

Review

## Cultivation techniques of potatoes

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**Abstract:** Potato has always been a relatively traditional cash crop and food crop in China. Potato's nutritional value is high and is rich in vitamins, proteins and even carbohydrates, which makes it a frequent vegetable at dining table. For the farmers, yield and quality of potatoes directly affect their income. In the practical process of farming, there remain some problems in potato cultivation techniques as well as disease and pest control, failing to have a better yield and quality. Therefore, the farming techniques of potato are extraordinary critical.

**Keywords:** Potato; Cultivation Techniques

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People call potato in many different names in China, and the most common one is “Tudou”. It is not only a vegetable, but also a staple food. Due to its high nutritional value, potato is loved by a lot of people. Compared with other vegetables, potato has a comprehensive industrial chain, which can meet the market demand all year round. Nowadays, there are many problems in potato planting, such as cultivation techniques, diseases and insect pests, which seriously affect the yield and quality of potatoes. Therefore, potato farmers should constantly improve their own cultivation techniques.

### 1. Selection and treatment of seed potatoes

When choosing varieties, farmers should choose the most suitable varieties based on local climatic conditions, soil conditions and other conditions. For example, in areas with more mature systems, they should choose varieties with shorter dormancy period, earlier tuber setting and easier germination. For one-season crops, the planting place of one-season crops is generally at high latitude, and the time of warm season is relatively short;

these crops can only be planted once a year. In this case, it is necessary to choose the varieties with longer dormancy period. It is also necessary to choose the tubers that have no degradation, no diseases and insect pests, no damage, proper tuber size, smooth surface of tuber, firm flesh and just passed dormancy as the seed potatoes for cultivation [1].

After selecting a good variety, the next step is to deal with the seed potato. The reason why it is important to deal with the seed potato is that some diseases are spread through the seed potato. Therefore, attention must be paid to the treatment of seed potatoes before planting. Farmers can soak the potatoes for an hour and a half, then rinse them off with clear water, or spray the potato piles with 40% formalin, and finally dry them and sow them.

In addition, some bacteria can infect the potato cutting process, so please choose to sow the whole potato as much as possible. If you want to cut potatoes, please disinfect the knife. When cutting into pieces, it is required to have 1~2 bud

eyes on each piece, and each piece should have the eye of tuber terminal bud, so as to ensure that the greatest benefit is to promote the germination and germination ability of the potato. In the long rest time of some potatoes, it is usually because the dormancy period is not over yet, and there is no germination phenomenon after sowing, and the emergence of sowing affects the later growth, so it is necessary to speed up the germination process and eliminate it during the germination process, which is beneficial to the whole seedling to bear fruit. The method of accelerating germination is to place seed potatoes and sand alternately in layers, with a thickness of about 3~4 layers, and accelerate germination at a temperature of about 20 °C. Pay attention to ensure that the sand layer is in a wet state [2]. Generally, seed potatoes can germinate in about 10 days, and when the buds grow 2 cm, they can be sown.

## **2. Selection and preparation of planting land**

In order to improve the yield and quality, the choice of planting land is also very important, and choosing suitable plots for potato growth is the guarantee of yield and quality. Potatoes should be located in a place with deep soil layer, loose geology, good drainage and flat terrain. Deep soil layer can ensure the nutrient absorption of potatoes, loose soil is conducive to the expansion of potatoes, and fertile soil is conducive to the growth and development of potatoes. Moreover, the plot for planting potato should not be continuous cropping plot, or the previous crop should not be solanaceae crop. Fine soil preparation is needed before planting, and potato tubers are formed and expanded in the soil. Therefore, it is required that the soil is loose and the organic matter content in the soil is high [3]. Therefore, deep tillage should be carried out, with a depth of about 25, and then sufficient base fertilizer should be applied. Base fertilizer is very important for potato growth, accounting for 60%~70% of the total fertilizer, and it should be mainly fully decomposed farmyard manure, combined with appropriate amount of chemical fertilizer and deep ploughing. After land preparation, it is required to rake the ground carefully, and then make furrow. The height and interval of furrow should be determined according to the actual situation.

## **3. Sowing at the right time**

Temperature is very important for potato growth. Therefore, in order to determine the best sowing time and timely sowing, the average monthly temperature of potato should be between 15 °C and 25 °C, which is suitable for the continuous growth of tuber. The longer the duration is, the higher the yield is. Therefore, many areas generally choose to sow in mid-April to early May and harvest in winter. Potato can be planted with plastic film to make potato market earlier. When sowing, we should pay attention to reasonably close planting, and reasonably determine the close planting degree according to varieties, soil fertility and other factors. If the density is too high, it will affect the expansion of potato blocks and reduce the yield per unit area [4]. If the planting density is too low, the land will not be fully utilized, which will also have a great impact on the yield per unit area. It is generally required that the number of plants per hectare is 75,000~90,000.

## **4. Field management**

In order to manage potato fields well and ensure that plants are full, plump and strong, it is necessary to do a good job in thinning seedlings, grouting and attaching plant materials. When farmers thin seedlings, the sick seedlings, weak seedlings and small seedlings will be pulled out. Then cultivate and weed in time to prevent soil hardening and weed, so as not to affect seedling growth. When the seedlings grow about 7cm, the first intervillage should be carried out in combination with the thinning seedlings, and the tillage depth should be about 10 cm. After half a month, the second intervillage should be carried out, at this time, shallow tillage should not exceed 10 cm, and the third interaction should be carried out in the bud to increase the soil thickness and high soil coverage of potato layer, which is beneficial to improve the yield and quality. Potatoes are in great demand for water and fertilizer, and most of them need fertilization at flowering stage. At present, soil should be kept moist, which is beneficial to tuber expansion. If soil moisture is found to be insufficient, watering should be done in time. However, in the later stage of potato growth, attention should be paid to controlling water. If the soil water content is large at this stage, it will lead to potato tuber disease. In case of rainy days, a large amount of drainage should be carried out. After sowing potatoes, the sowing time is longer which can be treated as early as possible to promote the germination and sowing of potato pieces. At this stage, livestock manure or a small amount of nitrogen fertilizer can be used to promote the increase of original parts and increase the accumulation of dry matter. In the initial stage, the top treatment is mainly potassium fertilizer and a small amount of nitrogen fertilizer and topdressing is usually not used in the later growth stage. However, if potatoes age prematurely, fertilizer must be applied to the leaves.

## **5. Diseases and pest control**

### **5.1. Fungal diseases**

Fungal diseases mainly include early blight, powdery mildew and late blight. Because of the adaptable early diseases, brown spots will appear in potatoes in the early prevention and control of diseases. To deal with this disease, Mn-Zn drugs can be used to control it. According to the actual situation, after diluting with the water solubility in potato leaves to a certain extent, the spraying frequency and time interval should be determined according to the actual situation. It can be carried out by deep soil, planting organic fertilizer, and properly controlling in the form of regional rotation and vermicelli disease. It is a disease mainly characterized by brown spots on potato skin, which can affect the quality of potatoes. It is possible to control crop rotation and ensure that drainage points are in good condition.

Finally, late-stage diseases are common potato diseases, which occur in the early flowering stage and mainly spread through the air, so potatoes are easily infected widely. Considering this disease, it is necessary to select varieties with high disease resistance and clean the planting site in real time to prevent pathogens.

## **5.2. Viral diseases**

This type of disease mainly includes leaf curl disease and mosaic disease. Among them, potato leaf curl disease has the greatest impact on potato planting. When infected, if it cannot be effectively controlled, it can make potatoes harvest. When the disease occurs, potato leaves will curl and harden, and with the passage of time, leaves will turn purple. For this disease, drug treatment is the most effective method, usually with foliar fertilizer Cuijie and other types of drugs. The main part of mosaic disease is potato leaves. After infection, potato leaves will gradually shrink and its yield will be weakened. There is no effective treatment for this disease. Therefore, it is necessary to pay attention to whether potato tubers are infected in the planting process. Once infection is found, it is necessary to clean up the diseased plants in time.

## **5.3. Bacterial diseases**

There are two common bacterial diseases in potato, namely bacterial wilt and soft rot. First, when potatoes are infected by bacterial wilt, their leaves gradually turn pale green, and the infected potatoes die quickly in a short time. In order to prevent this disease, we can strengthen crop rotation and continuous cropping, or spray streptomycin sulfate in reasonable proportion on potato surface. Soft rot usually occurs in the later stage of potato growth. Brown damage will appear on the surface of diseased plants, and the diseased areas will gradually solidify in dry environment. In order to resist this disease, it is necessary to be aware of the humidity in the potato planting area to ensure ventilation and light transmission in the plant area. At the same time, it can also be treated with drugs such as chlorothalonil and green milk copper emulsifiable concentrate.

## **5.4. Pest control**

Wireworms and aphids are common pests in potato planting. First of all, before and after the potato grows to a height of 10 cm, the cutworm larvae will gnaw at the young stem near the ground until it breaks. In view of this pest, weeds in plant areas should be cleaned in time to effectively remove eggs, and then killed and controlled by trapping lamps. When this pest occurs, the young stems of potatoes should be sprayed with 10% cypermethrin and 1500 times phoxim. On the other hand, aphids eat a lot of potato leaf juice, which makes the leaves curl. They consume too much nutrients and destroy photosynthesis. Aphids also spread virus diseases and prevent potatoes from growing normally. This pest occurs in the growing period and dry climate. In view of this pest, 2.5% bifenthrin emulsifiable concentrate or 25% pirimicarb wettable powder can be sprayed on potato leaves. In addition, yellow plates coated with oil can also be used to trap aphids.

## **6. Harvest in time**

When potato plants stop growing and most stems and leaves start to wither and turn yellow, this is the best harvest time. If it is used, it can be harvested in advance to avoid aging of bud roots or frostbite. Harvesting should be carried out on sunny days, watering should be stopped one week before harvesting, stems and leaves

should be removed 1–2 days before harvesting, and then harvesting should be done. In the process of harvesting, potato blocks should be avoided as much as possible, and exposure to the hot sun should be prevented. After the potato is harvested, it should be well ventilated, protected from sun and frost, and stored under light should be avoided.

## **7. Conclusions**

In summary, unit area, production and income are increased by using the cultivation techniques of high-yield potatoes, mastering the most key techniques, such as variety selection, close planting, timely seedling, grouting, and current topdressing.

**Conflict of interest:** The author declares no conflict of interest.

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