

## STUDIES ON SELF-INCOMPATIBILITY SYSTEM OF DURIAN (*DURIO ZEBITHENUS* MURR)

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**Keywords:** durian, *Durio zebithenus*, self-incompatibility, distyly, pollination.

### Introduction

The floral structure of durian has been described by Valmayor et al. (1965). While in While durian flowers have been shown to be self-incompatible (Valmayor et al. 1965; Shaari et al. 1985; Zainal Abidin, 1990) there is also evidence to indicate that the flower can be self-compatible (Soepadma and Eow, 1976). The self-incompatibility system has been stated to be that of heterostylous (Chin and Poon, 1982) probably from the observation that variation in the length of styles and stamens occurred among the clones (Soepadma and Eow, 1976). This statement may not be strictly true. Previous studies have been confined to a single clone or, at most, a few clones, thus comprehensive studies covering all available clones in Malaysia are lacking. The present study aims to shed some light on the self-incompatibility system of durian so as to overcome the above controversy.

### Materials and Methods

Experiments were carried out during the durian flowering seasons of September 1996-February 1997; July-December 1997; and September-December 1998. In a preliminary trial, the receptivity of the stigma was investigated by pollinating at various time intervals before anthesis. The first trial consisted of 25 combinations of self and cross pollinations which were carried out among durian clones of D2, D8, D24, D66, and D84. Prior to pollination, emasculations of stamens were carried out on the chosen flowers, which were then bagged with muslin bags. On the next evening, commencing from 6.30 pm onwards, pollinations were carried out on the emasculated flowers. After pollinations, the flowers were again bagged to prevent from contamination. Fruit sets and fruit development was recorded periodically until maturity of fruits. In addition to pollinations in the field, the compatibility or incompatibility of the various selfings and crossings were also studied using fluorescence microscopy, following the protocol described by Wong et al. 1994. The above trial was repeated during the second and third flowering seasons to monitor the repeatability of results.

### Results and Discussion

Durian flowers are normally fully open (anthesis) at 6.30 pm and natural pollination takes place during the night. In the preliminary trial to study the receptivity of the stigma, it was found that bud pollinations carried out at 6-10 h before anthesis resulted in significantly higher fruit sets than those

pollinated at 3-4 h before or at anthesis. There were, however, clonal differences in the above responses. This finding is significant because it reveals that the operation of artificial pollination can be carried out during the daytime. Similar finding has been reported by Valmayor et al. (1965). In trials where selfings and crossings of clones D2, D8, D24, D66 and D84 were carried out in all combinations over the three flowering seasons, it was found that there were clonal differences in response to the various pollinations. Except for clone D8, all other clones exhibited self-incompatibility. With clone D8, selfing had successfully produced matured fruits, thus indicating that this clone is self-compatible. Results with cross-pollinations revealed that there were variations among clones with regard to cross compatibility. Clone D24 and D66 were cross compatible with all the clones tested in this study. However, D24 showed differential results depending on whether it was used as gynoecia or polleniser. All other clones showed the same results irrespective of gynoecia or polleniser role. Among clones exhibiting cross-incompatibility, D2 showed incompatibility with D8 and D24; D8 showed incompatibility with D2, D24, and D84; and D84 was incompatible with D8. These findings are useful when selecting different clones planting under polyclonal planting system. Studies with fluorescence microscopy confirmed the results of the above pollinations. A technique has also been developed to section the large flower into various segments for staining and microscopic work.

### Conclusions

Higher fruit sets were obtained when durian flowers were pollinated 6-10 h before anthesis. Majority of the durian clones investigated were self-incompatible. However, clone D8 was found to show self-compatibility.

Clonal variations were shown by the clones in cross compatibility. When used as gynaecial material, D24 could set fruits when pollinated by pollens from D2, D8, D66 and D84. A protocol has been developed for studying pollen tube growth under fluorescence microscopy.

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