

Technical Bulletin #29:

# Knowing Your Crop: Pumpkin

## Introduction

This bulletin is intended to help Cambodia HARVEST clients follow the basic practices recommended by our technical team in order to reduce risk and increase yields in pumpkin production.

Pumpkins belong to the Cucurbit family (same as melons, watermelons, cucumber, gourds, and squash), which is a large and very strong plant with small or large fruit. The most popular one grown in Cambodia is round in size and a medium to dark green gourd-like squash. Pumpkin can be planted in all types of climates, because there are many varieties that can adapt to different weather conditions.



## Varieties

The variety selection will depend primarily on the desired market. If we want to sell fruit in the local market, and if we are more interested in selling leaves, seeds, or flowers, we should use a specific variety. However, if our main market is for Thailand or Vietnam, it is best to grow the variety that has the greatest market demand in those countries.

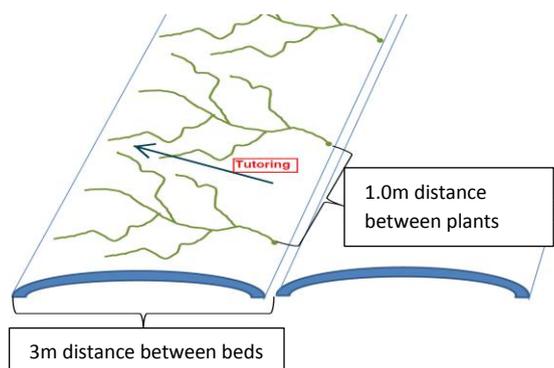
It is best to use certified seeds with a minimum of 85 percent germination and 95 percent purity, and the test date should not be older than one year. If you are not sure what variety to use, consult with your Cambodia HARVEST technician.

QTY	200	SEEDS	SUGAR	QUEEN
XPUR		98	LOT	3119581
XGERM		85	TEST	08/2013
BATCH	3122558	EYP		08/2013

## How to Grow

### Land preparation

Between 30 to 45 days before transplanting, plow the land 2-3 times thoroughly into a loose till to a depth of 25 to 30 cm. Next, create raised beds with a height of 20 to 30 cm; the distance between beds should be 3.0 m, and the tops of the beds should be 2.50 m wide (for the rotation crop we will have to divide this bed in two to our regular distance of 1.5 m wide).



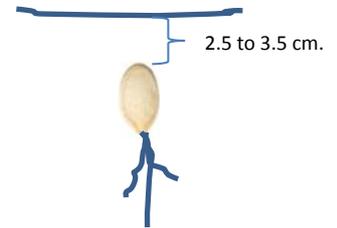
Once the beds are prepared, install the drip irrigation system and wet the beds in order to germinate the weeds and thus be able to control them before transplanting.

Because pumpkins have very deep root systems, we have to pay special attention to drainage. If during the rainy season the plot does not drain well, the plants will die from drowning or disease. Always create a place for drainage at the end of the lower part of the plot to remove excess water.

## Sowing - Plant distance

Pumpkin is direct-seeded. If the seeds we are going to use are inexpensive, we can place two seeds per hole. But if the seeds are expensive, we place only one per hole and sow about 5 percent of the required amount in seed trays to replace any seeds that do not germinate in the first week (the seedlings in the trays have to be sown one week earlier).

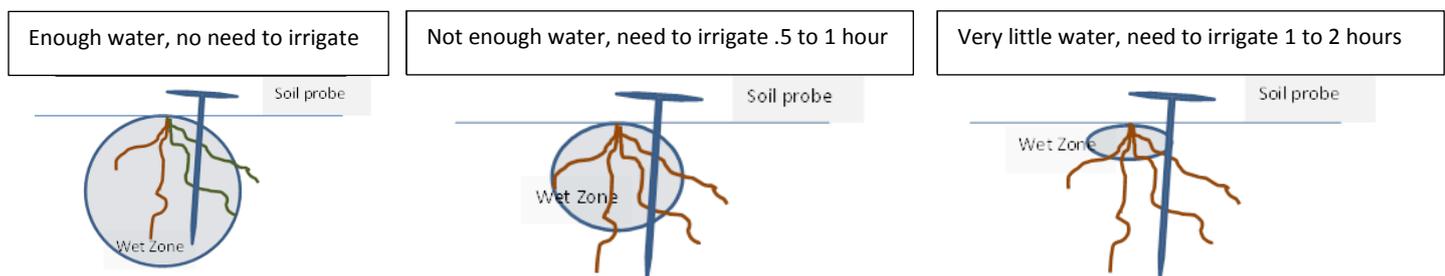
The recommended density is between 3,000 to 4,000 plants per hectare, with 3.0 m beds width and spacing between plants of 1.0 m which will result in a total density of 3,333 plants per hectare. Seeds must be placed at one edge of the bed, and during growth we should train the plants to grow towards the opposite side of the bed.



Seeds must be buried 2.5 to 3.5 cm deep. Be sure to put the pointed tip of the seed down, which will help the plants to grow faster.

## Irrigation

Pumpkins are very drought-resistant plants, but like all plants, they need a minimum amount of water per day. Because we will be using drip irrigation, we should apply the needed amount of water every day. The amount of water varies with weather conditions, soil type, and stage of plant growth. The best way to define how much water we need is by sampling the soil with a soil probe to see how many hours we need to water per day to keep the root zone constantly wet (though not in excess because roots need to breathe). To define the irrigation program, please contact your Cambodia HARVEST technician.



## Cultural Practices

Because plant density is low, be sure you have the correct amount of plants in your plot area. Once the plants are well settled, they will start growing very fast. At that moment, we should start training them to grow from one side of the bed towards the opposite side. Between weeks three and seven, when plant growth is very fast, is the optimum time to train the plant vines to remain on the opposite side of the bed. Training should be done at least twice per week. If we wait too long, the vines become too woody and if we try to move them, they can easily be damaged. In some cases when vines grow too much we can prune some of the lateral ones, especially if they are entangling with the ones from their neighboring plants.

We can prune misshapen fruit (usually fruit with pollination problems or pest damage), and we can also prune some old or sick leaves if they are in danger of damaging other fruits or the whole plant.

## Pollination

Like all cucurbits, pumpkins have separate male and female flowers, and pollen does not move easily by the wind, thus bees are the best method of pollination.

Pumpkin flowers are viable for pollination only one day and usually open only in the morning, which is why we have to be sure bees are visiting our field. On extremely hot or rainy days, bees do not go outside the beehive, so all female flowers that open that day are not going to be pollinated and we miss all fruits that were supposed to be set that day. In that case, we can manually pollinate our female flowers by hand. To do so, we have to go to the field at 7 a.m., collect all male flowers we can, take the petals out, and then take one flower and rub the anthers (where the pollen is) to the pistils of the female flower. This will result in a pollinated flower and a well-shaped and normal fruit.

## Pest and Disease Management

Successful disease and pest management involves good cultural practices such as selection of resistant cultivars, proper site selection with good drainage, crop rotation, plots free from weeds, and good irrigation and nutritional programs. If we consider all these activities and understand the effect they may have on our crop, the amount of pesticides we will need to use in our crop will be very low, giving us a better return on our investment. But more importantly, it will reduce considerably the negative impact that agriculture sometimes has on the environment by applying excessive pesticides.

There are some basic concepts we have to learn about pest and disease management:

- Fungal and bacterial diseases are more common during the rainy season.
- Pests like aphids, white flies, mites, and thrips are more common during the dry season.

In any case, we have to scout our plots every day to find anything that looks different. In this case, we have to search in more detail and see if we can find pests or see any symptoms of disease. If you are not sure, put a stake to mark the site, and when the technician visits your farm, ask him or her to check that spot.

### 1. Common Diseases can be grouped according to the pathogen:

a. Fungal disease. This type of disease can be prevented if we use resistant varieties. Also, in the very early stages, we can prune and take out of the field the infected leaves. Finally, there are different fungicides that we can use if the disease cannot be controlled otherwise.



i. Downy mildew. Symptoms are in the leaves. Infected leaves first appear mottled, and then yellow angular spots develop on the upper leaf surface. In late stages, you can see on the underside of the leaf a fungal growth, which most of the time is white but can also be gray.

ii. Powdery mildew. This disease is most common during the dry season. Spots are also yellow, but not angular, and on the underside of the leaf we will see in later stages of the disease a white or gray powder.



There are other fungal diseases such as fusarium wilt and phytophthora blight, which can affect not only leaves but also stems and fruits.



b. Viral disease. In most cases, this type of disease is transmitted by vectors (aphids, white fly, thrips, and mites). Once a plant is infected, we cannot cure it, and all new growth including leaves and fruit will show the symptoms, which are usually colored spots and deformations.

2. **Pests** are usually insects, but there are also some from the arachnid group and even some animals like rats or rabbits. In this bulletin, we will describe only the most important ones according to the type of damage they do.

a. Plant eaters. They can eat roots, leaves, stems, flowers, and fruits. The most common ones are caterpillars, but also a lot of beetles such as white grubs. Generally, if you keep your plot and the surrounding area clear of weeds, you will not have major attacks of this type of insect. And if you scout your field every day, you can kill them by hand. If the problem and the amount of pests are too large, then you will have to apply an insecticide.



Striped cucumber beetles are insects with mouths that allow them to chew. They do a lot of damage to young pumpkin plants, and during their life cycle as larvae, they live in the soil and also damage the roots.

b. Sap suckers are aphids, white flies, thrips, and mites. If they exist in large amounts, they can damage the plant due to the high volume of sap they suck. The most important damage they can cause is virus transmission. In Cambodia, all of these pests are present, but the level of virus-infected plants is relatively low. However, in the future, with more horticulture production, these levels can become considerably high.



c. Nematodes. These are very small worms that eat roots and live in the soil (especially sandy soils) that you cannot see with the naked eye. They cause the most destruction by limiting the amount of water and nutrients that are available to the plant. We do not have any available chemicals to kill nematodes, therefore with sandy soils we have to be careful not to plant crops susceptible to this pest, such as eggplant.



## Post-Harvest

Pumpkins should be ready for harvest between 90 to 100 days after sowing, when the skin has toughened and the fruit has a dull color (when immature they are shiny). You can collect them and leave them under shade for about five to 10 days to cure them (be sure to avoid rain), which helps the fruit last longer.

## Nutritional Value

Pumpkin is an exceptionally nutrition-rich food. It is one of the best sources of vitamin A - a single serving of boiled pumpkin provides 100 percent of a person's daily requirement. This is important in Cambodia, because night blindness, which affects many people, can be prevented by eating a diet rich in vitamin A. Pumpkins are also packed with other key vitamins, minerals, and dietary fiber. All parts of the plant contribute to a healthy, low-calorie diet. Cooking freshly picked young pumpkin leaves and flowers will help meet daily requirements for vitamins C and E, calcium, potassium, and dietary fiber. Even pumpkin seeds are a nutrition-rich food, especially when eaten raw.

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