

**Mosquito larvicidal and pupicidal properties of
essential oils from some Rutaceae plants against
Aedes aegypti (linn.)
and *Culex quinquefasciatus* (Say)**



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Outline

- ❖ **Introduction,**
- ❖ **materials and methods**
- ❖ **results**
- ❖ **discussion**



Introduction



Ae. aegypti is a major vector of dengue fever (DF) and dengue hemor-rhagic fever (DHF).







Chikungunya Fever



Culex quinquefasciatus

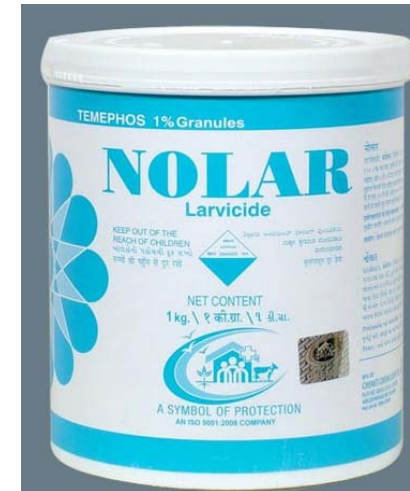


❖ Lymphatic filariasis “elephantiasis”



1.4 billion people
are threatened by
Lymphatic filariasis
(WHO,2013)

✓ The control of mosquito vectors are based on the chemical insecticide.



❑ The disadvantage of using Synthetic insecticides

- ✓ insecticide resistance
- ✓ environmental pollution
- ✓ contamination of humans and animals





Most of the available synthetic insecticides kill only adult mosquitoes



A few synthetic insecticides kill mosquito larvae and pupae

Natural products used as mosquito insecticides

- ❖ have less of an environmental impact due to shorter latency
- ❖ preventing the evolution of resistance
- ❖ Safe to human





Essential oil





The aim of the research



To investigate the larvicidal and pupicidal activities of essential oils from 7 Rutaceae plants

against *Aedes aegypti*

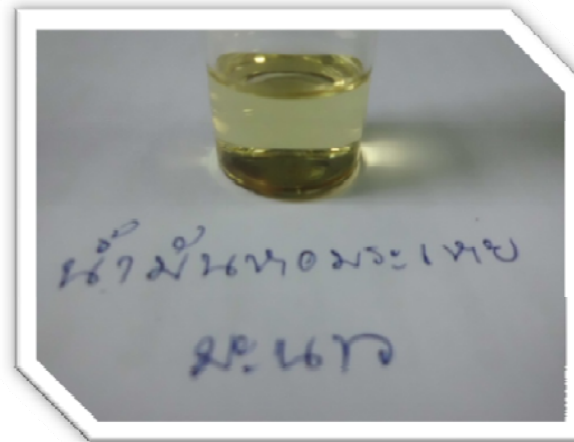
and *Culex quinquefasciatus*



Rutaceae plants



13



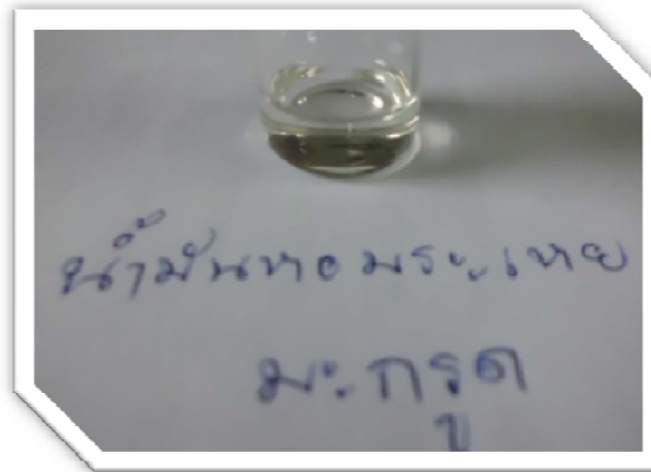
Thai name	Common name	Botanical name
Manao	Lime	<i>Citrus aurantifolia</i> Swing.



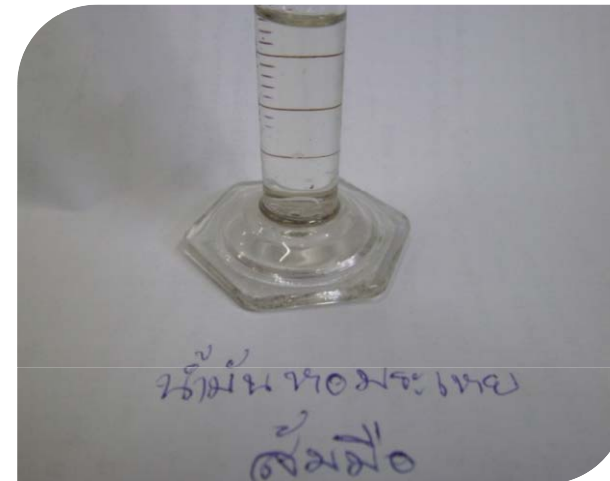
Thai name	Common name	Botanical name
Som sa	Bitter orange, Sour orange, ,Bouquetier, Bigarade	<i>Citrus aurantium</i> Linn



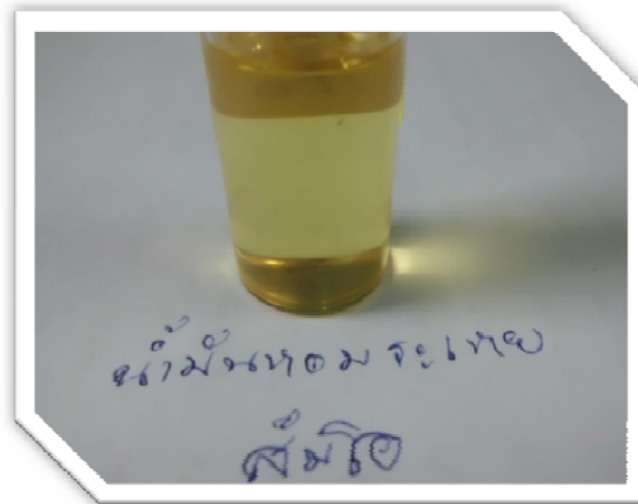
15



Thai name	Common name	Botanical name
Makrud	leeach lime , kaffir lime	<i>Citrus hystrix</i> DC.



Thai name	Common name	Botanical name
Sommo	Buddha's Fingers, Fingered Citron	<i>Citrus medica</i>



Thai name

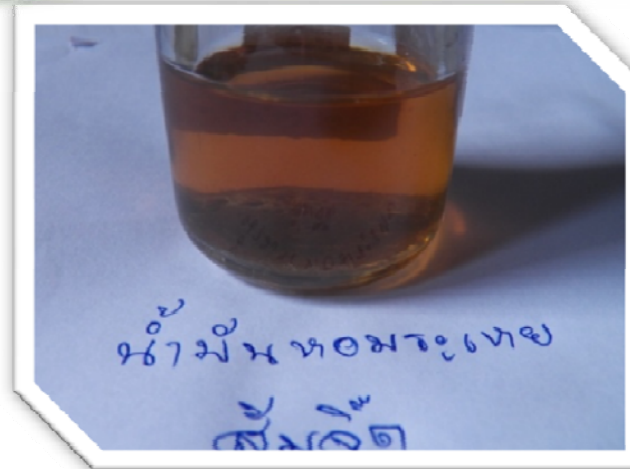
Common name

Botanical name

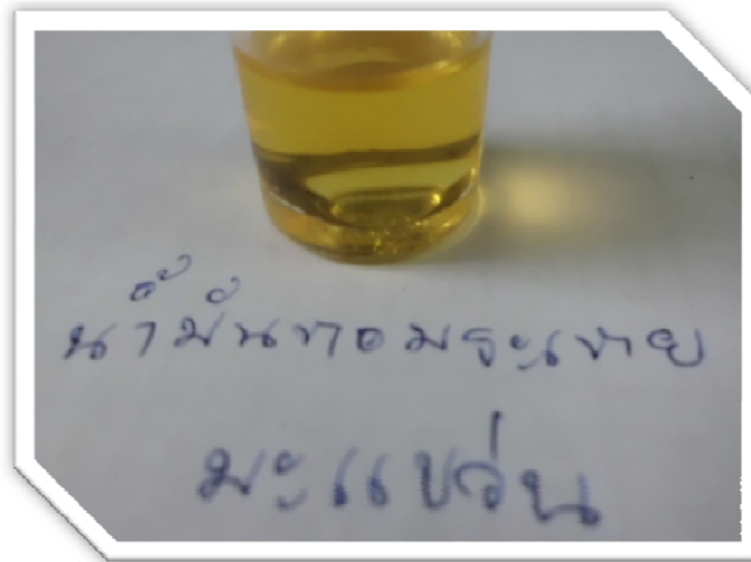
Som o

Pomelo or Grapefruit

Citrus maxima* var. *racemosa



Thai name	Common name	Botanical name
Somgid	Kumquat, Tound	<i>Citrofortunella microcarpa</i> (Bunge) Wijnands



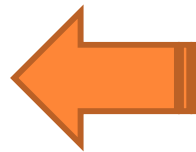
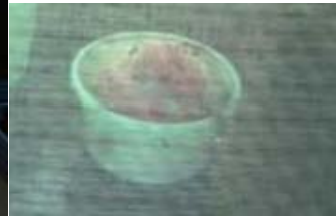
Thai name	Common name	Botanical name
Ma khwaen		<i>Zanthoxylum limonella</i> Alston

Material and methods

Mosquitoes

**The mosquitoes were raised in
Plant Production Technology Section,
Faculty of Agricultural Technology,
King Mongkut's Institute of Technology Ladkrabang
Bangkok.**





ESSENTAIL OILS



Water distillation



essential oil



**10%
in ethyl alcohol**



Larvicidal and Pupicidal activity Testing

According to World Health Organization (2005).



- ❖ One milliliter of test oil was added to 99 ml distilled water in a plastic cup.
- ❖ Twenty-five specimens of fourth instar larvae and pupae were placed in each cup.
- ❖ No food was provided during the treatment.

✓ **Larval mortality was recorded at 1, 5, 10, 15, 30, 60 minutes, and 24 hours**



✓ **Pupal mortality was recorded at 15, 30 minutes, 1, 3, 6, 12, 24 and 48 hours.**



✓ **Each experiment was performed in five replications**

Results

LT_{50}

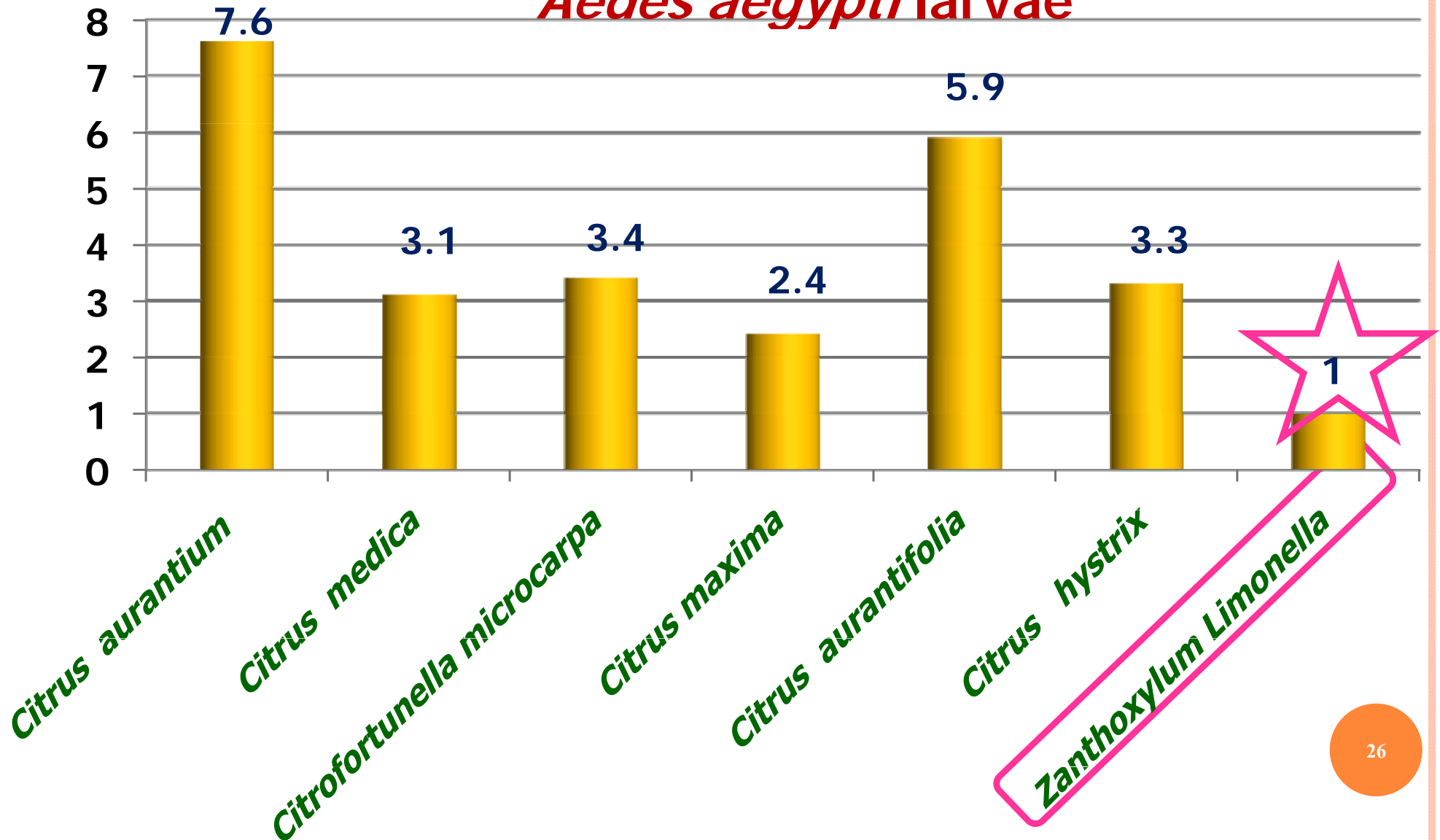
(lethal time for 50% mortality)



Larvicidal activity

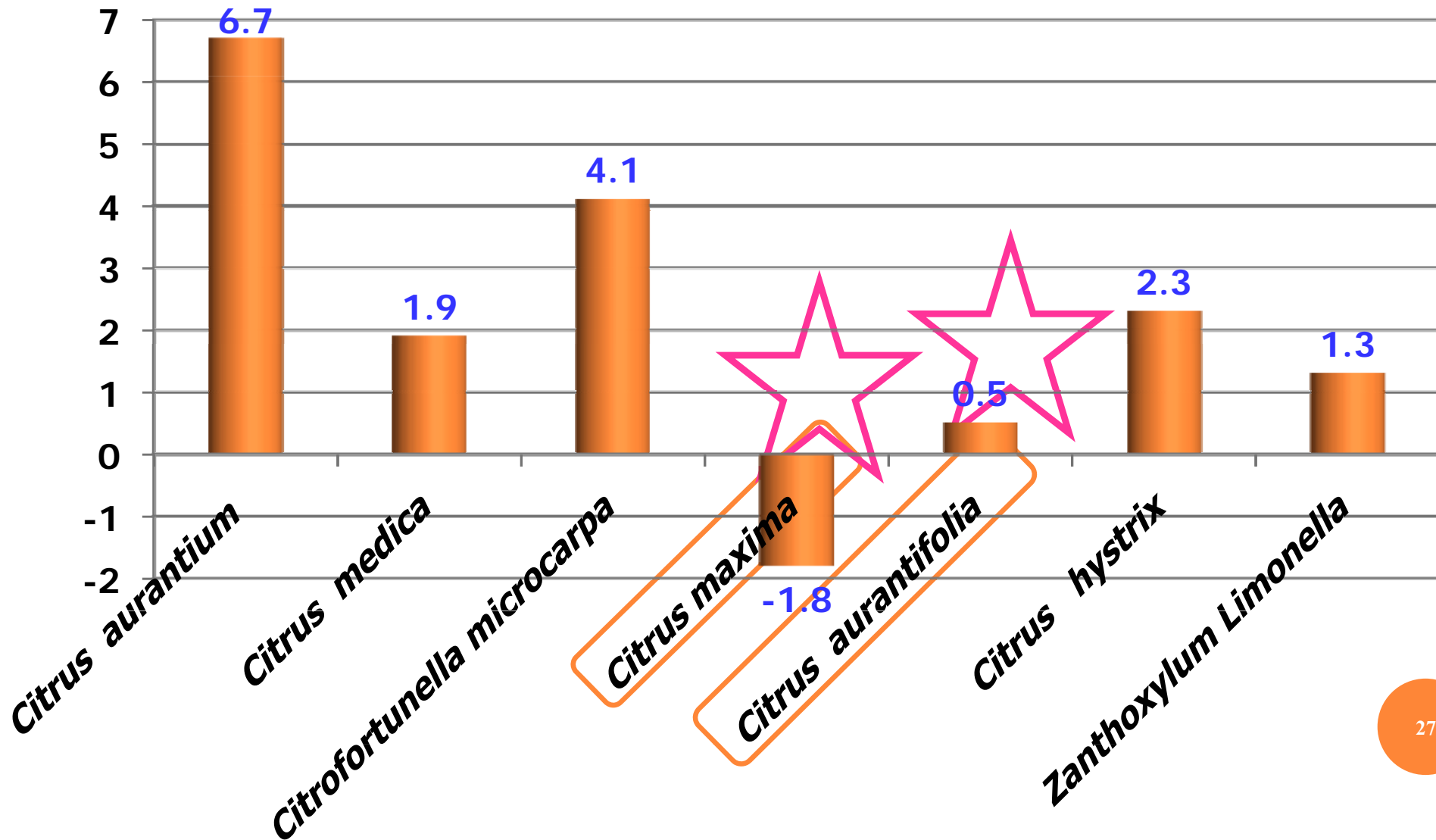
minutes

The LT_{50} of the essential oils against *Aedes aegypti* larvae



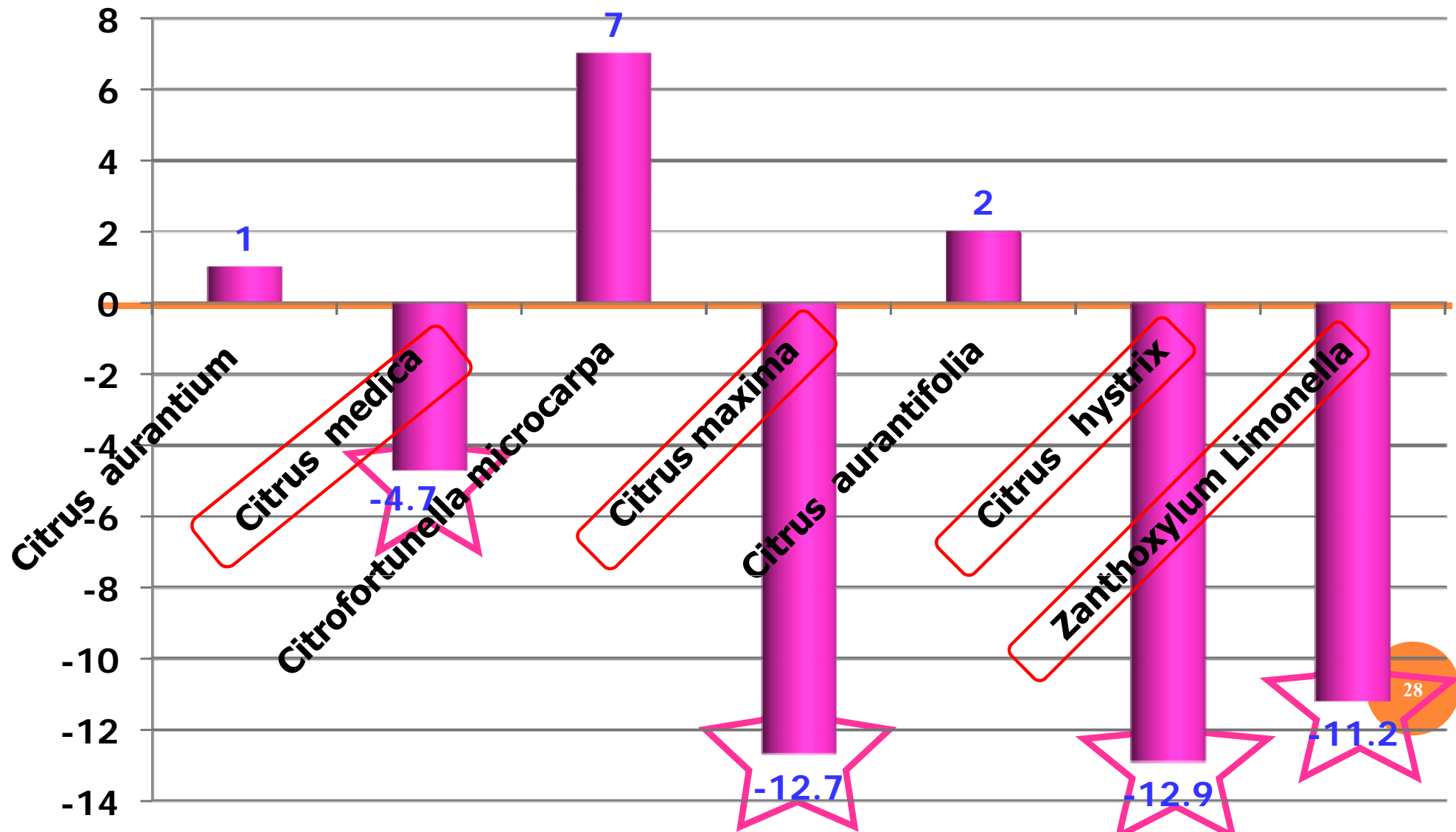
Larvicidal activity

The LT_{50} of the essential oils against *Cx. Quinquemaculatus* larvae



Pupicidal activity

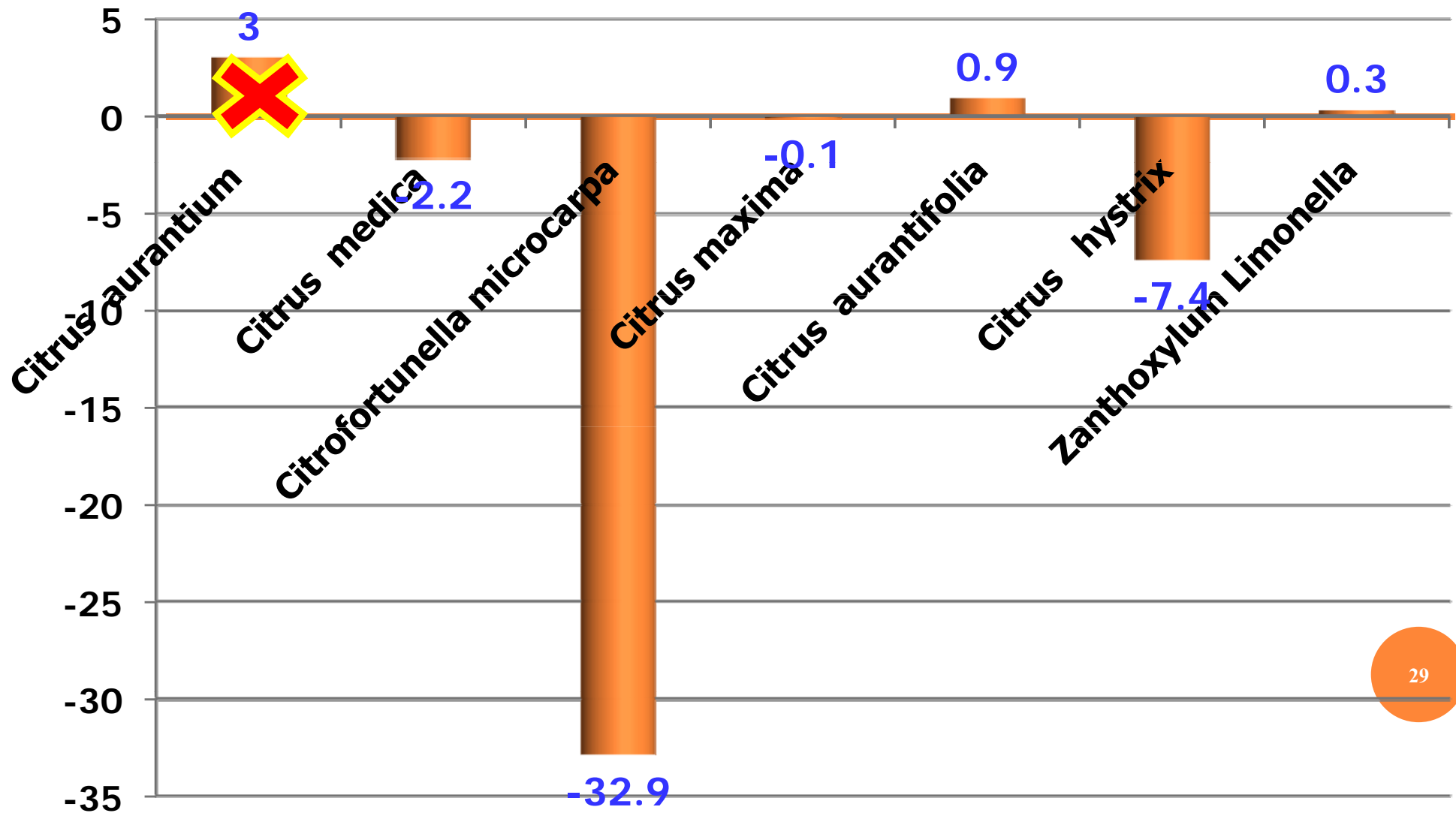
The LT_{50} of the essential oils against *Aedes aegypti* pupae



Pupicidal activity

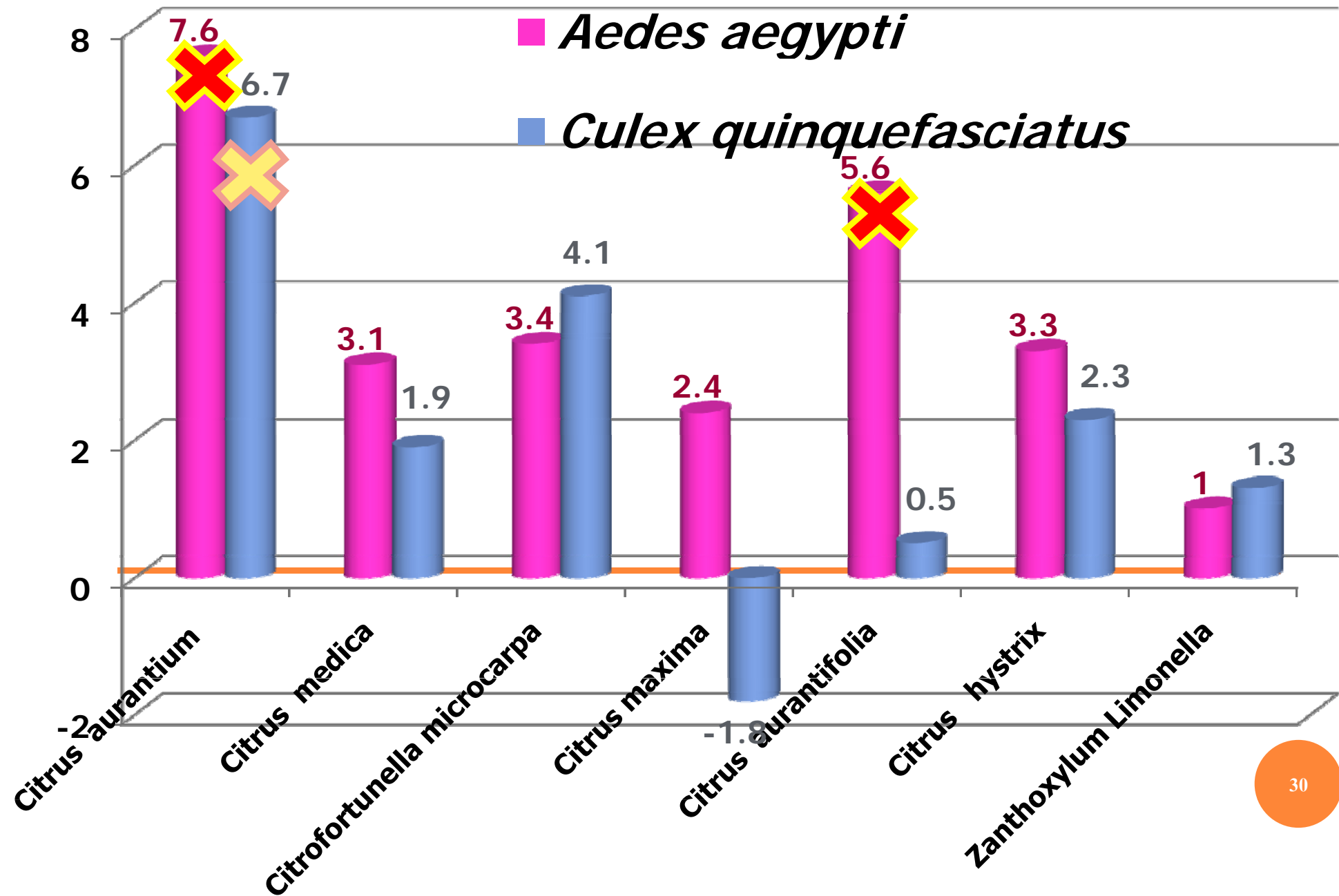
The LT_{50} of the essential oils against *Cx. Quinquifasciatus* pupae

hour



Larvicidal activity

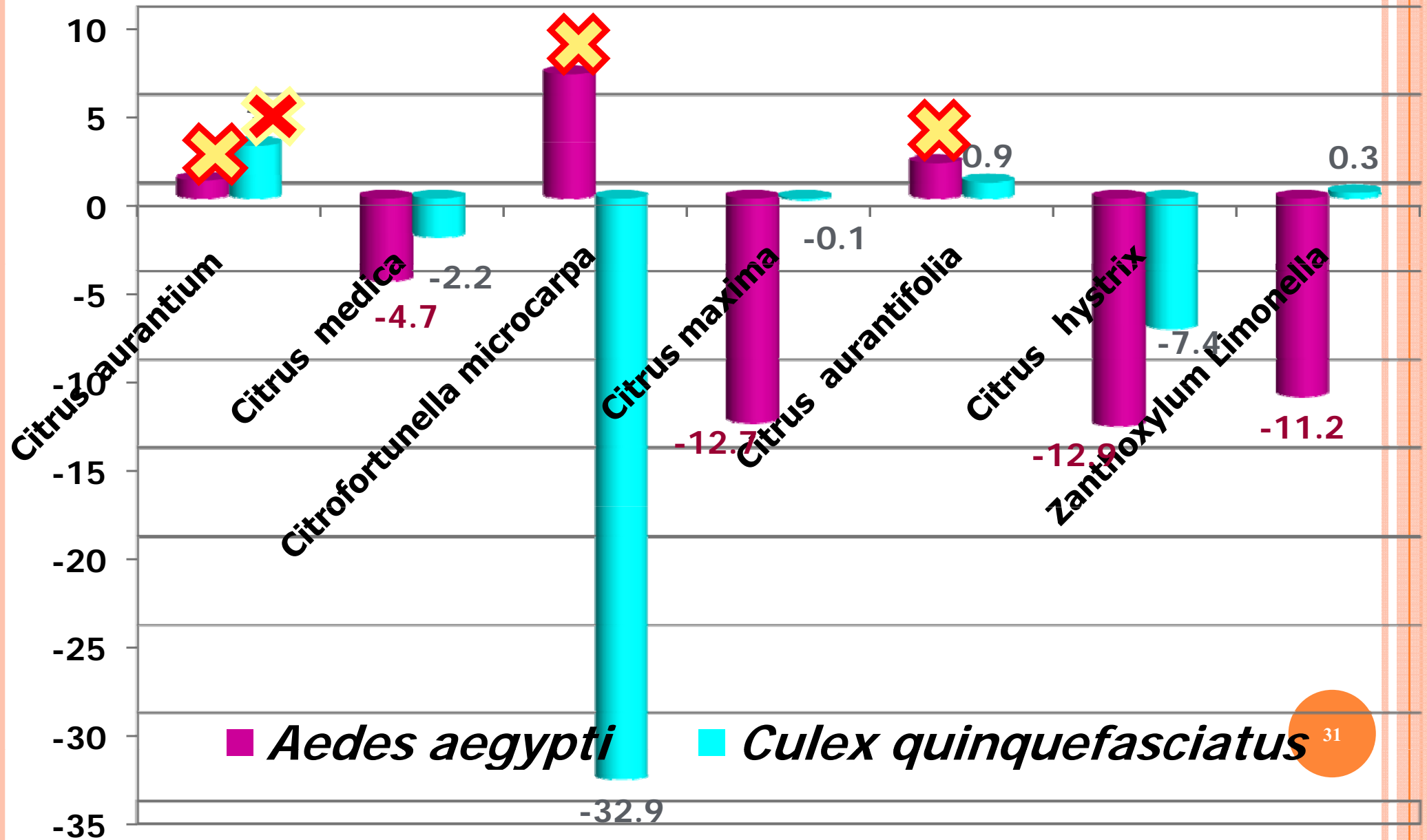
minutes LT_{50}



Pupicidal activity

LT₅₀

hour



Conclusion & Discussion



Citrus hystrix



Citrus medica



Citrus maxima



Zanthoxylum limonella



MosquitoWorld

Your guide to effective mosquito control

- The results could be useful to develop newer, safer and more effective natural products for controlling mosquitoes in the future.



Acknowledgments

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❖ The Department of Entomology, Armed Forces Research
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❖ Asso. Prof. Dr. Mayura Soonwera



Thank you

