

Artificial pollination of sugar apple and atemoya

THE SUGAR APPLE (*Annona squamosa*) originated in tropical America, and is now widely grown in tropical and subtropical areas. The atemoya is a hybrid of *A. cherimola* (the cherimoya) and *A. squamosa*. Both crops need warm, protected, frost-free sites, but the sugar apple is better suited than the atemoya to cooler places.

Pollination problems

The flowers of both the sugar apple and the atemoya have special features which make it necessary for growers to pollinate the flowers by hand. Although a single flower will have both male and female structures, they will mature at different times (“dichogamy”). The female-stage flowers mature first, just before petal separation. A few days later, the flower progresses into the male stage of flowering, when the anthers begin to shed their pollen.

Insect pollination of flowers is rare. Incomplete pollination may result in abnormal fruit, low fruit set and low yields. Poor pollination is perhaps the main problem in producing these two fruits.

Artificial pollination technique

The development of the flower petals can be classified into five stages (Fig. 1). When the flower is at the pollination stage (staminate flower stage), growers use a fine brush to collect pollen. At the open petal stage (pistilate flower stage), they remove 1-2 petals from a flower and carry out artificial pollination, using the pollen from another flower (heteroflower pollination) (Fig. 2).

Using this method, both sugar apple and atemoya increase their fruit-bearing percentage, sugar apple by 83% and the atemoya by an average of 90% (see Table 1). Furthermore, the fruit from hand-pollinated flowers are uniformly round and regular (Fig. 3 and Fig. 4). The best pollination time for sugar apple is in the morning (5 - 8 AM). For atemoya, the best time for pollination is in the evening (4 - 8 PM).

The brush used for pollination should be soft and fine, as a coarse, hard brush may reduce fruit set. Those fruit which do appear may have a poor appearance and quality, as a result of damage to the stigma.

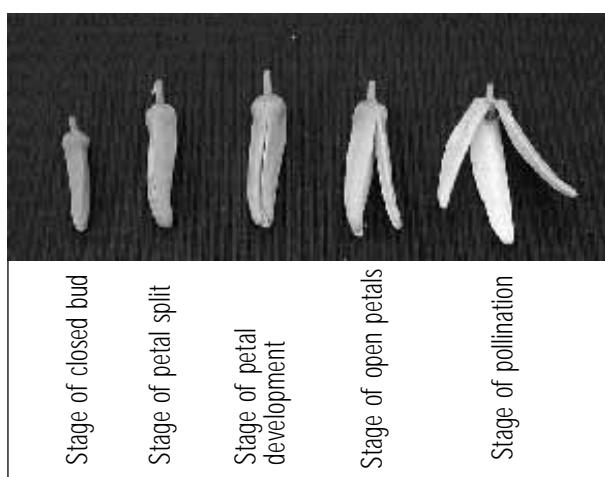


Fig. 1. Stages of petal development



Fig. 2. Artificial pollination

Food and Fertilizer Technology Center (FFTC)
14 Wenchow St., Taipei, Taiwan ROC
Tel.: (886 2) 2362 6239 Fax: (886 2) 2362 0478
E-mail: fftc@agnet.org Website: www.ffc.agnet.org
FFTC: An international information center for
small-scale farmers in Asia

Cooperating agency for this topic:

Taitung District Agricultural Improvement Station
Taitung, Taiwan ROC
Tel.: (886 4) 2330 2301 Ext. 654
Fax: (886 4) 2333 8162
E-mail: lightyeh@wufeng.tari.gov.tw

Advantages of artificial pollination

Artificial heteroflower pollination of sugar apple and atemoya results in complete pollination of the stigma of the pistal. There is higher fruit set and larger fruit,

which have a round, regular shape. Yields are higher, more stable from one year to the next, and fetch a higher market price.

Fig. 3. Fruit of sugar apple produced by artificial heteroflower pollination.



Fig. 4. Fruit of atemoya produced by artificial heteroflower pollination

Table 1. Fruit set investigated after various pollination treatments for sugar apple and atemoya

Treatment		No. flowers investigated ¹	Fruiting status		Premature fruit-drop %
			No. setting fruit ²	%	
Artificial pollination	Sugar apple	120	98	81.7	-
	Atemoya	120	108	90.0	-
2.4.5TP ³	Sugar apple	120	111	92.5	100
	Atemoya	120	116	96.7	100
Control	Sugar apple	120	8	6.7	-
	Atemoya	120	18	15.0	-

1 The flowers investigated were on the short shoots from which leaves had been removed during summer pruning.

2 Fruit set was investigated seven days after the pollination treatment.

3 2.4.5TP = Plant growth regulator (250 ppm).