers

- Outdoors, sow seeds thickly in rows about 1/2 inch deep. You can try mixing in radish seeds both to mark the planted rows and as a trap crop to lure root maggots away from the onions. Thin seedlings to 1 inch apart, and thin again in four weeks to 6 inches apart.

- For transplants or sets, use a dibble to make planting holes 2 inches deep and 4 to 6 inches apart. Use the closer spacing if you plan to harvest some young plants as green onions.

3. How to plant onions

Onion Planting Time:

- Onions are temperature sensitive: they require cool weather to produce their tops (early stages of growth) and warm weather to produce their bulbs (late stages of growth). Onions grow best in air temperatures of 55° to 75° F (13-24° C) Temperatures greater than 85° F (29° C) can cause soft, gray, watery bulbs.
- Plant onions sets (small bulblets) 3 to 4 months before the time you want to harvest mature bulbs; plant sets 3 to 4 weeks before you want to harvest green onions.
- Onion seeds are best started indoors: start seeds 4 to 6 weeks before the average last frost date in spring and transplant them into the garden as soon as the soil can be worked. In mild-winter regions, plant onions in the fall or winter, depending on the variety.

3. How to plant onions

Onion Planting Time:

- Most onions are sensitive to day length. American and Spanish onions need long days to produce their bulbs, and Bermuda onions prefer short days.
- **Green onions for autumn harvest:** Plant green onions 4 to 6 weeks before the first expected fall frost for autumn harvest; late summer or early fall temperatures should not be greater than 75° F (24° C).
- for growing green onions.
- Green onions for winter and early spring harvest: In mild winter regions, plant green onions in autumn for winter and early spring harvest.

3. How to plant onions

Onion Planting Time:

- Planting seeds: Seeds can be started indoors 4 to 6 weeks before you plan to set seedlings out or you can direct sow seed in the garden when the soil temperature is at least 40° F (4.4° C). Sow seed ¼ to ½ inches (12mm) deep. The seed will germinate in 7 to 10 days at 70° F (21° C), longer in cooler soil. Thin seedlings from 1 to 2 inches (2.5-5cm) apart in rows 12 to 18 inches (30-45cm) apart; thin again for bulb onions from 4 to 6 inches (10-15cm) apart. The final size of the onion will depend on how much growing space it has.
- Planting seedlings: Seedlings are onions that have begun growing. You can start seedlings indoors from seed or you can purchase onion seedlings at the garden center. Place transplants in the garden just slightly higher than the surrounding soil and they will settle into place. Space seedling transplants 2 to 3 inches (5-7cm) apart in rows 12 to 18 inches (30-45cm) apart. Thin again to 4 to 6 inches (10-15cm) or more apart allowing for bulb development.

3. How to plant onions

Onion Planting Time:

- Planting sets: Sets are small bulblets–about the size of a large pea–whose growth was interrupted before the bulbs developed. Bulblets larger than ¾ inch (19mm) in diameter may go to seed before developing bulbs (these are best grown as green onions). Plant sets 1 to 2 inches (2.5-5cm) deep. Plant sets pointed side up. Space sets 2 to 3 inches (5-7cm) apart in rows 12 to 18 inches (30-45cm) apart. Thin to 4 to 6 inches (10-15cm) or more apart allowing for bulb development. The final size of the onion will depend on how much growing space it has

3. How to plant onions

- **Climatic and Soil Requirements**
- Bulb Onions grow well in friable and well-drained loam soil with good water holding capacity and pH between 6 & 7.
- For best growth and bulb quality, onion requires cooler weather during the early stages of growth and a dry atmosphere with moderately high temperature for bulb development & maturation. Planting can be done as early as October (yellow onions) to as late as January (red onions).

3. How to plant onions

- **Seedling Production**

A 1-ha production area requires 5 kg seeds. A 300-500 m2 seedbed produces enough transplants for one ha/ Prepare beds 1 m wide & incorporate animal manure and rice hull.. Line sows 3-5 kg. seeds in rows set across the bed 7-10 cm apart. Distribute seeds thinly and evenly to control damping off. Cover the seeds lightly with compost and mulch with rice straw or grass clippings. Maintain adequate soil moisture. Protect the seedbed against direct sunlight and rain with nylon net or removable plastic tunnels. Reduce watering and expose seedlings to full sunlight one week before transplanting.

3. How to plant onions

- **Land Preparation**

One month prior to land preparation, apply about 30 cm layer of rice hull over the entire field & burn for about two weeks. Incorporate burnt rice hull during land preparation. Burnt rice hull reduces occurrence of weeds & diseases & improves soil texture.

Land preparation is done one month prior to transplanting. The use of tractor-driven implement requires 1-2 plowing & harrowing operations. Apply animal manure at 10-15 t/ha prior to bed preparation. Beds 1 m wide are recommended.

3. How to plant onions

- **Transplanting**

Transplant seedlings 4-6 weeks after sowing. Gently uproot the seedlings to prevent root damage. Plant at a distance of 15 cm between rows & 3-5 cm between transplants can also be practiced. Use markers for proper spacing & to facilitate transplanting. After marking, use dibbles to make holes. Plant deep enough but not too deep. Care must be taken so as not to damage the basal portion of the plant. Place the white portion of the plant below the soil surface. Press the soil firmly around the basal portion. Irrigate the field before and after transplanting.

3. How to plant onions

- **Companion Plants for Onions:**
- Grow onions with beets, lettuce, strawberries, summer savory, and tomatoes.
- Onions are easily inter-planted between larger crops such as cabbages or tomatoes.
- **Container Growing Onions:**
- Green onions easily grow in containers 6 inches deep (15cm); grow 8 to 10 green onions in a container 8 inches across.
- Grow bulb onions in containers 8 to 10 inches (20-25cm) deep.

3. How to plant onions

- **Fertilization**
- In the absence of soil analysis, a 1-ha production area requires 8.5-11.4 bags of ammonium sulfate (21-0-0), 6.6-26.7 bags super phosphate (0-18-0) and 2-4 bags muriate of potash (0-0-60).
- Apply all of 0-18-0 & half of 21-0-0 & 0-0-60 as basal fertilizer. Side-dress remaining 21-0-0 & 0-0-60 at 30, 45 & 60 days after transplanting. High nitrogen rates tend to shorten storage life of onions. Combine herbicide application with hand weeding to produce a good quality crop.

3. How to plant onions

- **Irrigation**

Bulb onions require adequate moisture for steady, continuous & desirable growth. Depending on soil types, irrigation varies between 4 & 7 days. Stop irrigation 2-3 weeks before harvest, or when 20-30% of the tops fold over. The last irrigation should be a light one.

3. How to plant onions

Pest & Disease Management

- Purple blotch (Alternaria porri), leaf blight (Botrytis spp.), white-tip disease (Phytophthora porri), and downy mildew (Peronospora destructor). Regulate humidity within the field through proper irrigation. Eliminate debris from previous crop. Spray compost tea (compost tea is prepared by fermenting rice compost for 10-14 days. The effluent is sprayed to control foliar diseases). Remove infected leaves. Practice crop rotation.Pink root (Pyrenochaeta terrestris). Practice soil solarization. Use resistant varieties.

3. How to plant onions

- Bacterial soft rot (Erwinia carotovora), neck rot (botrytis allii), & onion smut (Uroccystis cepulae). Harvests only mature bulbs. Maintain good air circulation during curing, packing & storage. Practice crop rotation.
- Sour skin (Pseudomonas cepacia) & slippery skin (P. alliicola). Use furrow irrigation. Incorporate copper sulfate at the last fertilization & fungicide application.

3. How to plant onions

- Thrips (Thrips tabaci), army worm (Spodoptera exigua), cutworm (Argotis spp.), & leafminer (Liriomyza spp.) Use overhead irrigation & high pressure spray of water & insecticidal soap solution. Remove badly infested leaves. Spray hot pepper extract, or spread wood ash to control army worm & cutworm. To control leafminer, spray chlorox solution (1:10 commercial chlorox & water) & rinse one hour later with water. Manage weeds properly to maintain sufficient population of natural enemies.

3. How to plant onions

- **Harvesting**
- Harvest when the tops begin to fold over. Pull mature plants/bulbs manually from the soil.
- **Post harvest**
- Cure harvested bulb for 10-14 days in a sunny, well-ventilated area. Align onions so that the leaves of one onion cover the bulb of another. Clip dried leaves 1.5 inches from the stem and remove all roots. Grade bulbs according to size & quality. Pack in jute or net sacks for storage and/or immediate disposal.

3. How to plant onions

- Practice of planting onion in traditional way (videos)

- Practice of planting onion in modern technology way(videos)

Thank you for your attention!