

# Hand-Pollinate Your Cucurbits!

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**Above:** Pollination is required for cucurbit fruits such as the cucumber to form properly. A deformed fruit produced as a result of incomplete pollination (**left**), compared to a normal-looking fruit (**right**).

Plants belonging to the Cucurbitaceae family include common fruit vegetables such as the cucumber, pumpkin, winter melon, bitter gourd and bottle gourd, as well as, dessert fruits such as the watermelon and honeydew.

Cucurbit plants produce male and female flowers. Female flowers need to be pollinated so that fruits will form. Pollination involves the transfer of pollen from the stamens of a male flower to the stigma of a female flower. Pollination brings about the fertilization of the ovules found inside the ovary of female flowers.

It is difficult to ascertain whether female flowers are pollinated successfully and the only way is to watch the fruit developmental process. The ovaries of poorly pollinated female flowers may swell initially to give a young fruit but they turn yellow subsequently and are aborted eventually. There are occasions that poorly pollinated flowers continue to develop into deformed-looking fruits.

In outdoor gardens where pesticides are used, poor fruit set by cucurbit crops may occur due to the reduction or absence of natural pollinator populations. Beneficial insects such as bees are attracted to the bright yellow flowers of cucurbits. The apartment gardener may also encounter similar problems due to natural pollinators because of the high-rise environment. In both cases, the hobbyist gardener growing a few vines can resort to hand pollination to ensure fruit production.

## Getting to know Cucurbit Flowers

Flowers of the cucurbits we grow in our vegetable gardens are five-petaled and mostly yellow or white. The flowers of both sexes can be differentiated easily. Female flowers, also called pistillate flowers, have an obvious bulge located just behind their petals, called the ovary, which looks like a miniature version of the cucurbit fruit. This structure is absent in male (staminate) flowers.



**Above:** Yellow flowers of the smooth luffa (*Luffa aegyptiaca*). Notice the ovary behind the petals of the female flower (**left**) and its absence in the male flower (**right**).



**Above:** White flowers of the bottlegourd (*Lagenaria siceraria*), another common cucurbit. The female flower is shown on the **left** while the males are on the **right**.

When plants mature and start to produce flowers, male flowers are always produced first and usually in abundance. The appearance of female flowers soon follows. Opened cucurbit flowers last only for one day and pollination can only take place when both the male and female flowers are open on the same day.

## How to hand-pollinate your Cucurbit Flowers

(Using pumpkin (*Curcubita moschata*) flowers as an example)



### Step 1:

Detach a fully opened male flower from the vine.

**Step 2:**

Remove the petals of the male flower to reveal the stamens.



**Step 3:**

Look for a fully opened female flower. Identify it via the presence of a swollen ovary located just behind the petals.

**Step 4:**

Transfer pollen from the male flower onto the female flower by brushing for several times the stamens of the male flower against the entire stigma of the female flower.

Check that there is a thin layer of pollen coating the stigma of the female flower.





**Above:** After a day, the female flower of the curcubit fades away (**left**). It is difficult to tell whether it has been pollinated. All one can do is to wait and if the ovary starts to swell and continues with its development, then pollination is successful (**right**).

## Some more tips...

- The best time to perform hand-pollination is on a fine, sunny day. This is because pollen on the stamens found in a male flower will transfer more easily onto the stigma of a female flower. Avoid watering directly into the flowers of your cucurbits. Flowers that are wet are difficult to pollinate properly as the transfer of pollen becomes trickier. Rainy weather renders hand-pollination difficult for the same reason.
- Note that a single male flower has enough pollen that it can be used to pollinate 2 to 3 female flowers. After pollinating a female flower, check the amount of pollen that is left on the stamens of a male flower. When the stamens look bare, it is time to pick a fresh male flower to start all over again.
- Interestingly, in the breeding of squashes, male flower buds that are mature and due to open the following day are picked and stored in an environment with low temperature and high humidity for several days. This can be achieved by storing male flower buds inside a sealed plastic bag and kept in the chiller compartment of a refrigerator.

Male flower buds harvested and stored this way can be taken out and used to pollinate female flowers that appear over the next few days. This is exceptionally useful on days in the vegetable garden where there are female but no male flowers in bloom.

You may want to try this on other curcubit flowers and do let us know if it works!

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## Reference

Robinson R.W. & Decker-Walters D.S. 1997. Crop Production Science in Horticulture 6 – Cucurbits. CAB International. New York.

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