Japanese Encephalitis Virus
- a vector borne pathogen in urban pig farming

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Features

Background
- Urban and peri-urban agriculture
- Vector borne diseases
- Japanese Encephalitis Virus

The studies
- Material & method
- Results
- Conclusions & goals

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Urban and peri-urban agriculture

• Increasing in both developed and developing countries
• “Urban agriculture is the practice of cultivating, processing and distributing food in, or around, a village, town or city.”

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Is urban agriculture important?

- 7 billion people
- 50% urban inhabitants – continuous urbanisation
- It involves approximately 800 million people and produces 15-20% of the food in the world
The benefits and problems

• Local markets with living and dead animals
The benefits and problems

- Possibility to use urban wastes and waste water
- Lacking sanitation
Pros and cons

• Economic possibility for smallholders
  – Extra income
  – High quality protein
  – Possibility for many women

• High density of people and animals

• Living in close proximity to the animals
Pathogens in the urban agriculture

- Zoonotic animal diseases
- Food-borne pathogens
- Vector-borne diseases
Vectors

- Host preferences
- Breeding grounds
Transboundary pathogens

- Climate & climate changes
- Globalisation
Epidemiology of vector borne diseases

• Anthropogenic changes
Japanese Encephalitis Virus, JEV

- Reservoir in birds
- Reproductive disorder in pigs
- Encephalitis in horses
- Most common cause of viral encephalitis in humans

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Disease in pigs....

- Embryonal death and resorption, weak born or mummified fetuses
- Symptoms mostly in pregnant sows
Disease in humans and horses

- Often asymptomatic
- Fever, headache and meningitis
- Acute flaccid paralysis
- Coma, death
A Flavivirus ...and an Arbovirus

- **Culicidae, genus Culex**
  - Culex pseudovishnui
  - Culex tritaeniorhyncus
  - Culex gelidus
  - Culex fuscocephala
  - Culex annulirostris
  - Culex quinquefasciatus

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A transboundary zoonosis

• 3 billion humans live in endemic areas

• 50,000 human cases per year

• Case fatality 30%
Objectives

– Study the seroprevalence of JEV
– Map the Urban agriculture in Can Tho
– Describe the vector density with respect to pigs and humans
Our goal

• Assess the association of seropositivity with reproduction
Virus & reproduction

- 315 serum samples from 1999
- Reproductive data
- Indirect IgG ELISA
Seroprevalence

Negative  Positive  Sceptical

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Division of reproduction
Conclusions

• In endemic areas the effect of seropositivity can’t be observed
Our goal

• Assess the risk of keeping pigs in urban areas
Can Tho province

People

Pigs

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Ninh Kieu district - Can Tho city

- Around 4800 pigs on 288 pig farms
  - <17 pigs per farm
  - 1-2 sows
- No poultry reported
- Not many paddy fields
Can Tho city

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Catching the vectors

- CDC Mini light traps over night
- Traps by pigs and people
- In different locations
  - In households with no pigs
  - In households with 1-110 pigs

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Human versus pig traps

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Division of reproduction

- Cx Tritaeniorrhynchus
- Cx Gelidus
- Cx Quinquefasciatus
- Anopheles
- Mansonia
- Culex males
Different species caught

Total number caught

- Tritaeniorrhynchus
- Gelidus
- Quinquefasciatus
- Anopheles
- Mansonia
- Culex males

No pigs in household

Pigs in household

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Conclusions

- Pigs in an urban area are associated with the number of vectors found close to human habitats
- This association differs between mosquito species
Conclusion

• JEV can be found in the urban mosquitoes
The importance of this?

• A transboundary pathogen
• Present in urban agriculture
• Risk for further emergence
Thank you for your attention!

• Any questions?