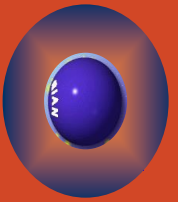


POTENTIAL VECTORS IN EQUINE DISEASES FREE ZONE, JAKARTA INTERNATIONAL EQUINE PARK PULOMAS INDONESIA

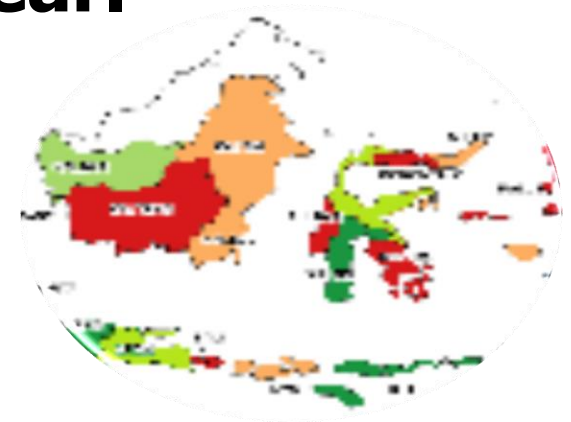


Upik Kesumawati Hadi, Susi Soviana, Sugiarto, Isna Lailatur Rohmah, Fahmi Khairi,
Entomology Laboratory, Division of Parasitology and Medical Entomology
Faculty of Veterinary Medicine – Bogor Agricultural University

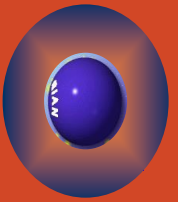
Republic of Indonesia



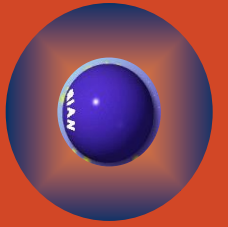
- ❖ **Indonesia is located in the tropical climate and crossed by the equator**
- ❖ **is also the meeting place of two mountain chains, the circum-Pacific and circum-Mediterranean.**
- ❖ **The sun shines continuously throughout the year.**
- ❖ **Evaporation is high, the humidity is high**
- ❖ **Has a relatively high rainfall.**
- ❖ **Have a tropical rain forest areas quite dense.**



Megadiversity



Indonesia is known as one of the countries that have the highest biodiversity in the world, endowed with rich and unique biodiversity fauna, including vectors of several diseases (Class Insecta & Arachnida).



Indonesia →
biodiversity of vector

- The Indonesian archipelago has been predicted to be a “hotspot” for the emergence of zoonotic and vector-borne pathogens (Rosenberg et al. 2013)

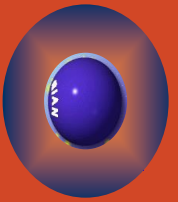


Vector Surveillance



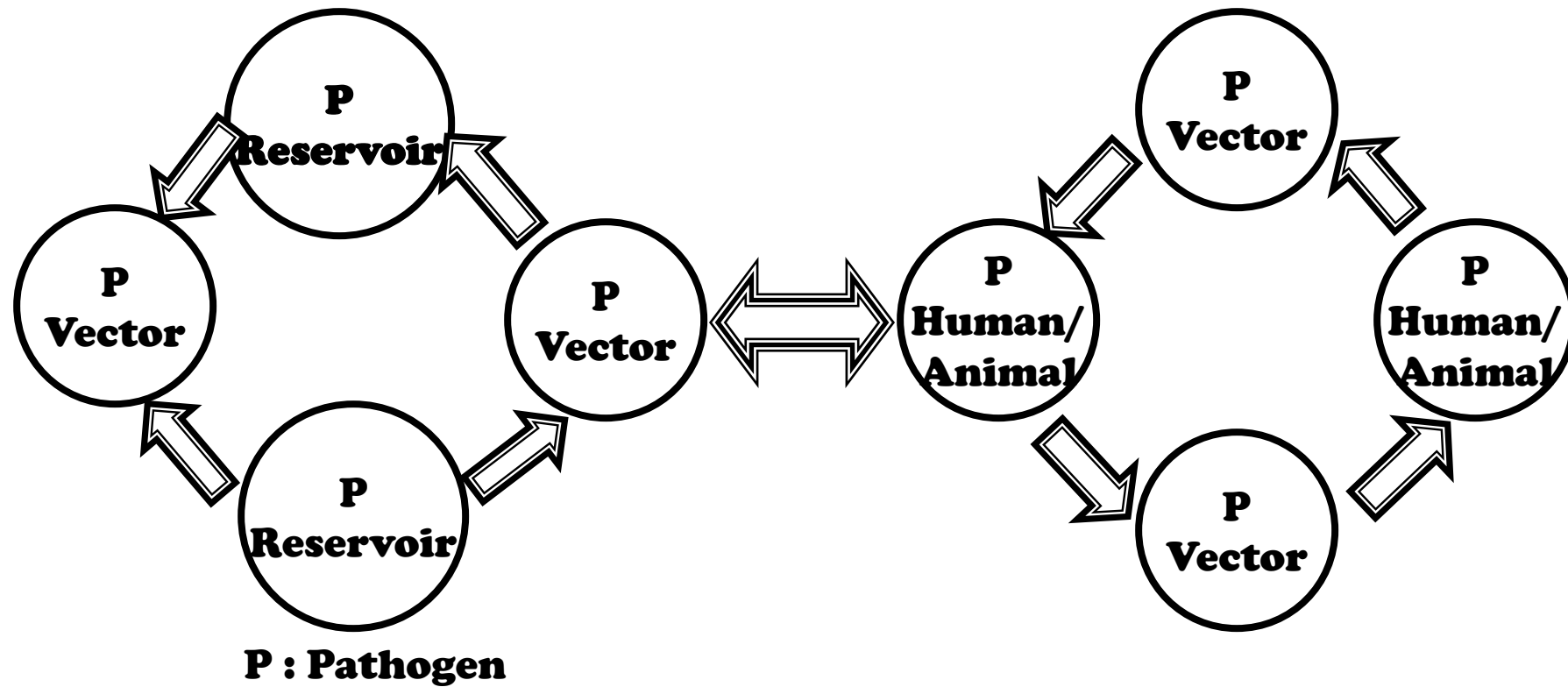
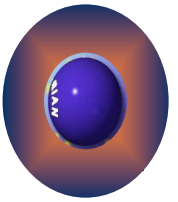
Vector Control

Vector borne disease

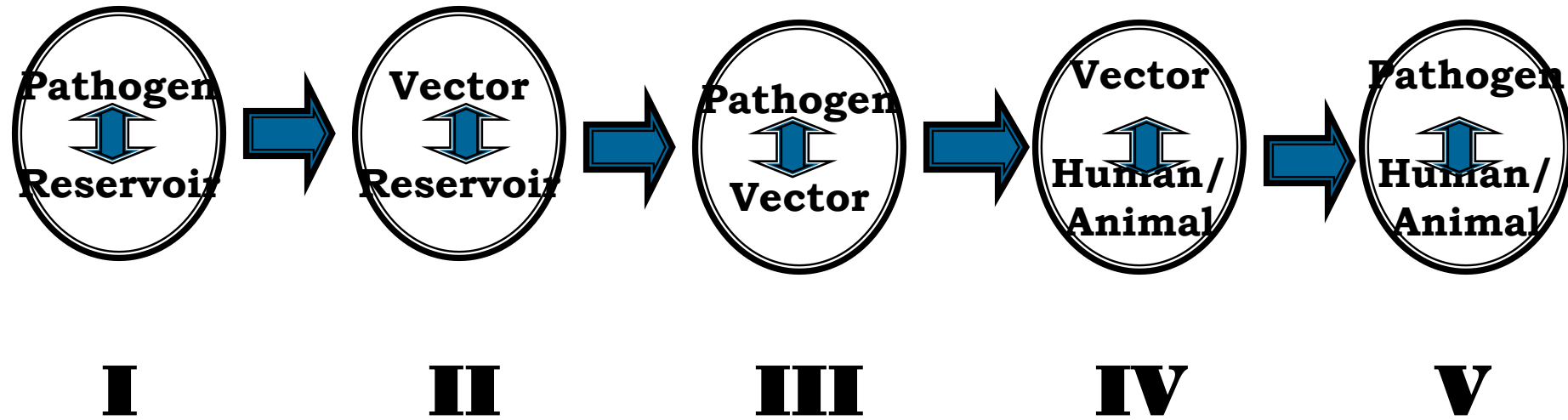


- A disease that is transmitted to humans or other animals by an insect such as a mosquito or another arthropod
- Nearly half of the world's population is infected by vector-borne diseases, resulting in high morbidity and mortality
- There are many examples of vector borne diseases in Indonesia: Malaria, Denque Fever, Japanese Encephalitis, Filariasis, Chikungunya, Dirofilariasis, Trypanosomiasis, Babesiosis, Ehrlichiosis etc.

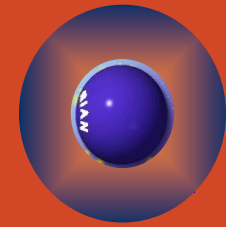
Vector borne diseases system



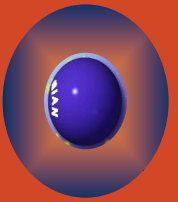
5 SubSystem in the Transmission System of Vector Borne Disease



ARTHROPOD VECTORS

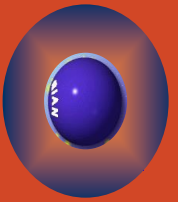


VBD in Indonesia



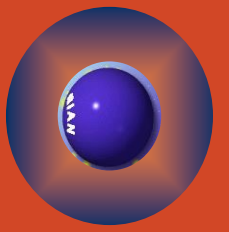
Tick-borne	Mosquito-borne	Other insect-borne
Lyme disease *	Malaria	Leishmaniasis *
Tick-borne encephalitis*	Dengue	Plaque
Human ehrlichiosis*	Chikungunya	Tsutsugamushi diseases
Tularaemia	Filariasis	Typhoid fever
Q fever	Japanese encephalitis	Thyphus, Trench fever
Babesiosis	West Nile virus *	Enteric bacteria diseases
Anaplasmosis	Arbovirosis <small>upikke@ipb.ac.id</small>	Trypanosomiasis

GLOBAL ISSUE EMERGENCE REEMERGENCE VBD



- Development of insecticide and drug resistance;
- Decreased resources for surveillance, prevention and control of vectorborne diseases;
- Deterioration of the public health infrastructure
- Unprecedented population growth;
- Uncontrolled urbanization;
- Changes in agricultural practices;
- Deforestation; and
- Increased travel

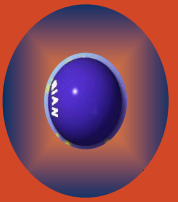
EDFZ in Core Zone JIEP



In order to support the implementation of the 18th Asian Games, especially for equestrian competition, Indonesia has to establish Equine Disease Free Zone (EDFZ).

EDFZ is a horse disease free zone defined by OIE to hold horse racing competitions at the Asian Games and is only valid temporarily



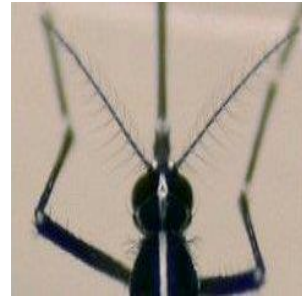


Vector surveillance

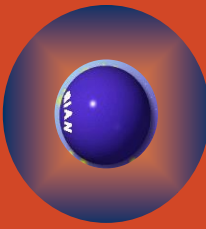
- ❖ Vector surveillance is one of the biosecurity requirement in the monitoring of progress of EDFZ in control and eradication for various diseases, such as mosquito borne diseases.
- ❖ There are several mosquito-borne viral diseases that cause varying levels of morbidity and mortality in humans and animals that can have substantial welfare and economic ramifications (Durand *et al.* 2013).
- ❖ Periodic collection of local mosquito species is essential to inform vector control strategies and track their impact on mosquito borne diseases (Chapman *et al.* 2016).

AIM

- Our field studies aim to describe the potential vector species in core zone, the behaviour, habitats and the environment help to understand the the fluctuation dynamics and the potential disease spread.

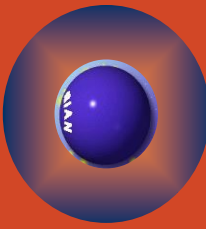


MATERIAL & METHODS



- Location : in Core zone of EDFZ at Jakarta International Equestrian Park Pulomas (JIEPP)
- Time : Januari – April 2018
- Sampling: bewekly

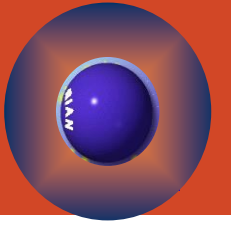
MATERIAL & METHODS



1. Mosquito larval survey → dipper

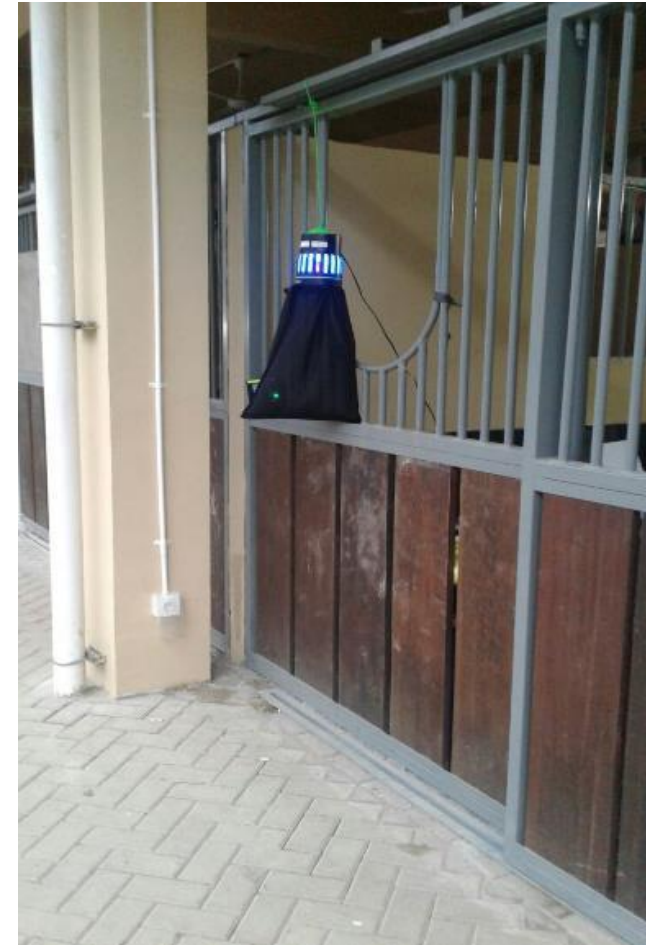


MATERIAL & METHODS

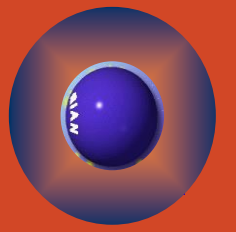


2. Adult mosquito survey → Light Trap (10)

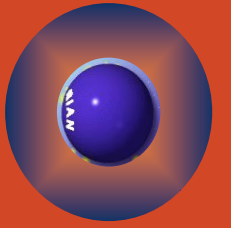
Analisis:
Mosquito Hour Density
(mosquitoes densities per hours)



Results



- ❖ Density of Mosquito larvae
- ❖ Adult Mosquito Density
- ❖ Nocturnal Mosquito Behaviour
 - Data per 2 week (7)
 - Data per month (4)
 - Data Total during 4 moths (1)

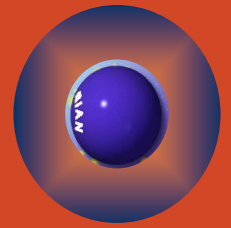


Results

Vector Species

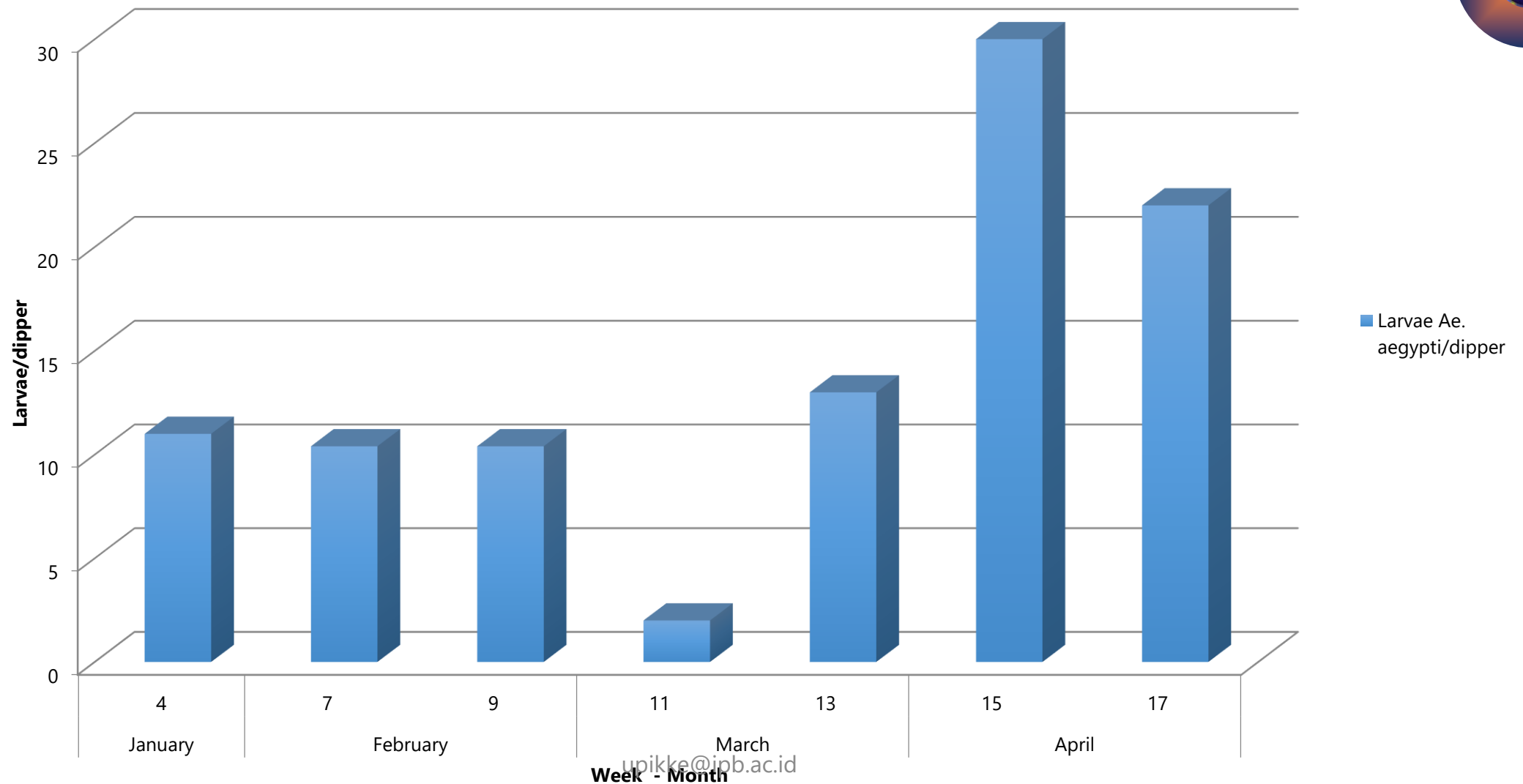
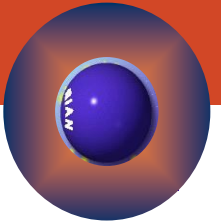
1. *Culex. quinquefasciatus* (adult & larvae).
2. *Cx. tritaeniorhynchus* (adult)
3. *Aedes aegypti* (adult & larvae)
4. *Ae. albopicus* (larva)
5. *Armigeres subalbatus* (adult)
6. *Musca domestica* (adult)
7. *Sarcophaga* sp. (adult)
8. *Chrysomya megacephala* (adult)
9. No Tick and no bat

Mosquitoes Larvae Density

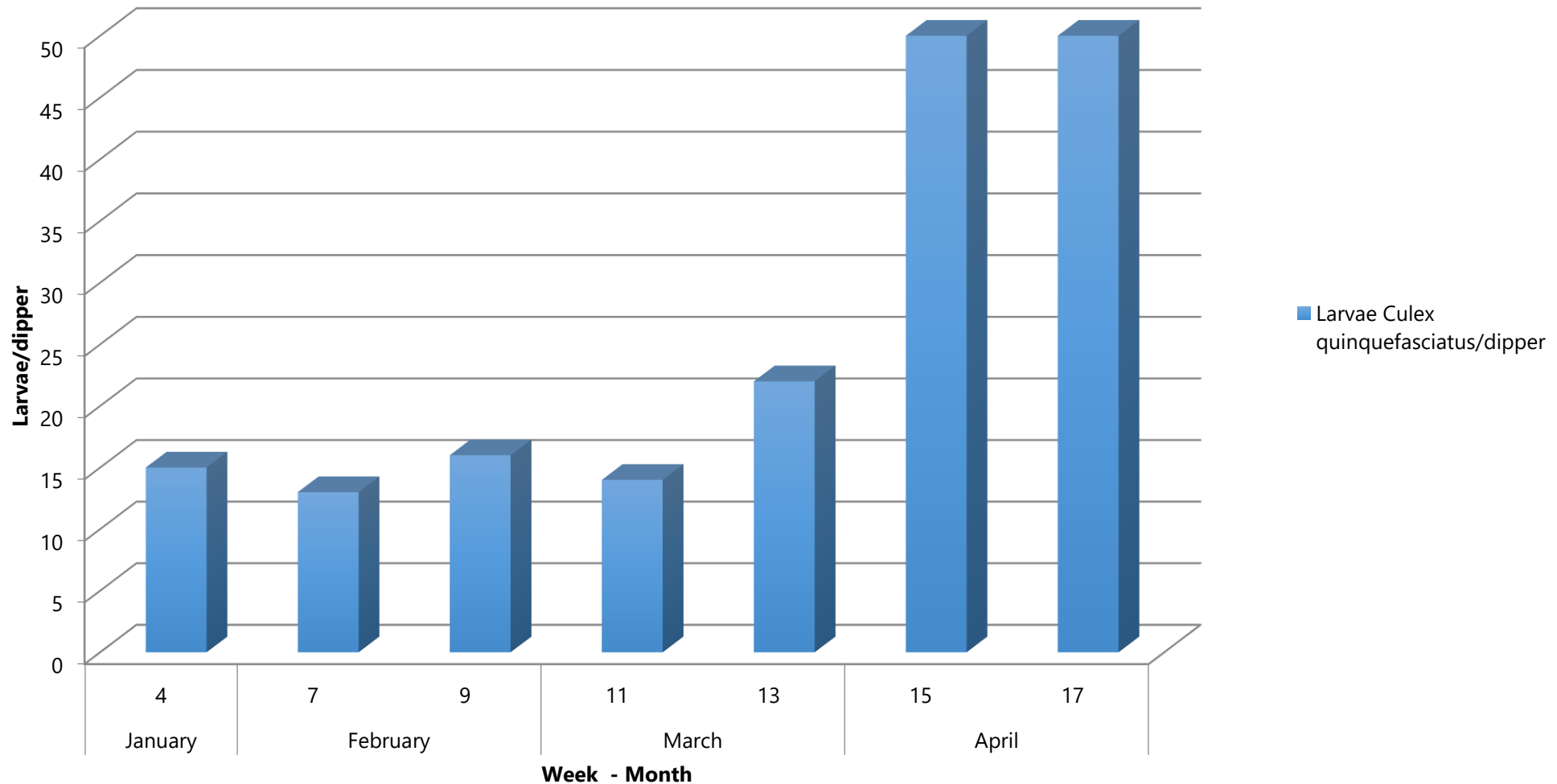
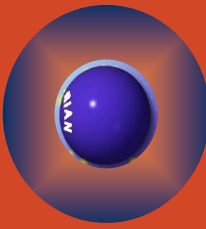


Location	Density of Larvae/Dipper	Spesies	Vector Standard Value (Permenkes No. 70 / 2016)
Temporary Bathroom (PORDASI)	71.4	<i>Cx. quinquefasciatus</i> & <i>Ae. aegypti</i>	Breedingplaces Index : Low : 0 High : > 1
Control Tank	28.6	<i>Cx. quinquefasciatus</i>	
Flower Pots	24.3	<i>Ae. aegypti</i>	
Bromelia Plants	21.4	<i>Ae. aegypti</i>	
Stagnant Water Under The Fountain	14.3	<i>Cx. quinquefasciatus</i> & <i>Ae. aegypti</i>	
Dispenser	5.3	<i>Ae. aegypti</i>	
Lakes	0	0	+ predator (dragonfly nymph)

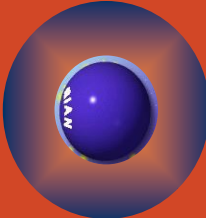
Density of *Ae. aegypti* larvae in Jakarta International Equestrian Park Pulomas (JIEP), January-April 2018



Density of *Cx. quinquefasciatus* larvae in Jakarta International Equestrian Park Pulomas (JIEP), January-April 2018

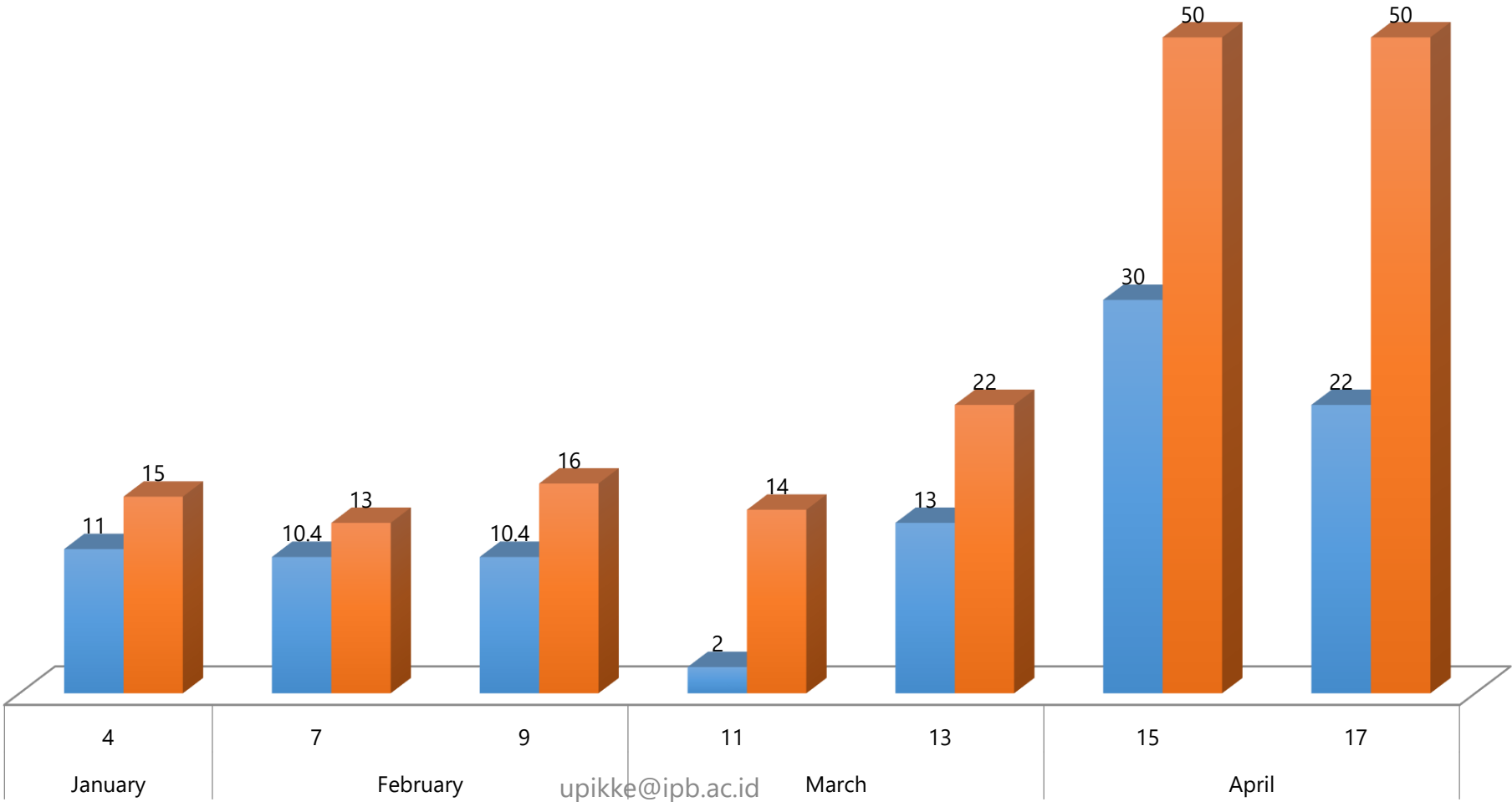


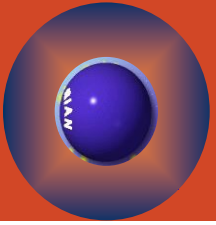
Density of Mosquitoes Larvae (*Ae. aegypti* and *Cx. quinquefasciatus*) in Jakarta International Equestrian Park Pulomas (JIEP), January-April 2018



Densities of Mosquitoes Larvae (larvae/dipper)

■ *Ae. aegypti* ■ *Cx. quinquefasciatus*





Breeding places of *Culex quinquefasciatus*



Control Tank

Breeding places Index : 28.6
larvae/dipper



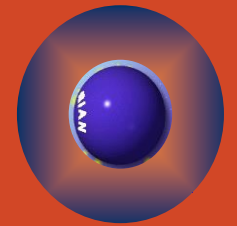
Temporary Bathroom

Breeding places Index : 71.4
larvae/dipper

i
Culex larvae in Temporary
Bathroom (PORDASI)



Breeding places of *Ae. aegypti* di JIEPP

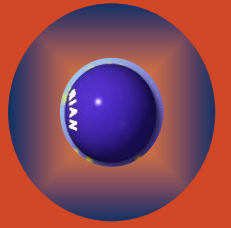


Bromelia Plants
Breeding places Index : 21.4 larvae/pipet



Stagnant Water Under The Fountain
Breeding places Index : 14.3 larvae/dipper

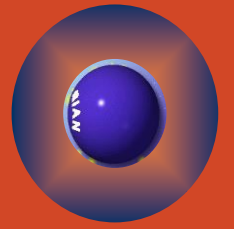
Potensial Breeding places of *Culex quinquefasciatus*



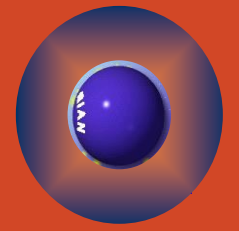
Stagnant Water

(Selokan yang tergenang)

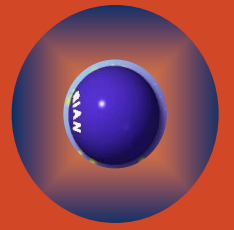
Lakes in JIEP



Mosquitoes predator



Adult Mosquitoes Density



Spesies	Mosq Hour Density (MHD)	Vector Standard Value (Permenkes No. 70 / 2016)
<i>Cx. quinquefasciatus</i>	1.15	Man Hour Density (MHD) : Low : < 0.025 High : > 0.025
<i>Cx. tritaeniorrhynchus</i>	0.08	
<i>Ae. aegypti</i>	0.9	

Mosquito species



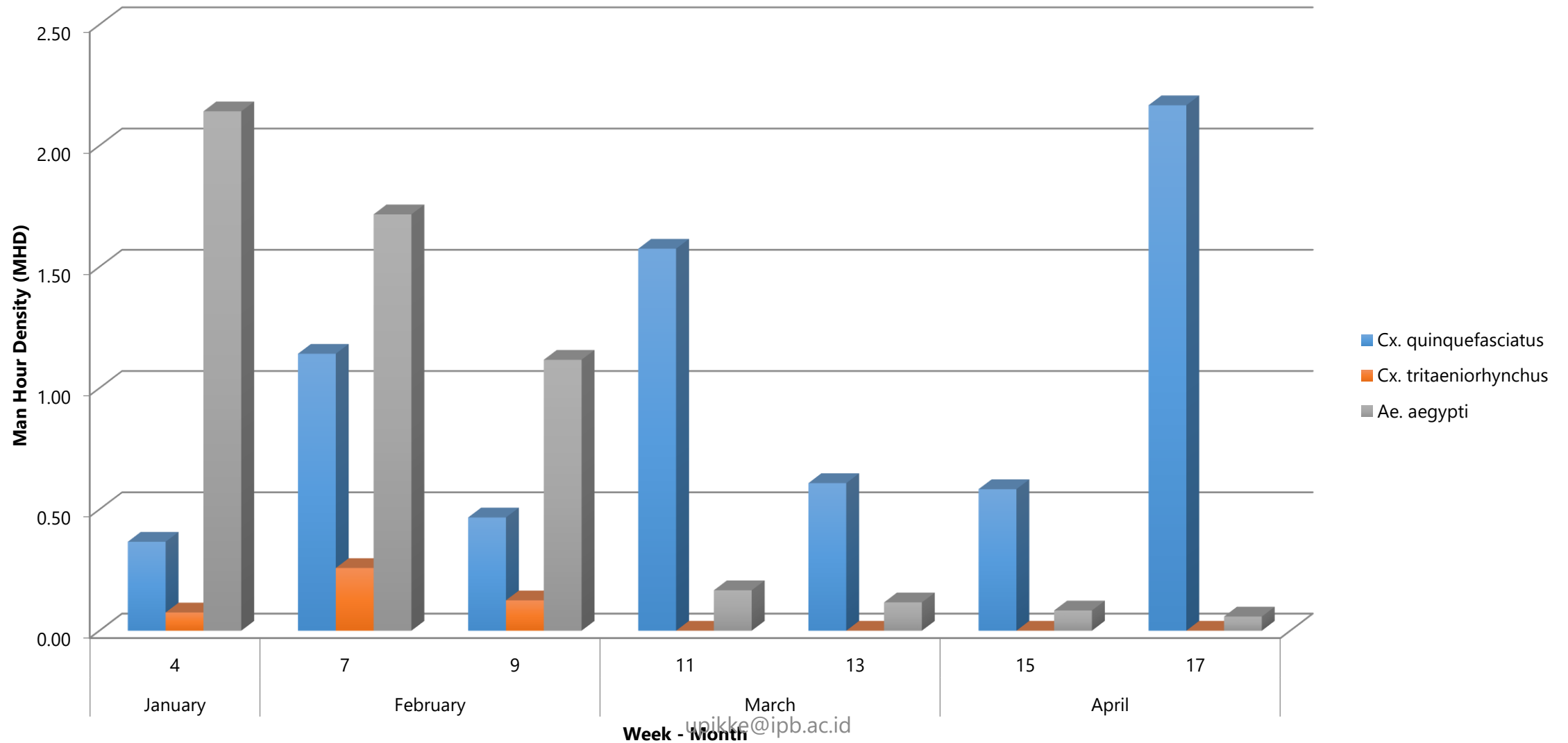
Cx quinquefasciatus

Aedes aegypti

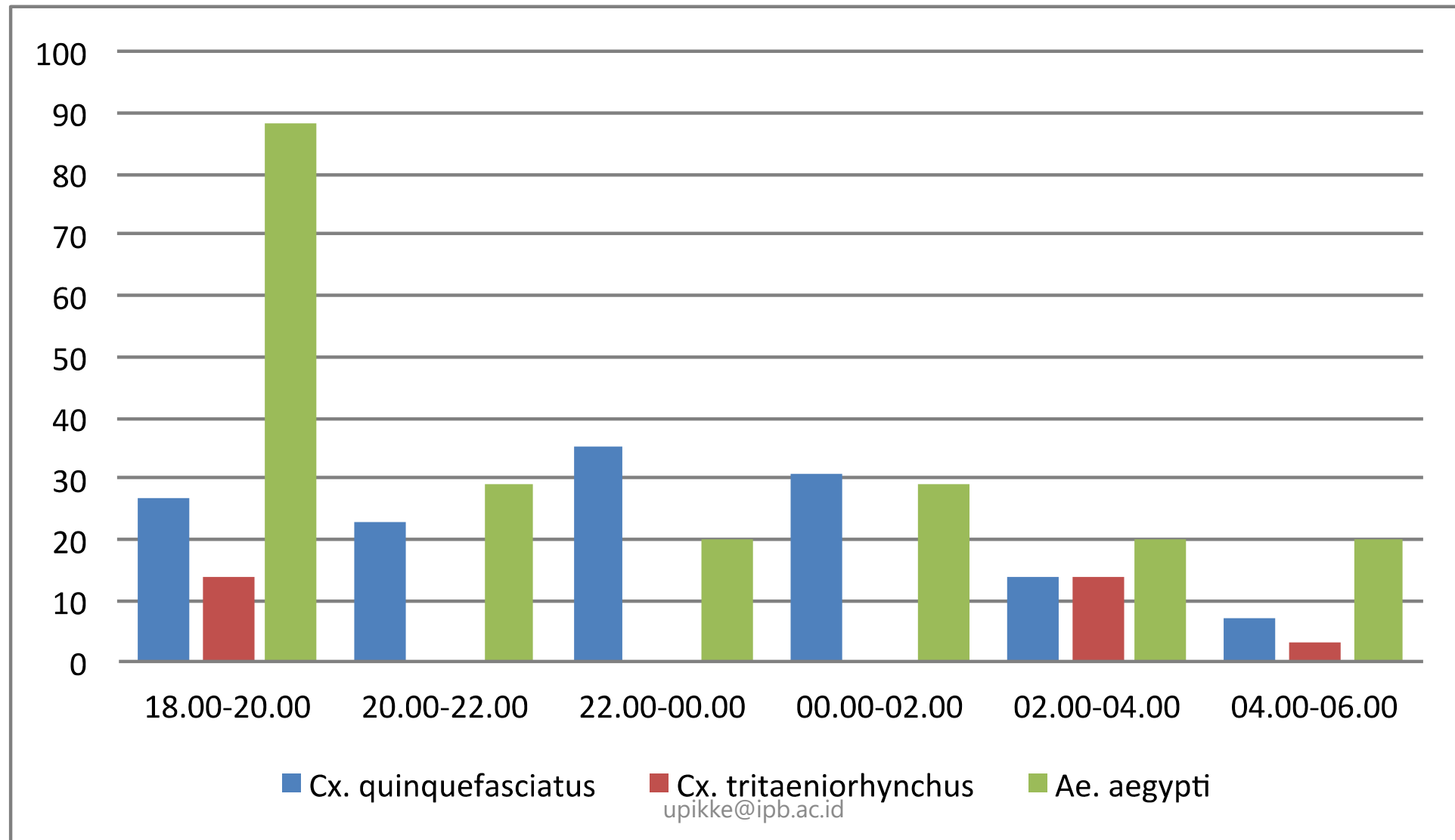
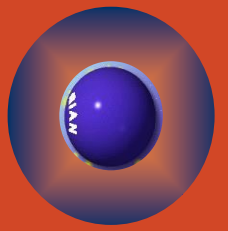


Cx. tritaeniorhynchus

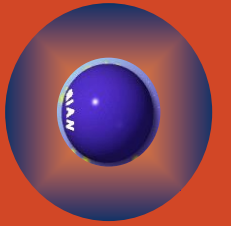
Adult Mosquitoes Density in Jakarta International Equestrian Park Pulomas (JIEP), January-April 2018



Fluctuation of Adult Mosquitoes Behaviour



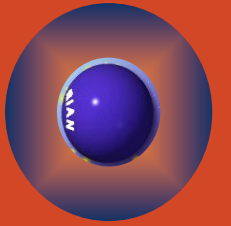
Conclusion



Mosquito Vector Species

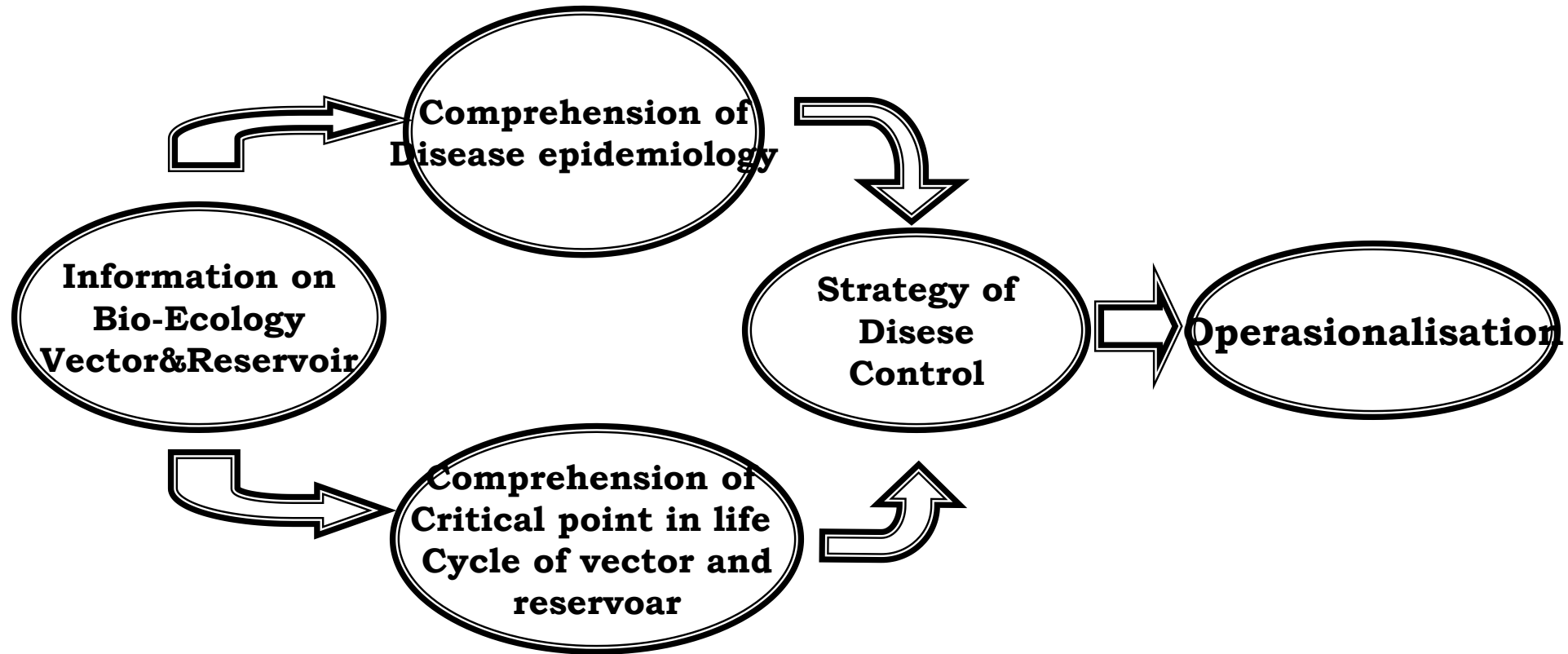
- 1. Culex quinquefasciatus: adult & larvae*
- 2. Cx. tritaeniorhynchus: adult*
- 3. Aedes aegypti: adult & larvae*

Conclusion

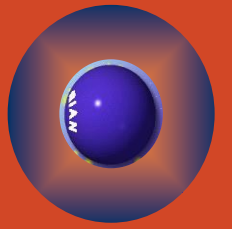


- ❖ The rate of mosquito hour density (MHD) of each mosquitoes was 0.98, 0.15, and 0.77, respectively for *Cx quinquefasciatus*, *Cx tritaeniorhynchus*, and *Ae. aegypti*
- ❖ The larval collection showed 3 species were found i.e. *Culex quinquefasciatus*, *Aedes aegypti* and *Armigeres* in 11 breeding places types.
- ❖ The finding appeared that the highest larval density was showed in public bathrooms (71.4 larvae/dipper) followed by stagnant water control tank (28.6 larvae/dipper) and bromeliad plants (24.3 larvae/pipet).

Concept of Vector borne disease control

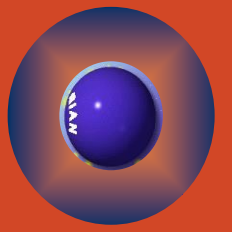


Recomendations



- Vector Surveillance System would provide a cost effective means to combat vector borne disease emergence.
- Early vector control at larval stage was a critical point of the success of EDFZ programs in Jakarta International Equestrian Park Pulomas (JIEPP) Indonesia

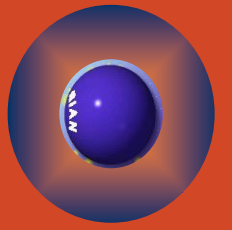
Integrated vector management



The principle of Integrated Pest Management: the use of insecticides with little or without insecticides.

Disposal of waste/garbage in a timely manner will prevent infestations of flies and odors

Good drainage must be maintained to prevent stagnat water and breeding sites of mosquitoes and other annoyance insects



Vector Control: 4 Location JIEPP

1. Tribun Area:

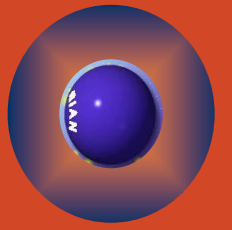
Prevention: Tribun (Air flow/UV Electric Light Trap near the entrance).

Insecticide applications by ULV / Fogging machines: 1-2 days before horse coming,

Source reduction in out door areas (park, fountain, flower pots, gutter etc)

Vector control in Office areas :

2. Indoor areas



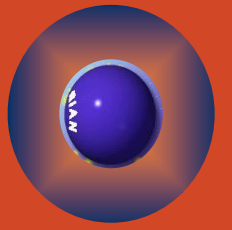
Prevention: Indoor (Air flow/UV Electric Light Trap near the entrance).

Daily Insecticide application by using One Push (One push application: effective protection 8-12 hours)

Efforts to eliminate the source of mosquitoes (breeding places) in door (inside the building)

Vector Control:

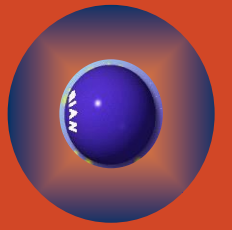
3. In Out door areas



- Insecticide applications by ULV / Fogging machines: 1-2 days before horse coming,
- Source reduction of mosquito breeding sites: (1) Good drainage must be maintained to prevent waterlogging and mosquito breeding, (2) replacement of bromeliad plants etc.

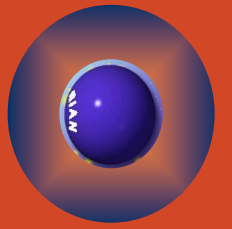
Vector Control:

4. In Horse Stables



- **Insecticide applications by ULV / Fogging machines: 1-2 days before horse coming**
- **Daily insecticide application with One Push (One push application: one push effective for protection 8-12 hours, every night in certain areas that are safe from horse contact)**
- **UV electric light traps**
- **Good management of manure, wastes, water and food**

Recommended Insecticide: Pyrethroid



For adult mosquitoes & other annoyance insects

- Alpha-cypermethrin, Permethrin, Deltamethrin, Lambdasihalotrin, Transflutrin, Cyflutrin, Metoflutrin, etc. circulating in Indonesia with various brands and formulations.

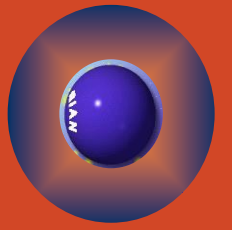
For Mosquito Larvae:

- Temephos 1%, Bacillus thuringiensis H-14 1200 ITU/ltr, S Methopren IGR 1.8% G 72 mg/ m², etc.

For Flies:

- Agita 1GB, Agita 10 WG, ZeroFly[®] Livestock

Last Recommendation

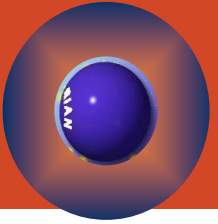


JIEPP must have one pest control authority
whose in charges in vectrol control
activities

ACKNOWLEDGMENTS

- ❖ The research was supported by the Directorate General of Livestock and Animal Health Services (DGLAHS), Ministry of Agriculture, The Republic of Indonesia,
- ❖ Veterinary Services of Jakarta Metropolitan

Vector Surveillance Team



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Terima Kasih_Thank You

