

Ringkasan

MANIPULASI WAKTU PANEN DAN PENCEGAHAN KERONTOKAN ORGAN REPRODUKTIF MANGGA (*Mangifera indica* L.)

(Kajian Fase Reproduksi dengan Perlakuan
Pemberian Paklobutrazol, Pupuk Majemuk-
makro + mikro dan Irigasi)

Bambang Priyanto

Tanaman mangga merupakan tanaman tahunan yang mengalami dormansi kuncup. Faktor lingkungan yang mempengaruhi dormansi kuncup antara lain adalah intensitas, kualitas dan kuantitas penyinaran. Salah satu kendala penting dalam meningkatkan produksi buah mangga adalah besarnya jumlah kerontokan buah yang terjadi pada setiap stadiaperkembangan buah sejak terjadinya antesis sampai menjelang buah dipanen. Pengelolaan mangga dengan memberikan nutrisi makro dan mikro. Salah satu penunjang terhadap pertumbuhan tanaman yang baik adalah pemberian nutrisi diantaranya pupuk makro dan mikro secara seimbang.

Proses kerontokan pada tanaman mangga dapat terjadi pada bagian tanaman yaitu daun, bunga, buah atau cabang dari batang pokok. Dilihat dari segi anatomi tanaman dikotil terlihat bahwa tanaman tersusun dari berbagai struktur, beberapa masalah yang dapat menimbulkan kerontokan bagian tanaman diantaranya, suhu rendah (dingin), panas, kekeringan, kimiawi, penuaan dan bermacam-macam jenis kerusakan. Pengaturan waktu pembungaan tanaman mangga dapat dilakukan dengan pemberian zat pengatur tumbuh paklobutrazol. Kondisi lingkungan diantaranya musim hujan, pemberian nutrisi, dan pengaturan pengairan pada musim kemarau merupakan masalah yang berpengaruh terhadap ketahanan organ reproduksi.

Serangkaian penelitian dilakukan untuk menanggulangi proses kerontokan bunga yaitu, Penelitian pendahuluan untuk mengetahui ukuran sampel (jumlah tanaman) dalam unit percobaan. Penelitian I) menginduksi tanaman mangga dengan mencari konsentrasi zat pengatur tumbuh Paklobutrazol yang tepat. Penelitian II) Pemberian pupuk makro dan mikro {1) $P_0 = 2\text{Kg ZA} + 1\text{Kg SP36}$; 2) $P_1 = 2\text{Kg ZA} + 1\text{Kg SP36} + 1\text{Kg KCl}$; 3) $P_2 = 3\text{Kg ZA} + 1\text{Kg SP36} + 1\text{Kg KCl} + 1,5\text{ ml micro}$; 4) $P_3 = 3\text{Kg ZA} + 1\text{Kg SP36} + 1\text{Kg KCl} + 2\text{ ml micro}$; 5) $P_4 = 3\text{Kg ZA} + 1\text{Kg SP36} + 2\text{Kg KCl} + 2\text{ ml micro}$; 6) $P_5 = 3\text{Kg ZA} + 1\text{Kg SP36} + 2,5\text{Kg KCl} + 2,5\text{ ml micro}$ } terhadap tanaman dengan kondisi alami dan dinaungi saat berbunga pada musim hujan. Penelitian III) Pemupukan majemuk makro dan mikro dan pemberian air irigasi {1) Tanpa diairi. 2) diairi 20 liter/minggu dan 3) 40 liter/minggu} pada saat musim kering. Rancangan percobaan yang digunakan adalah acak kelompok (RAK) secara faktorial.

Pelaksanaan penelitian terhadap tanaman pada fase reproduksi dilakukan pada bulan November – Mei dan bulan Mei – November. Untuk membandingkan rerata antar perlakuan yang dicoba digunakan uji beda nyata jujur (BNJ) pada taraf 5 % selanjutnya untuk mengetahui respon tanaman terhadap variabel yang diteliti sebab akibat digunakan analisis regresi.

Kerontokan bunga maupun buah menyebabkan rendahnya produksi buah mangga. Kejadian ini dimulai setelah buah terbentuk dan kerontokan terbanyak terjadi pada minggu pertama setelah itu kerontokan buah akan mereda pada minggu ke lima dari sejak terjadinya penyerbukan. Kerontokan buah selanjutnya juga terjadi pada buah yang hampir masak walaupun jumlahnya sedikit.

Dari hasil observasi kandungan klorofil dan asam absisat (ABA) baik pada musim hujan maupun musim kemarau terlihat semakin banyak akumulasi ABA dalam organ tanaman maka kandungan klorofilnya juga rendah dan sebaliknya. Penampakan fisik tanaman terlihat bahwa semakin banyak kandungan ABA warna organ tanaman menjadi kekuningan karena terjadi proses kerontokan. Pada kondisi tanaman kekurangan air yang berakibat turunnya kandungan air dalam daun akan berakibat juga terhadap penurunan kandungan ABA.

Zat pengatur tumbuh paklobutrazol ternyata mampu menginduksi pembungaan tanaman mangga dengan konsentrasi 6 ml/liter air. Hasilnya dapat memacu pembungaan lebih awal rata-rata 19,57 hari lebih awal dari tanaman tanpa diberi paklobutrazol.

Tanaman yang diperlakukan dengan pupuk majemuk makro dan mikro pada kondisi alami dan dinaungi jumlah kerontokan organ reproduksinya tidak berbeda. Hasilnya adalah pada tanaman tanpa naungan adalah P_4 (3 kg ZA + 1 kg SP 36 + 2 kg KCL + 2 ml mikro) dengan hasil buah dapat dipanen 8,70 %, dan hasil terendah akibat kerontokan tinggi adalah P_0 (2 kg ZA + 1 kg SP 36) = 4,86 %; P_1 (2 kg ZA + 1 kg SP 36 + 1 kg KCL) = 4,72 %. Kerontokan organ reproduktif tanaman dinaungi adalah P_4 (3 kg ZA + 1 kg SP 36 + 2 kg KCL + 2 ml mikro) = 8,62 % dan hasil terendah adalah P_0 (2 kg ZA + 1 kg SP 36) = 5,11 % ; P_1 (2 kg ZA + 1 kg SP 36 + 1 kg KCL) = 4,94 %.

Potensial buah yang ditunjukkan oleh jumlah bunga fertil tidak berbeda nyata diantara semua perlakuan kombinasi antara pupuk majemuk (makro dan mikro) dengan volume air irigasi yang diberikan. Terjadi interaksi terhadap kerontokan yaitu berturut-turut stadia buah awal, buah muda, dan buah siap panen berturut-turut I_1P_3 , (irigasi 20 ltr/Mg + 2 kg ZA + 1 kg SP 36 + 1 kg KCL + 2 ml mikro) = 103,96 buah/pohon dan I_2P_3 (irigasi 40 ltr/Mg + 2 kg ZA + 1 kg SP 36 + 1 kg KCL + 2 ml mikro) = 106,12 buah/pohon. Pemungutan hasil tanaman mangga akibat perlakuan zat pengatur tumbuh paklobutrazol, pemberian pupuk majemuk (makro dan mikro) dan pemberian air irigasi dapat memanipulasi waktu panen dan mengurangi kerontokan organ reproduksi.

SUMMARY

MANIPULATION OF HARVEST TIMING AND PREVENTION OF MANGO'S (*Mangifera indica L.*) REPRODUCTIVE ORGANS SHED

(Study on Reproductive Phase with Treatment of Paclobutrazole, Mixed Micro + Macro Fertilizers and Irrigation)

Bambang Priyanto

Mango plant is a perennial plant which undergoes bud dormancy. Environmental factors that influence the bud dormancy are intensity, quality and quantity of sunlight. One of the most important constraints in increasing mango fruit production is the enormous shed of young fruits occurring in each fruit growth phase commencing from anthesis to harvest. Mango can be managed well by furnishing it with macro and micro nutrients. One factor supporting the good plant growth is the administration of balanced macro and micro fertilizers.

The shed process in mango plant can occur in several parts, some of which are the leaf, flower, young fruit or branch from the stem. Viewed from an anatomical aspect of the dicotyledonous plant, it appears that this plant is made of many structures. Given this fact, several problems which induce the shed are including low temperature (cold), hot temperature, dryness, chemical factor, aging and many types of other damages. Timing of the plant flowering can be regulated by administering a growth regulating substance of so-called paclobutrazole. The environmental conditions such as wet season, nutrition granting, and regulation of irrigation in the dry season all produce significant effect on the reproductive organ viability.

Several researches have been done to cope with the flower shed, namely preliminary research purposively designed to find out size of sample (number of plants) in an experiment unit. The research I was done regarding induction of the mango plant by finding out the proper concentration of Paclobutrazole. The research II was conducted in line with the administration of the macro and micro fertilizers [1) $P_0 = 2\text{Kg ZA} + 1\text{ Kg SP36}$; 2) $P_1 = 2\text{ Kg ZA} + 1\text{ Kg SP36} + 1\text{ Kg KCl}$; 3) $P_2 = 3\text{ Kg ZA} + 1\text{ Kg SP36} + 1\text{ Kg KCl} + 1.5\text{ ml micro nutrition}$; 4) $P_3 = 3\text{ Kg ZA} + 1\text{ Kg SP36} + 1\text{ Kg KCl} + 2\text{ ml micro nutrition}$; 5) $P_5 = 3\text{ kg ZA} + 1\text{ kg SP 36} + 2\text{ kg KCL} + 2\text{ ml mikro}$ 6) $P_5 = 3\text{ Kg ZA} + 1\text{ Kg SP36} + 2.5\text{ Kg KCl} + 2.5\text{ ml micro nutrition}$] to the plant with natural condition and they were shaded while flowering in the wet season. The research III was undertaken regarding the administration of mixed micro and macro fertilizers and water irrigation, notably {1) without watering, 2) with watering of 20 l/week and 3) watering of 40 l/week in the dry season. The experiment employed a random group design in factorial manner.

The research was conducted at November-May and May-November. To compare means among treatments, the real and apparent discriminant test at 5% level was used. Furthermore, to know the plant response to the variables to be studied, the regression analysis was used accordingly.

The flower and fruit sheds generated the decreased production of fruits. This event began after young fruit was formed and the greatest sheds occurred in the first week. Afterward, the shed would decrease gradually in the fifth week since pollen discharging. The further shed also occurred in fruits that almost fully matured although this had much decreased significantly.

From observation to be done, it was showed both in the wet and dry seasons that when abscisic acid level much accumulated in reproductive organs, the chlorophyll level decreased and vice versa. From physical appearance, when the reproductive organs contained much abscisic acids, they became yellowish because of the shed process. The lack of water present in leaves would result in any decrease in abscisic acids level.

In fact, the paclobutrazole could induce flowering in mango plant with concentration of 6 ml/l water. Consequently, this could stimulate flowering on average 19.57 days earlier than those without administration of such a substance.

There was no difference in the shed of reproductive organs between plants treated with macro and micro fertilizers in the natural and shaded conditions. The yield of the plant without shade was P_4 (3 kg ZA + 1 kg SP36 + 2 kg KCL + 2 ml micro nutrition) where 8.70 fruits could be harvested, while the lowest yield due to the increased shed was P_0 (2 kg ZA + 1 kg SP36) = 4.86%; P_1 (2 kg ZA + 1 kg SP36 + 1 kg KCL) = 4.72%. The reproductive organs shed of the plant shaded was P_4 (3 kg ZA + 1 kg SP36 + 2 kg KCL + 2 ml micro nutrition) = 8.62% and the lowest yield was P_0 (2 kg ZA + 1 kg SP36) = 5.11%; P_1 (2 kg ZA + 1 kg SP36 + 1 kg KCL) = 4.94%.

Potential fruits indicated by fertile flowers didn't differ significantly among all treatments of the mixed micro and macro fertilizers with volume of water irrigation provided. There was interaction in the shed processes, namely at early phase growth of fruits, young fruits, and nearly matured fruits which were represented by I_1P_3 (irrigation 20 l/mg + 2 kg ZA + 1 kg SP36 + 1 kg KCL + 2 ml micro nutrition) = 103.96 fruits/tree and I_2P_3 (irrigation 40 l/mg + 2 kg ZA + 1 kg SP36 + 1 kg KCL + 2 ml micro nutrition) = 106.12 fruits/tree. The mango harvesting that was treated with paclobutrazole and administered with the mixed macro and micro fertilizers and water irrigation could manipulate timing of harvest and reduce the reproductive organs shed.

Abstract

**MANIPULATION OF HARVEST TIMING AND PREVENTION
OF MANGO'S (*Mangifera indica* L.) REPRODUCTIVE
ORGANS SHED**

**(Study on Reproductive Phase with Treatment of
Paclobutrazole, Mixed Micro + Macro
Fertilizers and Irrigation)**

Bambang Priyanto

One of major problems in commercial mango production is unfruitfulness on each fruit growth phase, since pollination is until harvesting period. The fruit dropped until 99 % even it can be aborted all. Some experiment are conducted in steps : 1) Experiment for knowing the effect of concentration of plant growth regulator application paclobutrazol, in this experiment also using macro and micro fertilizer. 2) Whit out shelter. 3) Whit Shelter. 4) Volume of water irrigation and macro + micro fertilizer application on mango Arumanis 143 cultivar.

Experiment was conducted in mango plantation in Bluluk District, Lamongan Regency. The altitude is ± 60 m on sea surface and dry climate. Rain intensity is $\pm 2154,4$ mm a year, temperature $25 - 35^{\circ}$ C in 2002 - 2003. Flower and fruit abortion caused to lower of mango production. Water is essential in plant metabolism.

Result of observation abscisid acid (ABA) and chlorophyll content at rainy season and dry season that more ABA accumulation fewer chlorophyll content and conversely. Physically crop showed that more ABA content hence leaf colour yellow. Plant in water lacking condition caused increase ABA content.

To minimize the reproductive organ (lower) abortion can be done with application of compound fertilizer macro + micro nutrient. The abortion of plant organ can assumed because by nutrition deficiency that caused competition between flower and fruit.

Keyword : Abortion, Fertilizer compound, water volume irrigation.