

Studies on the Pre-Harvest Fruit Dropping and Industrial Adjustment of Atemoya

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Abstract

At present, atemoya (*Annona squamosa* × *A. cherimola*) is mainly in the production of winter fruit. In recent years, due to the high temperature in winter often lead to the occurrence of pre-harvest fruit dropping, resulting in loss of yield and decline in fruit quality. In order to improve the problem of fruit dropping, this study investigates the fruit dropping rate of atemoya in different production periods, explores the relationship between the rate of fruit drop and the number of high temperature days before harvest in each production period, and then establishes the risk indicators of fruit dropping, analyzes the risk of fruit dropping in each period, and finally puts forward the adjustment strategy to reduce the fruit dropping. According to the results of the fruit drop survey in the four production periods in Taimali in 2020, the total fruit drop rate during the production period was significantly positively correlated with "mean daily maximum temperature" for 21 days before harvest ($R = 0.97$, $p < 0.05$) and negatively correlated with "rainfall days" ($R = -0.96$, $p < 0.05$), while the correlation with the remaining "mean daily temperature", "mean daily minimum temperature", "mean daily humidity", "mean daily temperature range" and "total rainfall" did not reach significant levels, indicating that high temperature is the main factor influencing fruit dropping. The "hourly mean temperature" above 28°C for 1 hour, above 27°C for 2 hours, or above 26°C for 3 hours can be used as a risk indicator for fruit dropping (fruit drop rate up to 5%). The rate of fruit drops per plant is positively correlated with the fruit retention ratio (number of retained fruit/centimeter of trunk perimeter) ($R^2 =$

0.54, $p < 0.01$), showing that the more fruits retained on the tree, the higher the fruit drop rate. There was a significant negative correlation between the potassium content of the leaves and the fruit drop rate ($R = -0.675$, $p < 0.01$), and a significant positive correlation between the calcium content of the leaves and the fruit drop rate ($R = 0.711$, $p < 0.01$). Regarding the strategy of industrial adjustment, this article mainly proposes four aspects, such as adjusting the production period, planting in an appropriate place, controlling the number of fruits retained, and cooling the orchard.