

### On the Pollen of *Carica Papaya*.

The following notes on the flowers of the Papaya (*Carica papaya*) are compiled from the observations of some plants grown in the Economic Gardens, Singapore.

An examination of the pollen of different types of flowers showed a considerable difference in the germination of the pollen grains but unfortunately, owing to thefts of fruit the ultimate results of the work could not be observed.

Pollen from four different types of flowers was examined.

1. Flowers with ten stamens from dioecious plants.
2. Flowers with ten stamens from plants bearing both male and hermaphrodite flowers.
3. Flowers with five stamens from hermaphrodite plants.
4. Flowers with ten stamens from hermaphrodite plants.

Flowers with the number of stamens varying between five and ten were omitted.

In all cases the pollen grains appeared to be identical. When dry the germ spore is not visible but when the grain has been soaked in water it swells up, becomes turgid, and the germ spore can be distinctly seen.

To ascertain if there was any difference in the time taken for the pollen from the four different types of flowers to germinate, pollen grains were cultivated in a sucrose gelatine medium in a hanging drop culture.

In the first experiment pollen from the first and second types of flowers mentioned above behaved practically the same, all the grains germinating and growing well. Similarly the pollen from the third and fourth types of flowers behaved almost identically but they both germinated several hours later than those of the first two types.

A second experiment was conducted using pollen from the first two types of flowers only, when it was found that pollen of the first type germinated half an hour before that of the second type.

The deductions to be drawn from these records so far as they effect pollination are not at present quite evident, and require further observations to be carried out.

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### Some Trials of Food-plants in the Economic Gardens, Singapore.

#### Ragi ("Eleusine Coracana")

In the *Singapore Free Press* of 23rd October, will be found a short account of this plot, of the method of cultivation followed, and an estimate of the yield of seed expected.

Briefly, this plot of 3980 square feet or say, one eleventh part of one acre, was stocked with 2675 seedlings transplanted on the 20th July from a nursery sown on the 29th June. The plot was divided into 18 beds, and the planting was all done on these raised beds at 12 by 12 inches.



An estimate made on October 5th put the expected crop at 20,000 panicles yielding 177 lbs. of clean dry seed.

The last gathering has now taken place and the result of the crop is shown by the following figures:

Dates of picking.	Number of panicles.	lbs.	ozs.
28th September	218	2	—
1st October	360	3	15
6th „	880	7	11
9th „	1030	8	8
12th „	not counted	4	2½
16th „	430	2	—
20th „	970	10	8½
26th „	4000	48	—
3rd November	10000	80	—
10th „	7000	17	—
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Totals	24888	183	13

Thus the crop of one eleventh of one acre totalled 183 lbs. 13 ozs. of clean dry ragi ready for grinding, equivalent to 2000 lbs. or 300 gantangs per acre.

It is probable judging from the number of panicles collected, which is far in excess of the estimate previously made, that the crop would have been greater but for the depredations caused by birds. Although a boy was employed lustily beating a kerosine tin, it is feared that the toll taken on Sundays and holidays was somewhat considerable, as is shown by the short weight of the last picking of 10th November, which for 7000 panicles only gave 17 lbs. of clean seed—a great number of panicles being found empty of seed. The crop was sold at 7 cents per lb. realising \$12.80 which is equivalent to a gross return of \$140.80 per acre.

From the date of sowing the seed in the nursery on 29th June, to the last picking, the crop had occupied the ground for 4 months and 12 days.

The piece of land on which this trial was made is very low, rather wet and liable to floods, with a loose friable and deep soil, quite suitable to the cultivation of ragi if it could be properly drained. Fortunately no flood occurred to spoil the crop, and the weather was moreover propitious throughout, except just towards the end when excessive rains may possibly have delayed the ripening of the grain, affecting thereby the colour of the seed which lacked the brilliant orange tint of the previous lots.

Except the changkoling of the land and the making and raking of beds, the work, from the transplanting of the seedlings to the harvesting of the crop and the de-husking of the grains, was almost wholly performed by women, who seem to take to this work with the zest which attaches to the familiar tasks of farm life.



The gathered crop was treated in the following way. The panicles, cut close to the base of the spikelets, were brought in in baskets and put in heaps of ten, then in heaps of 100 to get an exact count of the crop. The whole day's gathering was then exposed to the sun on a concrete floor and after a few hours drying, the whole was trodden under with the feet, the right foot being now and again used in a twisting motion to tear the spikelets asunder. The result was a mixture of husks, of nerves of panicles, and of grain which was then taken up on trays, the ordinary "neerus" of the country—and there, after three circular motions and a final jerk upward, the seed, absolutely clean, was dropped in a basket in front, the remaining waste being thrown aside. This work requires great deftness of hand and tamil women excel at it.

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(To be continued.)

### Coconut Bud Rot.

The Philippine Journal of Science Vol: XIV, No. 1, January, 1919 contains a valuable addition to our knowledge of the disease known as "bud rot" which causes such severe losses of coconut trees throughout the tropics. Mr. Otto A. Reinking after giving a short history of the symptoms of the disease gives in detail his investigations both in the laboratory and the field. In his conclusions he states that the actual cause of the disease is a fungus *Phytophthora Faberi* Maubl. which in the majority of cases is quickly followed by bacteria which rapidly destroy the weakened tissues, causing the familiar rot.

As the fungus is the same that attacks coconut seedlings, cacao fruit, Hevea rubber seedlings, and papaya fruit, and as it is impossible to cure trees badly infected he gives the following instructions:—

1. Systematic inspection, condemning and burning of all diseased coconut trees.
2. All parts of diseased trees must be burned, otherwise the organism will live as a saprophyte on dead matter, and then spread to healthy trees.
3. Clean cultivation ought to be practised in all groves.
4. Under no circumstances should coconuts be interplanted with cacao or papayas.
5. If coconuts are planted near diseased Hevea rubber, precautions should be taken to avoid the spread of the disease.
6. Trees in new groves must be planted 10 meters apart each way. This spacing is one of the most satisfactory means of control against bud rot, and at the same time tends to give the highest production of nuts.

T. F. C.