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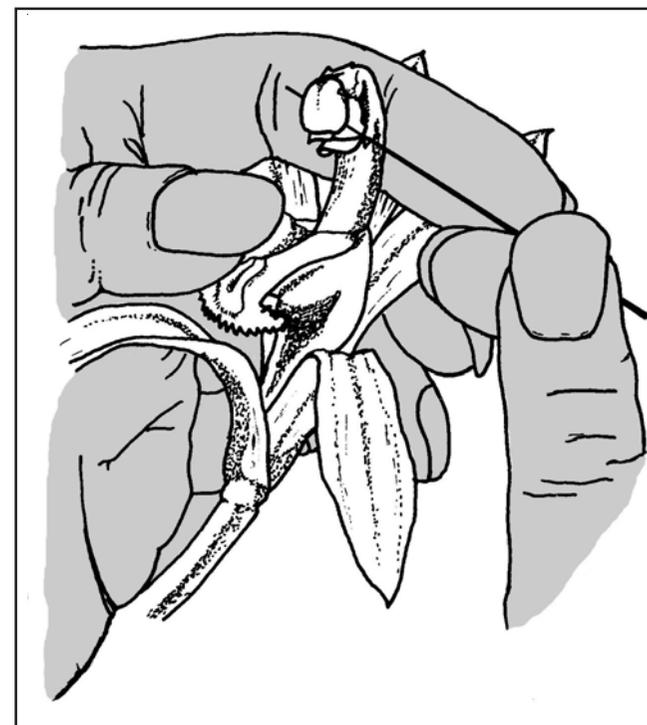
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National Agricultural Research Institute

Vanilla Pollination



**NARI TOKTOK
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THE INSTITUTE

The National Agricultural Research Institute (NARI) was established by an Act of the National Parliament of Papua New Guinea in July 1996 as a publicly funded, statutory research organisation, to conduct applied and development oriented research on food crops, alternative food and cash crops, livestock and resource management issues. Besides applied and adaptive research, NARI is responsible for providing authoritative technical, analytical and diagnostic services and up-to-date information to the entire agriculture sector in PNG. The major targets are the smallholder semi-commercial farmers in the country.

The mission of NARI is to contribute, through applied research and technical services, to the development of the agriculture sector and realisation of the national goals by identifying, adapting and transferring agricultural technologies and information, so as to:

- Enhance the productivity, efficiency and sustainability of the smallholder agriculture, and
- Improve farmer income, food security and welfare of Papua New Guineans and the nation.

This toktok was written by Gadi Ling, NARI Wet Lowlands Islands Programme in June 2003. The material presented is based on the best information available at the time of printing (November 2003).

In addition, remove any weak, bent, damaged or small beans within four to eight weeks after pollination and pollinate the respective number of new flowers (if still available) to meet the desired number of beans.

Another option is to pollinate 12 flowers per bunch and remove the two less desired ones after four weeks.

A skilled worker can pollinate up to 1,500 flowers per day.

If looked after properly, vanilla plants will produce an income for more than 10 years. Do not weaken your vanilla plants by pollinating too many flowers. If you do you will only get small beans of low quality, the vine will be susceptible to diseases and you will not get many beans in the following harvest.

How many vanilla flowers should be pollinated?

The number of flowers to be pollinated per bunch will depend on the size and health of the plant and the number of flower bunches on each vine. Not more than ten flowers on each bunch should be pollinated otherwise the plant will be weakened too much. A guide to the overall number of bunches pollinated per plant is as follows:

- **Very big and healthy plant** with 20 looped vines and thick stems, long internodes and a dark green colour: pollinate 10 flowers per bunch and keep to a maximum of 12 bunches (120 flowers per plant)
- **Healthy big plant** with 16 to 20 looped vines: pollinate 10 flowers per bunch and keep to a maximum of 10 bunches (100 flowers per plant)
- **Weak or small plant:** pollinate between 30 and 60 flowers in total
- **Very weak plant:** do not pollinate at all

Pollination of Vanilla

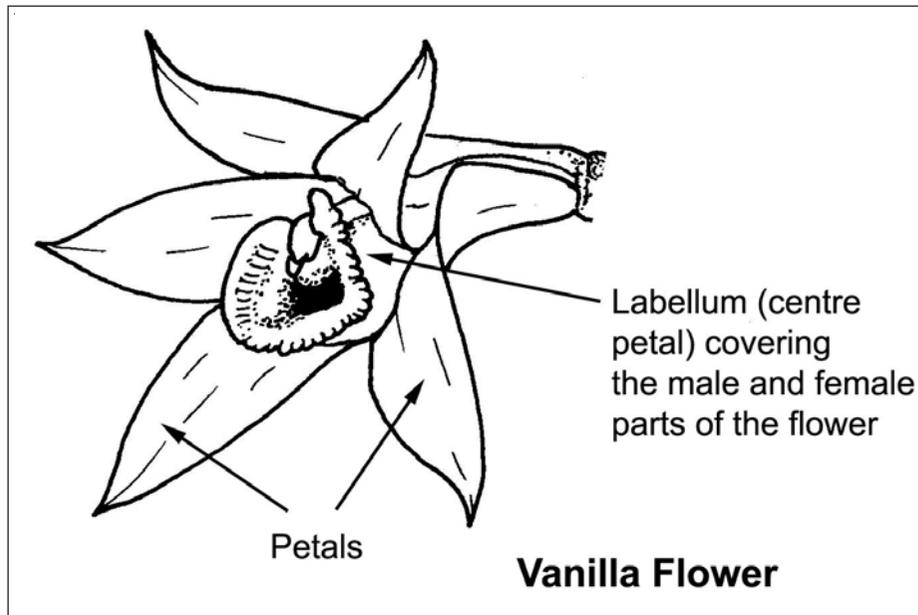
Pollination is the process where the male powder ('pollen') from the male part ('anther') of a flower is put on the female part ('stigma') of a flower so that fruit and seeds will develop. In Vanilla the pollen from the male part of one flower can be put on to the female part of the same flower and fruits (vanilla beans) will develop.

Why does Vanilla have to be hand-pollinated?

Hand pollination of vanilla flowers is essential to produce vanilla beans. The male and female parts of the vanilla flower are separated inside the flower making pollination difficult and natural pollination rare. Even if natural pollinators were present, only very few flowers would be pollinated. Therefore, hand pollination of vanilla is always required.

How are Vanilla flowers structured?

To master the steps of pollination described in this toktok, it is essential to understand the structure of a vanilla flower. The following drawings explain the position of the male and female parts of a vanilla flower.



The labellum needs to be pulled back to expose the male and female parts of the vanilla flower as shown on the opposite page.

When should vanilla flowers be pollinated?

Each vanilla flower opens in the morning and closes about eight hours later in the afternoon and will not open again. In order to achieve a high success rate of pollination, it is strongly recommended to pollinate between dawn and mid morning as the female part (stigma) is less likely to accept pollen in the afternoon.

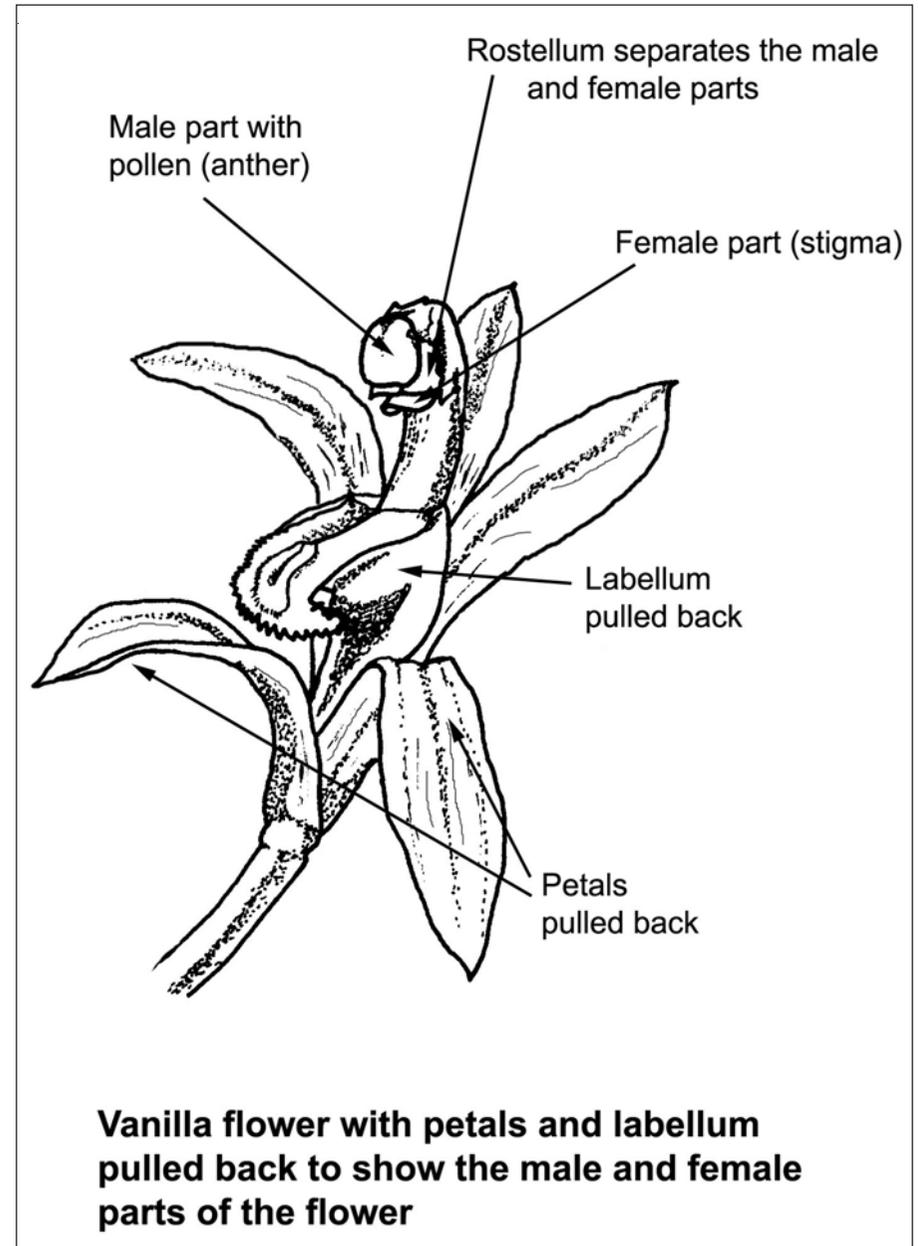
Which vanilla flowers should be pollinated?

Flowering of a vanilla plant starts at the base of the bunch (closest to the stem) with the entire flowering period of the bunch lasting about 24 days. It is best to pollinate the flowers at the base of the flower bunch **first** as those will produce the biggest beans.

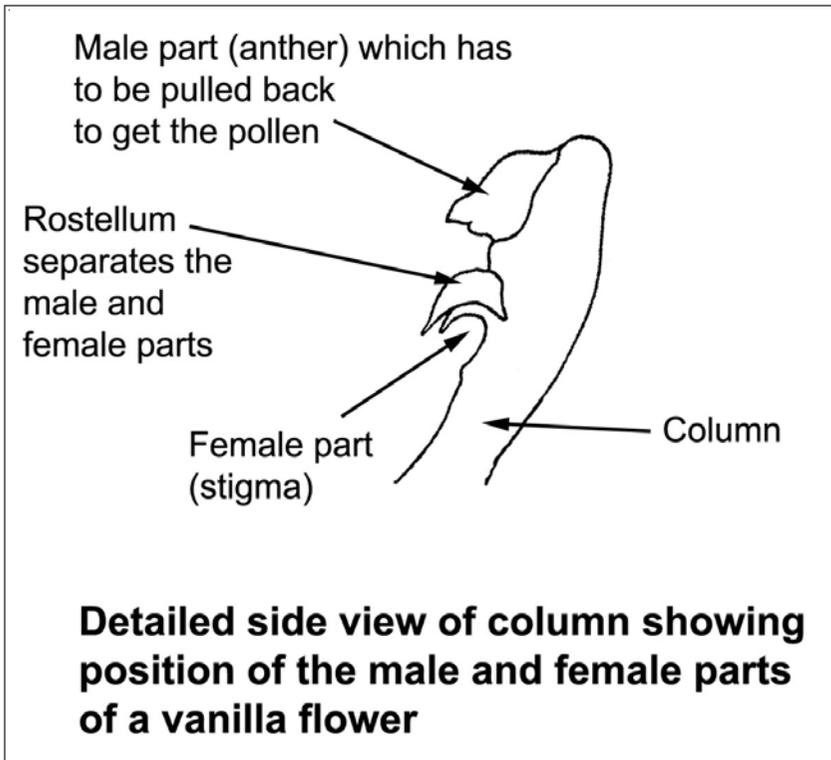
Only the flowers on the **lower side of the bunch** (growing towards the ground) should be pollinated. These flowers will produce straight beans. Those on the upper side usually produce bent or hooked beans of inferior quality.

If a vanilla flower is not pollinated, it will fall off within a day. If the pollination is successful, the flower will remain attached and slowly dry up as the vanilla bean develops. Some successfully pollinated flowers may drop off within a week of pollination. If this happens, more flowers need to be pollinated to give the desired numbers of beans per bunch (usually 10 to 12).

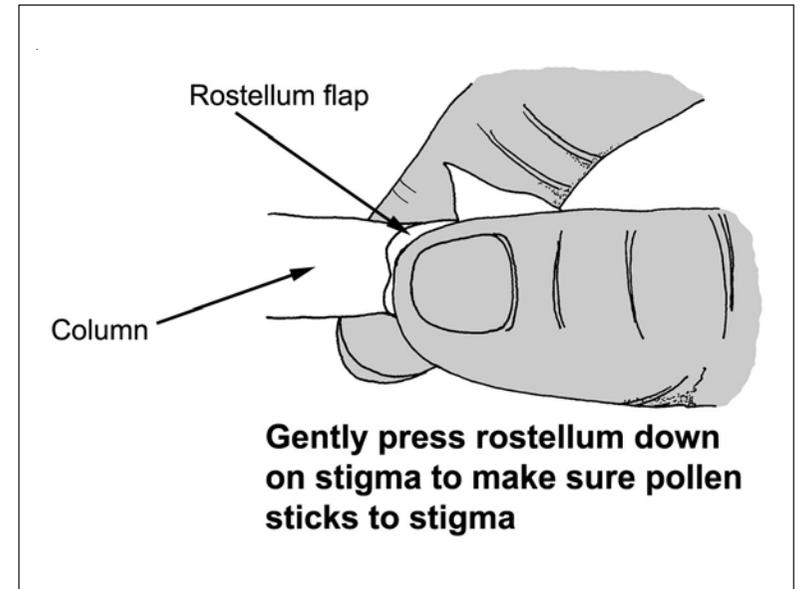
The number of vanilla beans produced depends on how successful pollination has been. Therefore, it is very important to learn the correct method of hand pollination.



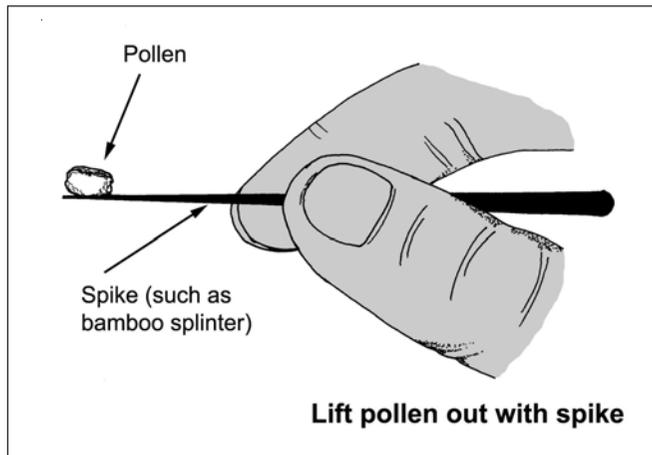
The objective of hand pollination is to get the male pollen from the anther on to the female part of the flower (stigma). The drawing below shows a detailed side view of the male and female parts of a vanilla flower.



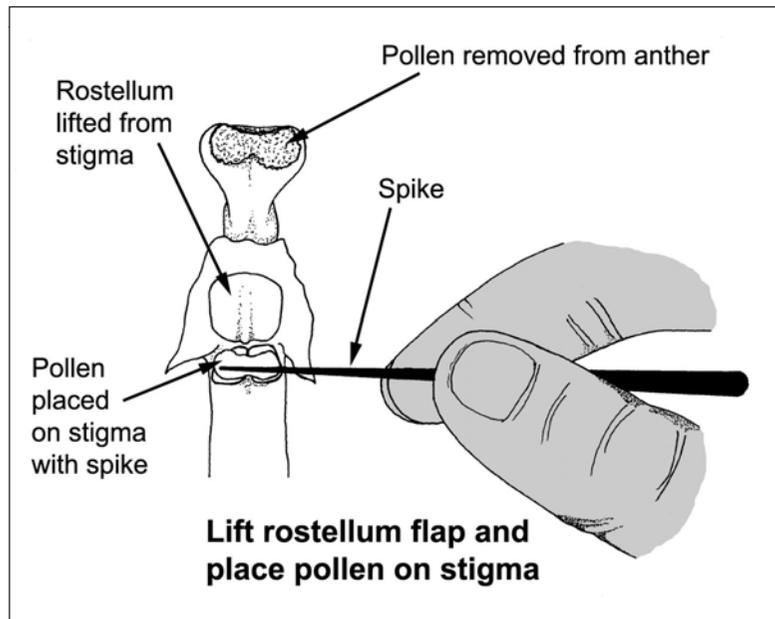
The thin flap-like part of the flower between the stamen and the stigma ('rostellum') is then pushed up under the stamen with the splinter and the pollen is put on the sticky stigma. Gently press the rostellum down on the stigma with the thumb and finger to make sure the pollen sticks to the stigma. When the pollen mass sticks to the stigma, pollination is completed.



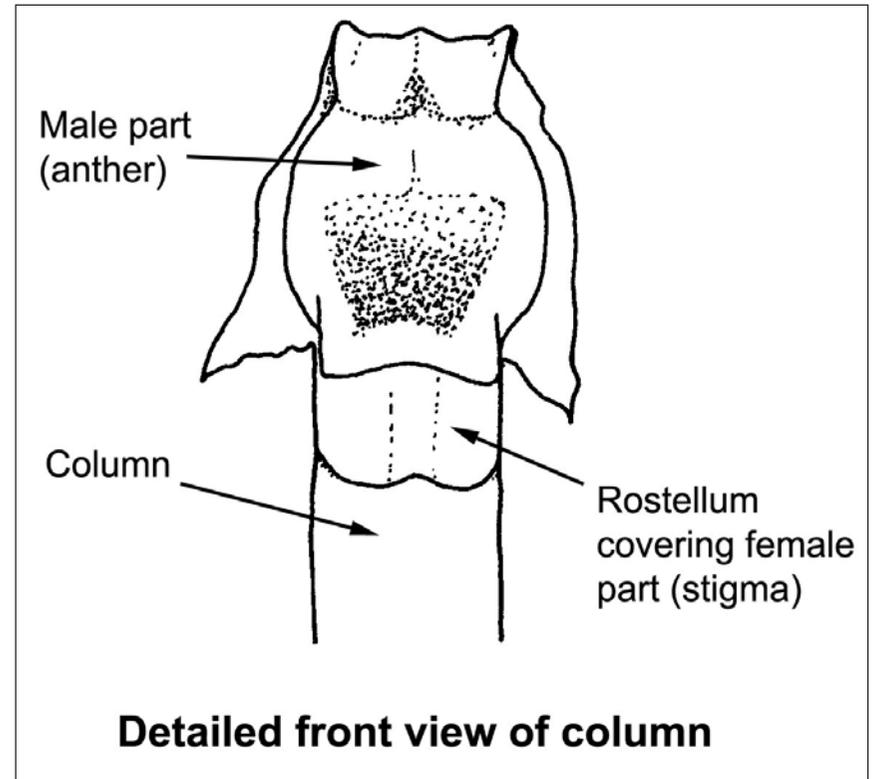
The pollen is then lifted out with the spike:



The pollen needs to be placed on the stigma:

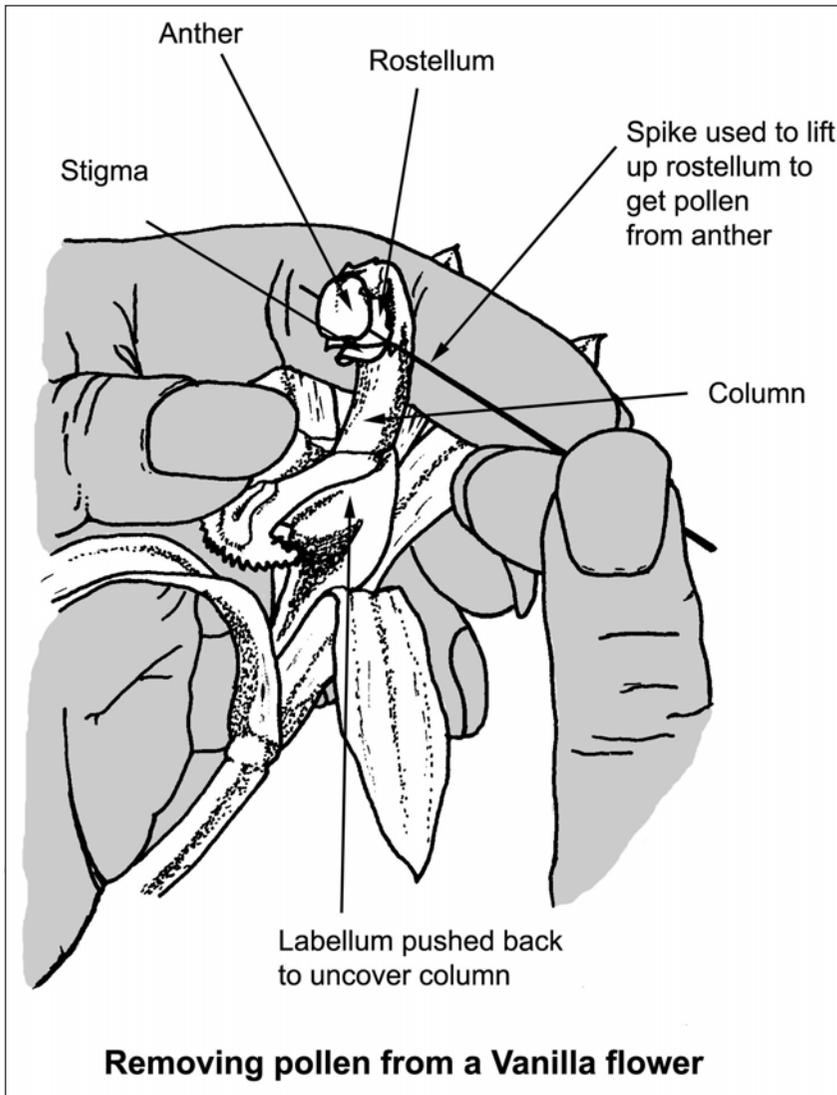


The detailed front view of the column below shows how the rostellum covers the stigma.



How is Vanilla pollinated?

The flower is held with the thumb and index finger of one hand.



The big petal in the centre of the flower (called 'labellum') is pushed down with the thumb revealing the column. The pollination is done with the other hand using a splinter of bamboo or other material about the size of a sharpened match stick.

The cover on the pollen is removed with the spike of the splinter exposing the pollen as shown in the drawing below.

