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THE MANGO INFLORESCENCE

THOMAS T. STURROCK[1]

The mango fruit has been the subject of much interest by growers, scientists, and laymen for many centuries. In contrast very little has been written about the blossoms which are necessary before these highly desirable fruit can be produced. A discussion is presented here concerning these blossoms and some of their irregularities.

Descriptions of the inflorescence are found in the literature (6, 10, 11, 12, 13). In general the inflorescence is a terminal shaped panicle with a main rachis and side branches from it often arising in an irregular manner. Cymes are produced on these side branches. The cyme is a determinate inflorescence with the apex bud blooming first and subsequent buds arising laterally. These lateral buds may give rise to secondary cymes of their own with their apex buds blooming next and the laterals to these arising later.

This complex structure in the mango produces an inflorescence with a few hundred to several thousand individual blossoms and requires up to a month for the final blossoms to open (1, 2, 12). This time for opening gives opportunity for many environmental factors to effect the eventual fate of these blossoms.

The individual blossoms are of two types either perfect or staminate. The perfect blossoms are easily distinguished from the staminate by the presence of a globular ovary with a lateral style (Fig. 1) which is absent in the staminate type (Fig. 2). Both types of blossoms generally have one functional stamen and several sterile staminoids.

Counts made by Cobin and Harkness (2) reveal a spread between varieties as to the percentage of perfect blossoms from 3.0 to 3.5 for the Edward variety to 29.7 for the Kent variety. More detailed work by these workers

[1]Florida Atlantic University, Boca Raton.

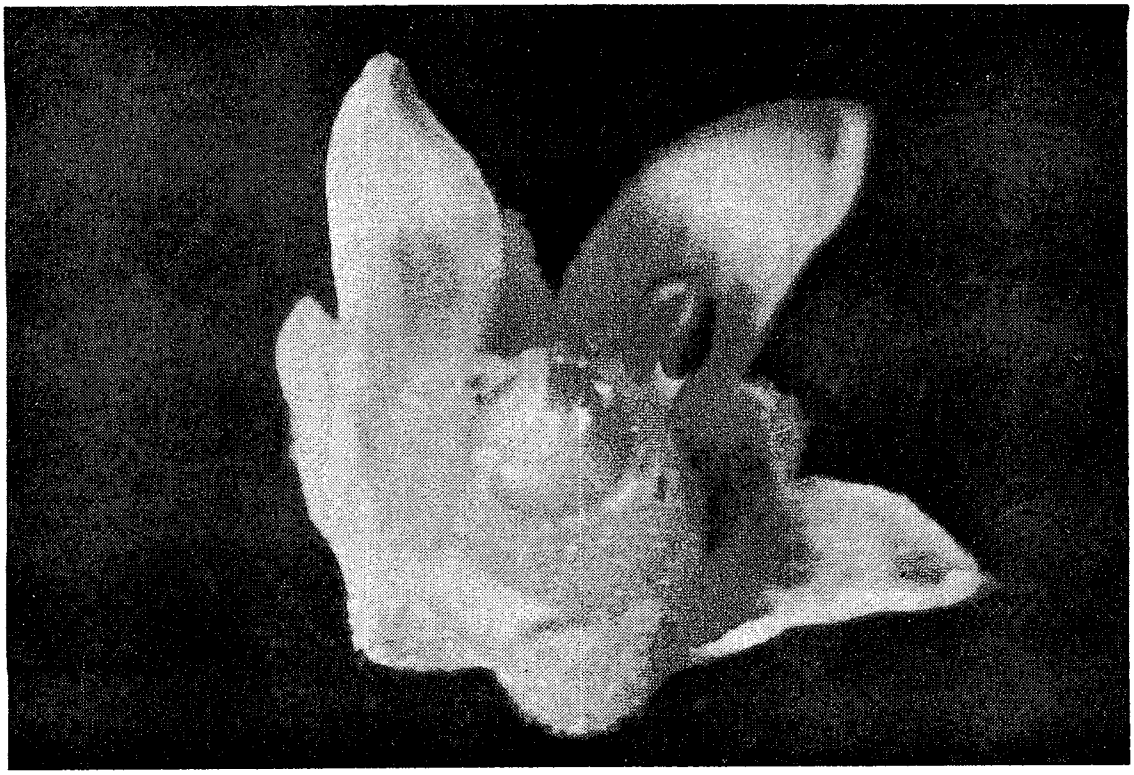

Fig. 1.—Perfect Blossom.

with the Haden variety showed that the highest percentage of perfect blossoms was produced on the terminal three inches of the panicle and in the first ten days of the panicle's blooming period. This is in keeping with the writer's observation on the Edward variety that generally the initial apical bud gives rise to the only perfect blossom of each cyme (Fig. 3). The lateral buds, as well as many of the apical buds, develop into staminate blossoms. This would account for the low percentage of perfect blossoms in this variety.

Even with the minimum number of blossoms per panicle (a few hundred) and at the minimum observed percentage of perfect blossoms (3.0), there would still be more perfect blossoms than one panicle could bear as fruit if they were all to to develop to maturity. Growers will testify that this is not the case. Many panicles will shed all of their blossoms, both perfect and staminate, without developing a single fruit. In addition many of the panicles which do set fruit shed these fruit before maturity.

Many trees will produce a second and sometimes a third general bloom with these panicles developing from buds lateral to the original terminal panicles. If the terminal panicles would have developed fruit, these lateral buds would have later developed into vegetative tissue. This would seem to indicate sufficient nutritional and growth substances being present within the plant to support the blooming activities. We might assume, therefore, that loss of bloom is not due to insufficient substrate material in the plant. Many of these secondary and tertiary blooms and fruit set from them will be shed as from the primary bloom.

The resulting fruit which a tree will mature reflects only a very small percentage of the potential as based on the total number of perfect blossoms on that tree. This is the problem which faces mango growers—very few fruit matured compared to the number of blossoms produced.

Obvious physical damages such as wind and other breakage will explain some of this de-

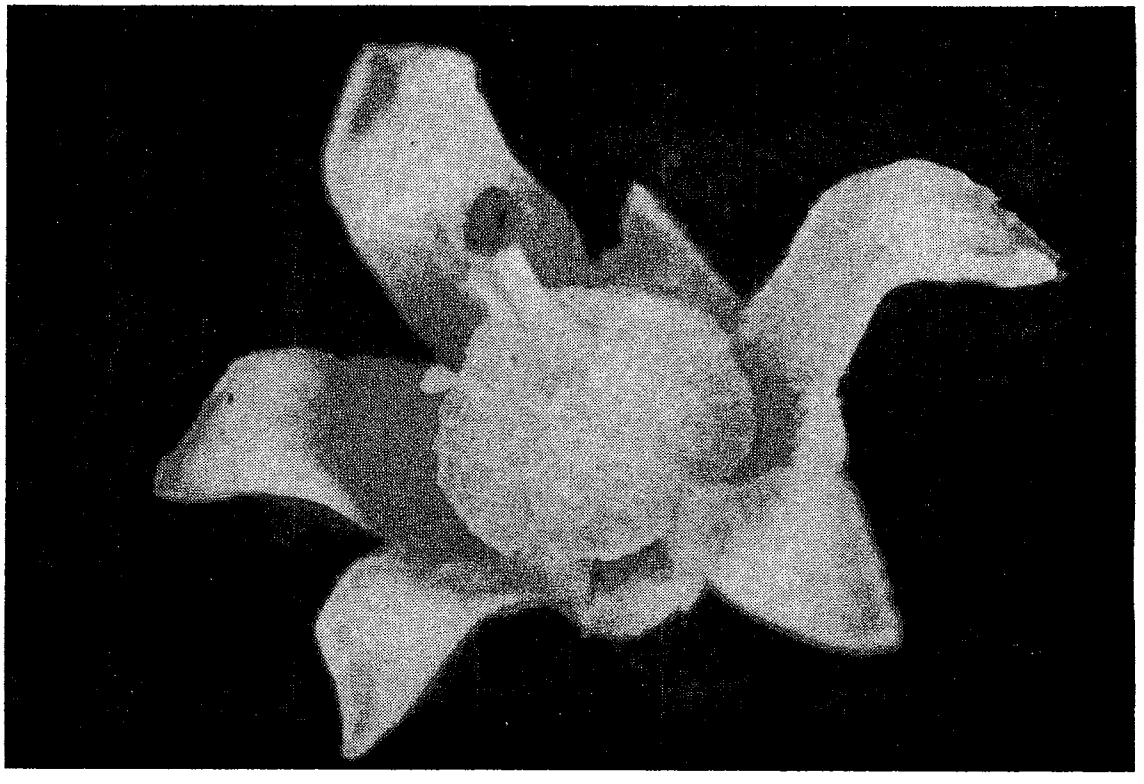

Fig. 2.—Staminate Blossom

crease in fruit-set. Insects do their share of damage to the blossoms. Probably Anthracnose (*Colletotrichum gloeosporioides* Penz) has been blamed for more reduction in marketable fruit than any other factor (6, 12, 13, 14). These factors combined do not account for the total reduction of crop experienced in most mango growing areas of the world.

Much speculation has been advanced as to other probable causes of this unfruitfulness. It is a generally accepted hypothesis that the carpel is the last floral organ to be formed (5). Since we know by external observation that two types of blossoms exist as already discussed, we can accept the fact that there are structural differences between these blossoms which originated sometime during their differentiation and development. Several investigators have reported blossoms which were externally perfect but had varying stages of deterioration or lack of formation of the internal reproductive structures of the carpel (1, 3, 4, 5, 7, 8, 9, 11, 14, 16). As it has been observed that the apical buds produced during the early development of the panicle are often the only perfect blossoms, it is thus conjectured that these early buds developed their internal functional reproductive structures while those developing later did not fully form their essential parts.

If this rationale is true, then it would be of interest to know how and why this occurs. Confirming this relationship would then lead to distinguishing whether the cause is environmental or hereditary (15, 17). Once the cause is determined, then the search for the cure would be feasable.

Another hypothesis which has been advanced as a possibility in this case is the detrimental effect of low temperatures. Perhaps temperatures not low enough to do physical damage to the vegetative parts of the tree are low enough for possible damage to the reproductive structures. Various growers have noted a reduction in yield following temperatures below 40°-45° F during the time of blooming. Some preliminary investigations by the writer along this line are now in progress to determine if such a relationship does exist.

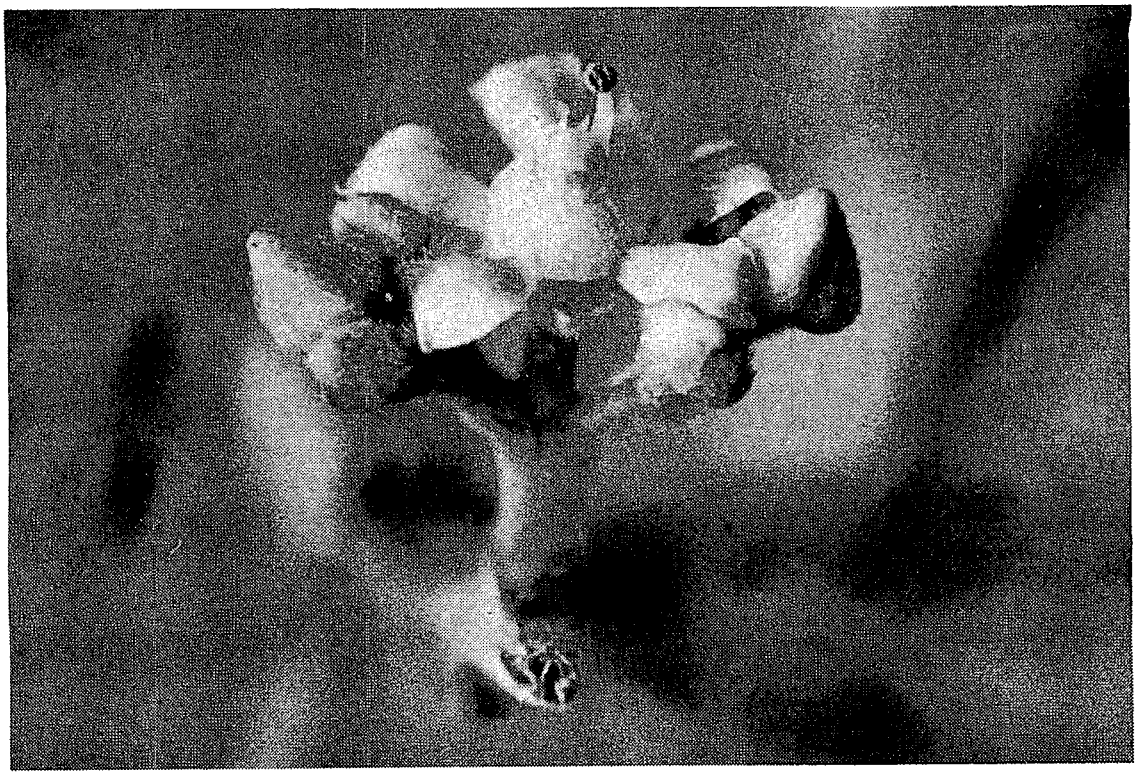

Fig. 3.—Cyme with apical bud developed as a perfect blossom.

We know a structural difference exists among mango blossoms on the same panicle. Some of these differences are obviously the cause of lack of fruit-set. We know that a number of external environmental factors cause a decrease in the number of blossoms which would otherwise be able to carry fruit to maturity. Yet these factors do not fully explain the very light yields experienced with the mango. Investigations need be conducted to determine these other unknown factors.

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