**3-Pepper**

**Family: Solanaceae**

**Sweet pepper** (***Capsicum annumm* L.*)***

 **-Hot pepper** (***Capsicum frutescens* L*.)***

**Botanical description:-**

**-Roots**: - Pepper plants have a shallow root system. There are usually a few major lateral roots that can penetrate the soil to a depth of 60 cm.

**-Stem: -** Erect and the shoots are compact in most varieties, the main stem divided into many branches which become woodened with the progress in growth.

**Leaves: -** The leaves are oblong, pointed at the tip and arranged alternately. In hot varieties the leaves are smaller and thinner.

**-Flowers: -** Single, complete white-colored or in clusters of two or more. The stigma of the flower grows longer than the stamens therefor the cross-pollination by insects is important in most varieties, the rate of cross pollination is ranging between 6-68%.

**-Fruits and seeds: -** The fruit is a pendant or erect fleshy berry. The seeds are cumulated on the placenta at the base of the fruit and they are yellow in color and larger than tomato seeds.

**Reproduction method:**

Pepper is reproducted by seeds. Each donum needs about 200 gm seeds when the transplants are produced in beds and it needs 40-50 gm. when the trans- plants produced in disc or cups.

**Planting methoods:**

The land is ploughed well then analyzed animal manure with the rate of 10 cm³ per donum must be added. Land is divided into rows the distance between them is about 80cm.The transplants are planted as water is on one side of the rows. In case of planting in both sides of the rows the distance between the rows must be 120 cm and between the plants must be about 30 cm. Pepper needs intensive care in irrigation especially in the flowering and fruit setting stages,

**Pepper varieties:**

**1-California Wonder:** Erect, strong vegetative growth with big, sweet, cubic fruits which are dark green and turn to red when ripped.

**2-Anaheim chilli:** Strong ,branched plants with cylindrical deep green fruits before ripening and red after ripening, moderate hot fruits using for drying .

**3-Tabasco:** Small, hot, cone-like fruits with pale green color turning to red when it ripped.

**Disease and insect pestes:**

**Disease:**

**1- Bacterial spot. .**

**2-Tomato spotted wilt virus (TSWV)**

**3-Cucumber mosaic virus (CMV)**

**Insect pests:**

**Aphids-**

**Mites-**

**Thrips-**

**Leaf hoppers-**

**Leguminosae (Fabaceae Family(**

**1- Common bean**: *(****Phaseolus vulgaris****)*

**Family**: **Leguminosae, Fabaceae**

**Botanical description:** Common bean is an annual, herbaceous plant consist of the following parts:

**1-Roots:** fibrous root system reach to about 90 cm depth and it extended laterally to about 75 cm from the plant base

**2 -Stem:** Herbaceous stems have both bush and running forms. The bush varieties, which grow in erect leafy clumps reach 1 m tall, while running varieties forms vines 2-3m long.

**3-Leaves:** All varieties bear alternate, green or purple [leaves](http://en.wikipedia.org/wiki/Leaf), which are divided into three oval, smooth-edged leaflets, each 6–15cm long and 3–11cm wide covered with downy hair. The leaves shape and size differ according to the variety.

**4-Flowers:** The flowers, which may be white, yellow, violet, or red, in loose, open unbranched clusters (racemes) that are shorter than the leaves, and develop into linear round to slightly flattened pods up to 15 cm long and 1–1.5 cm wide.

**Common bean varieties**: Beans varieties can be divided according to the plant height, using part, pods color and seeds shape into many varieties such as:

1-**Monte calme**: Short variety used for their pale green pods. The dry seeds are white with deep red color spots in placenta zone.

2-**Contender**: Short plants with long green pods, their dry seeds are white and mixed with brown color.

3-**Lima Bean**: Large, dry, white beans with a buttery flavor and starchy texture.

4-**Kidney**: A large, kidney-shaped bean with a subtle sweet flavor and soft texture that keep their shape during cooking

 **Reproductive method:** Beans are directly planted by seeds. The quantity of seeds differs according to the varieties, planting method and seed size. Every donum requires about (15) kg of seeds.

**Planting method:** The soil is twice plowed and divided into rows the distance between them is about 80cm .the seeds are sowed in holes spaced from each other by 20cm.Put two seeds in each hole then it will be thinned into one plant the depth of planting is about 2-6cm. Watering is necessary immediately after sowing. Subsequent irrigations are given at 5-10 day intervals. In areas with warm and dry periods, it is recommendable to irrigate the beans during and after the flowering.

**Harvesting:** times depend on the use of the crop. For snap beans consumed as a vegetable, harvest begins two to four weeks after flowering (seven to eight weeks after sowing). For dry beans, harvest occurs when the pods have turned yellow and the seeds have matured. Seed filling takes from three to seven weeks. Although seed maturity occurs when the moisture content is approximately 50%, harvesting does not typically occur until the seeds dry down to 15-16%.Significant losses can occur post-harvest if plants are left to dry excessively before moving them to the threshing area, because seed pods may open spontaneously and drop seeds on the ground. Plants may be hand harvested and threshed in the case of smallholder farms, or in the case of commercial production, the harvest and threshing processes may be mechanized

**Quantity of yield:**

1-2 ton/donum of green pods

300 kg/donum for dry seeds

**2- Cow pea** (*Vigna unguiculata****)***

  *(Vigna sinensis)*

 **Botanical description:**

Cow pea is an annual herbaceous plant consist of the following parts:

**Root:** Cowpea plant has a fibrous and very branched roots, the lateral roots extended to about (30-60) cm from the plant base. The highest density of the roots found at the depth of (15) cm from the soil surface.

**Stem:** Stem may be short and bushy, or tall and vine-like depending on the variety. Upright stems are hollow and hairless. The twining stems are thinner than the bushy stems.

 **Leaves**: Leaves are three-parted, egg-shaped, and hairless. The two lateral leaves are asymmetrical, and the pedicel of the terminal leaf is longer than the pedicel of the lateral leaves.

 **Flowers:** The branchless inflorescence produces flowers about (2.5 cm) long, along the main axis. The flowers can be purple or white.

**Pods:** Long, slender, round pods about (8-15cm) long, contain about (6-13) small seeds. The kidney-shaped seeds are white with or with not black mark around the scar. The shape, size and the color of the seeds differ according to the varieties.

**Cow pea varieties**: Cowpeas have been grouped into the following market classes based on seed type and color:

**1-Crowder:** Seeds are closely crowded in the pods and tend to be globular in shape with different color.

**2-Cream:** Seeds of these types are generally cream colored and have no noticeable "eye".

**3-Clay:** These are generally older varieties that are medium to dark brown in color and kidney shaped. They are no longer commonly grown.

**4-White acre:** The peas are kidney shaped with a blunt end. This type is a semi-Crowder, generally tan in color and somewhat small. Pods are quite stiff.

**Reproductive method:** Cowpea is sexually propagated by seeds which are directly sowed in the field on depth of 3-5 cm. Every donum required about 10-15 kg of seed depending on the used variety and planting distance.

**Planting method:** The soil is plowed twice, then divided into rows the distance between them is about 75 cm .Every hill will receive( 2-3) seeds and the distance between them is about( 20-25) cm, then the field is irrigated directly .Cow pea must be irrigated every (4-5) days in summer season. The harvesting begins after (2-2.5) months from planting for the green pods. While in dry yield the pods are harvested when it dries. The plants are harvested and left in a sunny place to complete the dryness.

**The quantity of yield**:

1- green pods yield reach to about 1-2 ton/donum ,

2- The yield of dry seeds reach to about 300-400 kg/donum.

**Disease and insect pests**: Beans and cowpea may be affected by many disease such us:

1- Fusarium wilt 2- bacterial canker, 3-southern stem blight

4-cowpea mosaic virus, 5- rust, 6- powdery mildew

**Insects:** damage will most often occur during the seedling stage and may be caused by: red spider, white fly, aphids and worms.