INTERNATIONAL CONFERENCE ON BIOLOGICAL SCIENCE

ADVANCES IN BIOLOGICAL SCIENCE:
Respect to Biodiversity from Molecular to Ecosystem
for Better Human Prosperity

PROCEEDINGS

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THE EFFECTS OF \textit{A-NAPHTALENE ACETIC ACID} ON THE SUCCESSFUL POLLINATION AND FRUIT RIPENING OF \textit{Phalaenopsis} Orchids

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\textbf{Abstract}

The effects of \textit{a-naphtalene acetic acid} (NAA) in promoting successful pollination and fruit ripening of \textit{Phalaenopsis} orchids have been evaluated. The research was carried out by applying lanolin paste containing NAA on the base of flower stalk of self pollinated \textit{Ph.delestris}, self pollinated \textit{Ph.amabilis}, cross pollinated of \textit{Ph.delestris X Ph.amabilis} and cross pollinated of \textit{Ph.amabilis X Ph.delestris}. Three levels of NAA were used, namely 0 ppm (control), 200 ppm and 500 ppm. The lanolin paste containing NAA was applied after flowers were fully opened and 3 flowers were used for each self and cross pollination of \textit{Phalaenopsis}.

The result revealed that NAA of 500 ppm gave a successful pollination of \textit{Ph.delestris} to 100\%, however for self pollinated \textit{Ph.amabilis}, application of NAA up to 500 ppm did not show any significant effects to the successful pollination. The successful pollination of cross pollinated of \textit{Ph.delestris X Ph.amabilis} was obtained without any application of NAA. On the contrary, successful pollination of \textit{Ph.amabilis X Ph.delestris} can not be obtained even NAA 500 ppm has been applied. The ripening times for cross pollinated \textit{Ph.delestris X Ph.amabilis} fruits was from 77 to 84 dap (days after pollination), in comparison to self pollinated \textit{Ph.delestris} (49 to 56 dap) and self pollinated \textit{Ph.amabilis} (up to 120 dap)

\textbf{Keywords:} \textit{a-Naphtalene Acetic Acid}, pollination, fruit ripening, \textit{Phalaenopsis} orchid

\textbf{INTRODUCTION}

Indonesia is home of huge number of natural orchids that terms as megabiodiversity, for more than 5000 species (Irawati, 2002). The orchid flowers exhibit wide range of variation in shape, color, and fragrant compare to the other flowering plants. Therefore, orchids is a valuable product in flori-trade as cut flowers, pot plants, or as food additives. Hybridization is very important to increase the orchid genetic variation and to create higher quality of the hybrids than that of the parentals.

Pollination initiates maturation of the ovary and the differentiation of ovules prior to fertilization. Auxin has important role to promote the ovary development after pollination and
to stimulate the ethylene production. Ethylene promotes fruit ripening and flower senescence, it also regulates the early development of ovary. The $\alpha$-naphtalene acetic acid (NAA) is the most effective auxins to induce the development of ovary into mature fruit (Zhang and O’Neill, 1993).

In this study, the effects of $\alpha$-naphtalene acetic acid (NAA) in promoting successful pollination and fruit ripening of Phalaenopsis and Doritaenopsis orchids has been evaluated.

MATERIALS AND METHODS

Plant Materials

Orchids plants of the genus Doritaenopsis were obtained from Royal Orchid, East Java while Phalaenopsis amabilis were obtained from local people at Curug Sewo, Sukorejo, Central Java. The orchid plants were maintained under optimal growth condition in a greenhouse at Faculty Biology, Universitas Gadjah Mada, Yogyakarta. Three flowers were used for each self and cross pollination of Doritaenopsis and Phalaenopsis.

Pollination

The fully opened flowers of P. amabilis and Doritaenopsis were self- and cross-pollinated to produce fruits and seeds. Before pollination, the flower stalk were treated by lanolin paste containing three levels of NAA (Sigma) i.e. 0 ppm, 200 ppm and 500 ppm.

Ovary Growth Measurements

After pollinated, flowers increased in size of ovary. At each seven days, the diameter of ovaries of self- and cross-pollinated orchid were measured at the middle of the ovary (Fig. 1a) by using calipers (Zhang and O’neill, 1993). The succesful pollination was determined by comparing the numbers of pollinated flowers that produce fruits and the numbers of pollinated flowers.

RESULTS AND DISCUSSION

The result shows that 500 ppm of NAA gave a succesful pollination of Doritaenopsis to 100%, however for self pollinated P.amabilis, application of NAA up to 500 ppm does not show any significant effects to the successful pollination. The successful pollination of cross pollinated of Doritaenopsis X P. amabilis was obtained without any application of NAA. On the contrary, succesful pollination of P. amabilis X Doritaenopsis can not be obtained even 500 ppm of NAA has been applied. Figure 1b-1d illustrates morphological changes following pollination as indicated by the increase of fruit diameter. The morphological changes based on fruit diameter among the pollinated orchids are occuring in different time and reflecting the fruit ripening in orchid. The ripening times for cross pollinated Doritaenopsis X P. amabilis fruits was from 77 to 84 dap (days after pollination), in comparison to self pollinated
**Doritaenopsis** (49 to 56 dap) and self pollinated *P.amabilis* (up to 120 dap, data not shown in Fig.1b).

![Figures showing orchid fruit diameter increase](image)

**Figure 1.** The increase of orchids fruit diameter following pollination. The morphology of *Doritaenopsis* (upper) and *P.amabilis* (bottom) and fruit diameter measurement, d; the increase of orchid fruit diameter in *P.amabilis* (b), *Doritaenopsis* (c), and *Doritaenopsis X P.amabilis* (d).

**REFERENCES**


**FUNDING**

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P-PD04

THE OVIPOSITION RESPONS OF Aedes aegypti (DIPTERA; CULICIDE) IN OVITRAP WITH LARVACIDES OF TEMEPHOS AND ATTRACTANT OF HAY INFUSION

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Abstract

The research has been held in the aim to know the oviposition responses of Aedes aegypti (Diptera : Culicide) in ovitrap with larvicide’s of Temephos and Paspalum grass infusion. The procedure of this research is to give the female gravid with the several of substance which contain the attractant (Paspalum grass infusion 10% and 20%), the larvicide’s (Temephos) and combination of both. The result shows that the oviposition percentage in the ovitrap which contain single larvicide’s almost same with control. The opposite result is in the combination between Paspalum grass infusion and larvicide’s which the percentage of oviposition is rise up to 80%. In those ovitrap we could collects until 15.2 to 19.2 eggs per ovitrap. From this data we can suggest that the combination between attractant and larvicide’s will rise the percentage of oviposition from gravid female. This information is very valuable for controlling the population of Ae. aegypti by using of lethal ovitrap.

Keywords : oviposition responds, larvicide’s, attractant, Aedes aegypti

Introduction

Dengue hemorrhagic fever (DHF) is one of the most serious public health problems in Indonesia as well as in many other tropical countries around the world. Dengue virus is transmitted by the mosquito Ae. aegypti adapted to living near areas of human habitation (Dario et al., 2008). These mosquito species coexist in man-made containers in urban, suburban and rural settlements in tropical and subtropical regions (Adson et al., 2005). In recent years, ovitrap surveys for monitoring the Ae. aegypti population have found greater acceptability, as this have been found to be sensitive even at times when vector are at low levels (Kwanda et al., 2007). Temephos has been used as larvicide’s and being accepted for larval control program in several country. Some of researchers suggest that the use of temephos in water container quite effective for control the growth of mosquito larval but the smell of this chemicals compound has been rejected for some people. This condition is became serious in the area where fresh water became valuable resource. This research has the aim to know the preference of female Ae. aegypti gravid to oviposition media which contain of larvacide’s and attractant.
Materials And Methods

Traps were consisted of 250 ml plastic glass in cylinder of black plastic tube, 14 cm tall by 12 cm wide. The oviposition substrate was a 12 cm long and 1 cm in diameter of a plastic pipe and covered by coarse grade filter paper. A *Paspalum* grass infusion (HI) of *Paspalum conjugatum* in concentration of 10% and 20% was used to attract female mosquitoes. The grass stock infusion was prepared by adding 250 gr dried grass to two liters of tap water and fermented for seven days. We use the commercial abate with active compound as *Temephos* 1% as larvicide’s. Traps were prepared with 175 ml of water and added by larvicide’s or attractant respectively. The combination of *Temephos* 1% as a larvicide’s and *Paspalum* grass infusion as attractant with appropriately labeled papers before transportation to the filed.

To evaluate the effect of *Temephos* 1% on the *Aedes aegypti* oviposition response, some of ovitraps were placed in shaded area of living quarters, under six different experimental conditions, i.e. (Aquadest, *Temephos* 1%, *Paspalum* 10%, *Paspalum* 20%, *Paspalum* 10% + *Temephos* 1%, *Paspalum* 20% + *Temephos* 1%). A total of 60 ovitrap were set out and exchanged between 09.00 – 12.00 hours, the time of lowest oviposition activity and left for three days. Egg counts were made using a magnifying glass.

Results and Discussion

We found 832 mosquito eggs and in field experiments, female mosquitoes did not avoid ovipositing in ovitrap that contained of *Temephos* 1% as larvacides than in the controls although there was choice on the oviposition media contain with the *Paspalum* grass infusion (20%) attractant (Table 1). In the pure water we just find 5.2 eggs. The addition of *Paspalum* grass infusion in the ovitrap enhances significantly the number of eggs collected, thus increasing the trap efficacy (Dario *et al*., 2008).

Table 1. Number of ovitraps placed, positivity and total number of eggs of *Aedes aegypti* harvested under different experimental groups.

<table>
<thead>
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<th>No</th>
<th>Treatment Concentration</th>
<th>Oviposition</th>
<th>Egg</th>
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<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Control</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td><em>Temephos</em> 1%</td>
<td>15</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td><em>Paspalum</em> 10%</td>
<td>15</td>
<td>126</td>
</tr>
<tr>
<td>4</td>
<td><em>Paspalum</em> 20%</td>
<td>15</td>
<td>312</td>
</tr>
<tr>
<td>5</td>
<td><em>Paspalum</em> 10% + <em>Temephos</em> 1%</td>
<td>15</td>
<td>288</td>
</tr>
<tr>
<td>6</td>
<td><em>Paspalum</em> 20% + <em>Temephos</em> 1%</td>
<td>15</td>
<td>228</td>
</tr>
</tbody>
</table>

Although the presence of *Temephos* 1% appears to influence the choice of ovitraps as an oviposition the adding of *Paspalum* grass infusion as attractant has a effect to rise the oviposition rate. It is possible that female mosquitoes are not able to detect the larvicide’s of a
component of the test product when used with high infusion concentrations (Adson et al., 2005).

We suggest that the adding of attractant on various ovitrap was found to influence the oviposition responses of the gravid females, indicating thereby, the role of some other factor released by various substances used in the ovitraps which influenced the oviposition responses (Dario et al., 2008). The study finding indicate that the present of attractant will make the oviposition media more attractive to gravid mosquitoes as compared to same media without it; indicating presence of certain other chemical responses offered by the organics mater and also the microorganisms and perceived by the female as an encouraging signal for oviposition (Kwanda et al., 2007). The finding from the study have implication on the monitoring of Aedes breeding wherein these attractant substances may be utilized in ovitrap instead of plain water. However, the community based application of these laboratory generated finding needs to be established by appropriate field studies.

References
P-PD05

MECANISMUS UNDERLYING SOMITE BOUNDARY FORMATION

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Abstract

In vertebrate development, the most prominent metameric structure is somites, which give rise to vertebrae, ribs, skeletal muscles and dermis. Somites are generated by periodic segmentation of anterior of the presomitic mesoderm (PSM), where several genes displays oscillatory expression associated with somite segmentation. It is believed that the oscillatory gene expression works as a segmentation clock, which controls the periodicity of somite segmentation. Retinoic acid (RA) signaling plays important roles in the somite formation and segmentation. However, the dynamic influence of RA on individual somite segmentation in real time frame remains largely unknown. Here we blocked the endogenous RA production in zebrafish embryos by injection of a morpholino (MO) against retinaldehyde dehydrogenase 2 (raldh2), encoding an enzyme which catalyzes the production of RA and performed real-time imaging of somite segmentation to understand the role of RA during dynamic segmentation. raldh2-morphant showed extension of somite segmentation period and variation of length time of individual somite segmentation. The final somite and vertebrae number of raldh2-morphants are less compare to the control, and the vertebrae defects were also observed. However, morphants embryos have almost normal oscillatory expression of her1 cyclic genes. Taken together, these results suggest that Retinoic acid is maintaining constancy and acts as a linker of the segmentation clock and somite segmentation machinery in somitogenesis.

Keyword: Zebrafish, somitogenesis, segmentation clock, retinoic acid

INTRODUCTION

In vertebrate development, the most prominent metameric structure is somites, which gives rise to vertebrae, ribs, skeletal muscles and dermis. Somites are generated by periodical segmentation of anterior extremity of the presomitic mesoderm (PSM) in a sequential manner, where several genes displays oscillatory expression associated with somite segmentation. It is believed that the oscillatory gene expression works as a segmentation clock, which controls the periodicity of somite segmentation. Retinoic acid signaling plays important role on the somite formation and segmentation. Retinoic acid deficiency or the absence of retinoic acid signaling lead to the abnormalities of somite (1), and lack of coordination of somite formation between the left and right side of the mouse...