LinkTADs

Joint research and exchange activities supported by LinkTADs

LinkTADs 项目支持的合作研究和交流活动

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Acronyms

RVC	Royal Veterinary College
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement.
SVA	National Veterinary Institute
SHVRI	Shanghai Veterinary Research Institute
HVRI	Harbin Veterinary Research Institute
CAHEC	China Animal Health and Epidemiology Center
CADC	China Animal Disease Control Center

Brief introduction of LinkTADs WP7 objectives

Objectives

- To prepare and organize series of exchanges including short-term visits and laboratory works, and training programmes between European and Chinese research organisations.
- To raise the cooperation opportunities and identify joint research interests on specific topics between European and Chinese researchers.
- To enhance existing collaborations and encourage new partnerships.

Brief introduction of LinkTADs WP7 tasks

Task 7.1 Short-term Academic Visits

Leader: RVC

–Main Contributors: SPI, FAO, SVA, HZAU, HVRI,SHVRI, CAHEC

Description

–To bring together interested European and Chinese scholars, researchers and other stakeholders in order to deepen the knowledge about each other´s organizations.

–Organize 4 short-term academic visits between European and Chinese institutions.

–The short-term visits will serve as bases for establishing further collaboration activities.

Brief introduction of LinkTADs WP7 tasks

Task 7.2 Laboratory and Epidemiology Work

Leader: SHVRI

–Main Contributors: FAO, RVC, CIRAD, SVA, HVRI, CAHEC, CADC, SPI

Description

–To enhance collaboration between research institutes in China and EU on selected topics through bringing outstanding, interested European and Chinese scholars, researchers and other stakeholders to each other´s institutions.

–Three joint research topics for this work as well as the relevant hosting institutes will be selected and implemented in China and EU.

Overview of LinkTADs WP7 tasks implemented

Task 7.1 short-term academic visits

- Topics for short-term visit and exchange programmes (D7.1)
- Short-term visit: CAHEC to RVC (D7.2)
- Short-term visit: RVC to CAHEC (D7.3)
- Short-term visit: CIRAD to SHVRI (D7.4)
- Short-term visit: FAO to CAHEC and CADC (D7.5)
- Additional short-term visit: CIRAD to SHVRI
- Additional short-term visit: SVA to SHVRI

Task 7.2 laboratory and epidemiology work

- Professional questionnaires for exchange programmes (D7.6)
- Exchange programme between HVRI and SVA (D7.7)
- Exchange programme between SHVRI and SVA (D7.8)
- Exchange programme among CIRAD, RVC and CAHEC (D7.9)

Special activities of Task 7.1

Topics identified for Task 7.1 and 7.2 (D7.1)

– Nine topics were identified by European and Chinese scientists and experts in Shanghai workshop held in April 14-16, 2014, for implementation of Task 7.1 and 7.2.

- **Communications on strategies and policies related to animal health and trade**
- **Training in epidemiological methodologies**
- **Share and exchange technologies in development of novel diagnosis and vaccines**
- **Collaboration on epidemiology and impact of avian influenza**
- **Collaboration on surveillance of African swine fever**
- **Collaboration on diagnosis and vaccine development of classical swine fever**
- **Collaboration on detection of antimicrobial resistance**
- **Joint-research on Rabies**
- **Collaboration on surveillance of vector-borne virus (Flavivirus)**

Special activities of Task 7.1

Short-term Visit 1: CAHEC to RVC (D7.2)

- In May 6-30, 2014 RVC hosted an academic visit by Dr Kang Jingli of CAHEC to deepen knowledge about each other's organisations, and facilitate Kang Jingli's training in epidemiological techniques for animal health management.
- Specific aims for Kang Jingli were:
  - Learn about animal health information systems and database management.
  - Learn about animal disease surveillance, outbreak investigation and risk analysis.
  - Discuss interesting programmes for possible collaborations in the future.

Special activities of Task 7.1

Short-term Visit 2: RVC to CAHEC (D7.3)

- Between the 6th and 14th of April, 2015, three researchers form RVC visited CAHEC in Qingdao under the LinkTADs short-term visit programmed.
  - Dr Guillaume Fournié
  - Dr Bryony Jones
  - Dr Timothée Vergne
- The specific objectives were:
  - To contribute to the LinkTADs epidemiology workshop organized by CAHEC;
  - To visit the CAHEC laboratory and exchange research interests with scientists from CAHEC;
  - To assist CAHEC and RVC to deliver the PETFV training.

Special activities of Task 7.1

Short-term Visit 3: CIRAD to SHVRI (D7.4)

- Between the 4th and 12th of September 2015, two scientists from CIRAD visited SHVRI to participate in the Kick-Off meeting of the JEV project "Eco-epidemiology and Risk Analysis of Genotype Shift of Japanese Encephalitis Virus in Pigs and Mosquitoes" and laboratory experiments.
  - Dr Julien Cappelle, Health Ecologist at CIRAD.
  - Dr Véronique Chevalier, Veterinary Epidemiologist at CIRAD
- The purposes of the short-term visit were:
  - To discuss the strategic and operational issues linked to the JEV project implementation;
  - To participate in the sample collection from pig farms;
  - To train Chinese young scientists and students in epidemiology;
  - To identify potential collaborations.

Special activities of Task 7.1

Short-term Visit 4: FAO to CAHEC and CADC (D7.5)

- Between the 2nd and 7th of August 2015, two representatives from FAO visited CAHEC, CADC, SPI and Veterinary Bureau, Ministry of Agriculture in Beijing (China)
  - Daniel Beltrán-Alcrudo, the coordinator of LinkTADs project
  - Shuo Li, LinkTADs representative at both FAO ECTAD China and CADC
- The specific objectives were all related to ASF:
  - To discuss the current ASF status, ongoing ASF global initiatives and potential collaborations;
  - To discuss the ASF ontingency Plan currently being finalized for China;
  - To discuss the participation at the coming meetings in Vienna;
  - To discuss on-going and future activities of LinkTADs with the Advisory Board member.

Special activities of Task 7.1

Short-term Visit: CIRAD to SHVRI (Additional)

- Between the 6th and 13th of April, 2016, Dr. Julien Cappelle from CIRAD visited SHVRI.
- The purpose of this visit was:
  - To finalize the experiment protocol of the JEV project “Eco-epidemiology and Risk Analysis of Genotype Shift of Japanese Encephalitis Virus in Pigs and Mosquitoes”.
  - To participate in the sample collection from pig farms.

Short-term Visit: SVA to SHVRI (Additional)

- Between 19th and 24th of June 2016, Dr. Frederik Widén and Dr. Lihong Liu from SVA visited SHVRI.
- The goals of this visit were:
  - To exchange progress on porcine respiratory disease complex (PRDC).
  - To discuss the potential of a grant application between SVA and SHVRI.
  - To set up the plan of preparation for a grant application.

Special activities of Task 7.2

Professional questionnaires (D7.6)

- Questionnaires for WP7 exchange programmes were conducted in August 2014.
- Three exchange programmes were identified:
  - Exchange programme 1: HVRI-SVA
    - share and exchange technologies in development of novel diagnosis)
  - Exchange programme 2: SHVRI-SVA
    - Collaboration on emerging swine diseases
  - Exchange programme 3: CIRAD-CAHEC-RVC
    - Collaboration in epidemiology by twining LinkTADs and RiskSur projects

Special activities of Task 7.2

Exchange programme 1: HVRI and SVA (D7.7)

- Topic: Share and exchange technologies in development of novel diagnosis
- Date: June 24-30, 2014; October 18-31, 2014
- Organizer/tutor: Dr Huaji Qiu, HVRI
- Description:
  - Dr. Lihong Liu visited HVRI on June 24-30, 2014. During his visit, Dr. Liu demonstrated his portable real-time PCR in Dr. Hua-Ji Qiu's lab, exchanged the research progress in both parties, and discussed the possible collaborations between HVRI and SVA.
  - Dr. Yuzi Luo from HVRI visited SVA on October 18-31, 2014. In SVA, Dr. Luo evaluated several diagnostic assays for CSF and ASF developed in HVRI and visited labs and facilities of SVA.

Special activities of Task 7.2

Exchange programme 2: SHVRI and SVA (D7.8)

- Topic: Collaboration on emerging swine diseases
- Date: July 19-23, 2015; September 21-25, 2015
- Organizer/tutor: Zhiyong Ma, SHVRI
- Description:
  - Two scientists from SVA and one from CReSA visited SHVRI on July 19-23, 2015.
  - Two young scientists from SHVRI visited SVA on September, 21-25, 2015.
  - The objectives were:
    - To participate in the Kick-Off meeting of the JEV project.
    - To exchange the knowledge and research projects on emerging swine diseases.
    - To discuss the establishment of joint-laboratory of animal infectious diseases.
    - To identify potential collaborations.

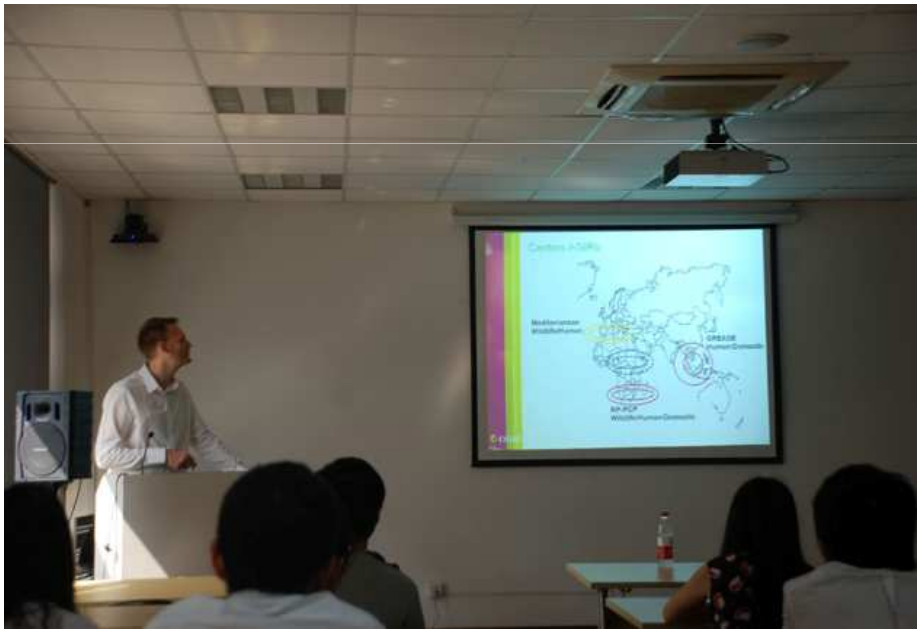
Special activities of Task 7.2

Exchange programme 3: CIRAD, RVC and CAHEC (D7.9)

- Topic: Collaboration in epidemiology by twining LinkTADs and RiskSur projects
- Date: from 2015 to 2016
- Organizer/tutor: Dr Julien Cappelle, CIRAD
- Description:
  - Visit 1: RVC and CIRAD scientists visit CAHEC and participate to the field epidemiology training and Risk surveillance workshop planned in WP3 in Qingdao in July 2015.
  - Visit 2: CAHEC scientist participate to the final RISKSUR meeting in Paris, France, in October 2015;
  - Visit 3: CIRAD and RVC scientists met with CAHEC scientists when they participated in the analytical epidemiology training organized in Qingdao on 25-27 April 2016.
  - Visit 4: CAHEC, CADC Fudan university scientists will meet with CIRAD scientist in Bangkok during the advanced epidemiology training of the InterRisk master.
    - Participation in the basic epidemiology and biostatistics module (7 to 18 March 2016).
    - Participation in the advanced modules (19-30 September 2016; 03-14 October 2016).

Photo of the special activities

Shirt term visit: CIRAD to SHVRI (D7.4)



Presentation by Dr Julien Cappelle from CIRAD

Kick-Off meeting of the JEV project

Photo of the special activities

Shirt term visit: FAO to CAHEC and CADC (D7.5)






at CAHEC, Qingdao

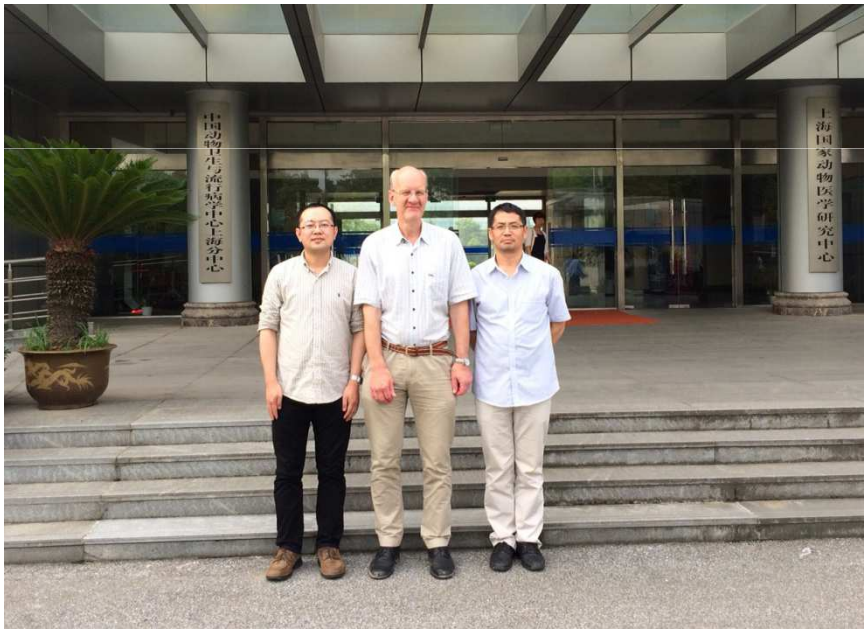
at CADC, Beijing

at Veterinary Bureau, Beijing

Photo of the special activities

Shirt term visit: CIRAD and SVA to SHVRI (Additional)

Dr. Julien Cappelle visiting a pig farm



Dr. Frederik and Dr. Lihong's visit to SHVRI

Photo of the special activities

Exchange programme 1: HVRI and SVA (D7.7)

at HVRI

at SVA

Photo of the special activities

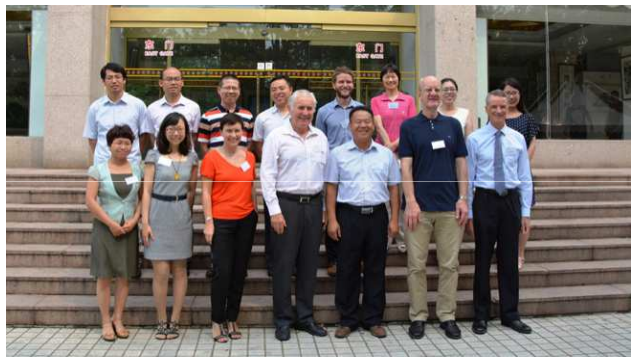
Exchange programme 2: SHVRI and SVA (D7.8)

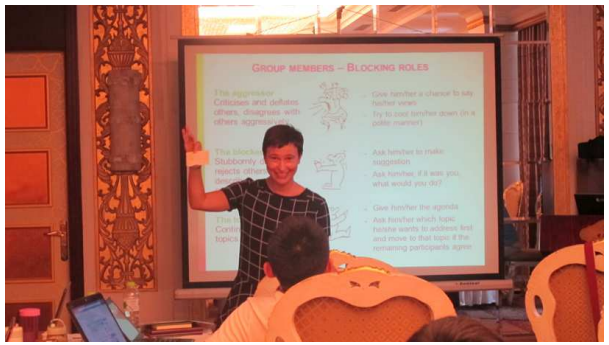
at SHVRI

at SVA

Photo of the special activities

Exchange programme 3: CIRAD, RVC and CAHEC (D7.9)





Surveillance workshop

LinkTADs training

Main achievements

- Improved the management of EIDs and TADs and strengthened the collaborations between Chinese and European epidemiologists in the long term.
- Built a bridge for Chinese and European scientists to exchange and improve the knowledge and techniques on EIDs and TADs.
- Trained young scientists and promoted friendship between Chinese and European young scientists.
- Established a base for further collaborations and project applications on EIDs and TADs between Chinese and European scientists.
- Specialized research activities on particular animal diseases such as JEV, ASFV and PRDC.

Collaborations between Chinese and EU institutions

- SHVRI and SVA: international joint laboratories on animal infectious diseases
- SHVRI and CIRAD: agreement on JEV research
- HVRI and SVA: international joint laboratories on animal infectious diseases
- Publications: CSF, ASF, Rabies, Pseudorabies, diagnosis, vaccine development
- Joint research projects: “Eco-epidemiology and risk analysis of genotype shift of Japanese encephalitis virus in pigs and mosquitoes” funded by ministry of S&T, China

国家国际科技合作专项项目（2014DFE30140）

乙脑病毒优势型别变化的生态流行病学及风险

China-EU international S&T collaboration program by ministry of S&T, China

Eco-epidemiology and risk analysis of genotype shift of Japanese encephalitis virus in pigs and mosquitoes

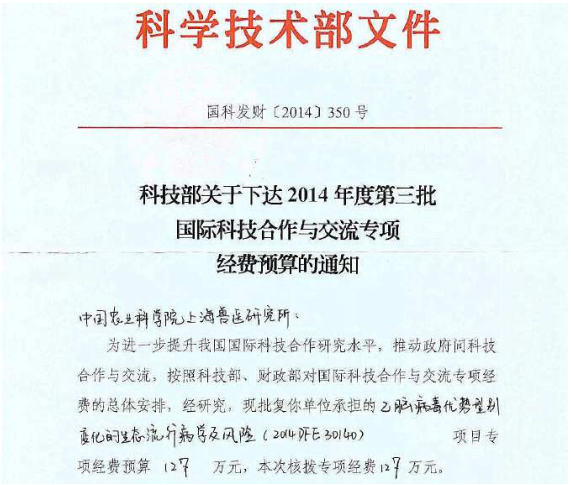
–Duration: From 1/2015 to 12/2017

–Principal Investigator: Zhiyong Ma, SHVRI

–Overseas investigator: Julien Cappelle, CIRAD

–Overseas organizations: CIRAD, SVA

–Budget: 1,270,000 RMB



科学技术部文件

国科发财〔2014〕350号

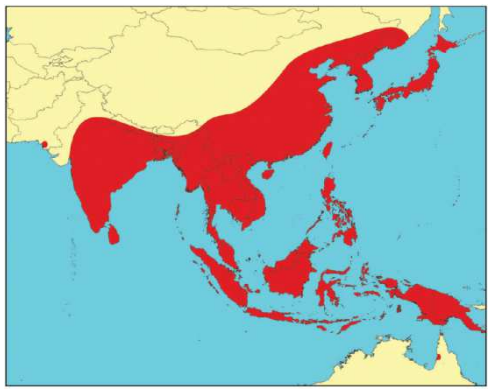
科技部关于下达2014年度第三批
国际科技合作与交流专项
经费预算的通知

中国农业科学院上海兽医研究所：

为进一步提升我国国际科技合作研究水平，推动政府间科技合作与交流，按照科技部、财政部对国际科技合作与交流专项经费的总体安排，经研究，现批复你单位承担的乙脑病毒优势型别变化的生态流行病学及风险（2014DFE30140）项目专项经费预算127万元，本次核拨专项经费127万元。

Japanese encephalitis

- Japanese encephalitis caused by JEV is one of the most important viral encephalitis in the world.
- JE is prevalent mostly in Asia including eastern Asia, southern Asia and southeast Asia.
- An estimated 68,000 human cases and a reported 10,000 to 15,000 deaths annually.



JE in pigs

Breeding pigs: reproductive disorders such as orchitis and abortion (stillbirths and mummified fetuses).

Piglets: weak piglets sometimes with nervous signs. (encephalitis)

Growing and adult pigs: no observable clinical signs.

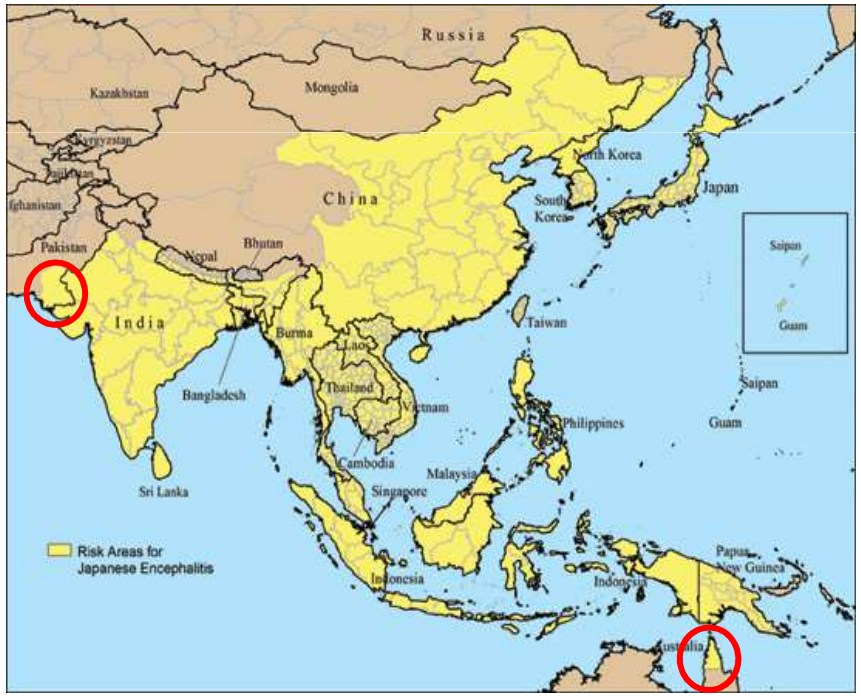
Epidemics: sporadic and/or endemic
Seasonal distribution: 80-90% cases in summer and autumn
Infection rate: up to 100%
Morbidity: 20-30%
Mortality: low

Geographical distribution

JEV has been found throughout most of Asia since 1935

The geographical borders extends:

- West into Pakistan in 1992.
- North into maritime Siberia in 1964.
- East into the island of Saipan in 1990.
- South into northern Australia in 1995.



Zoonotic disease

Vertebrate reservoir Hosts

Ardeid wading birds and bats are considered the primary enzootic hosts and play a role in epizootic viral amplification.



Vectors

Paddy-breeding mosquitoes: *Culex tritaeniorhynchus*, *Cx. gelidus*, *Cx. fuscocephala,* and *Cx. annulirostris,*
Bloodsucking midges:


Amplifying hosts

Pigs and wild birds.

Dead-end hosts

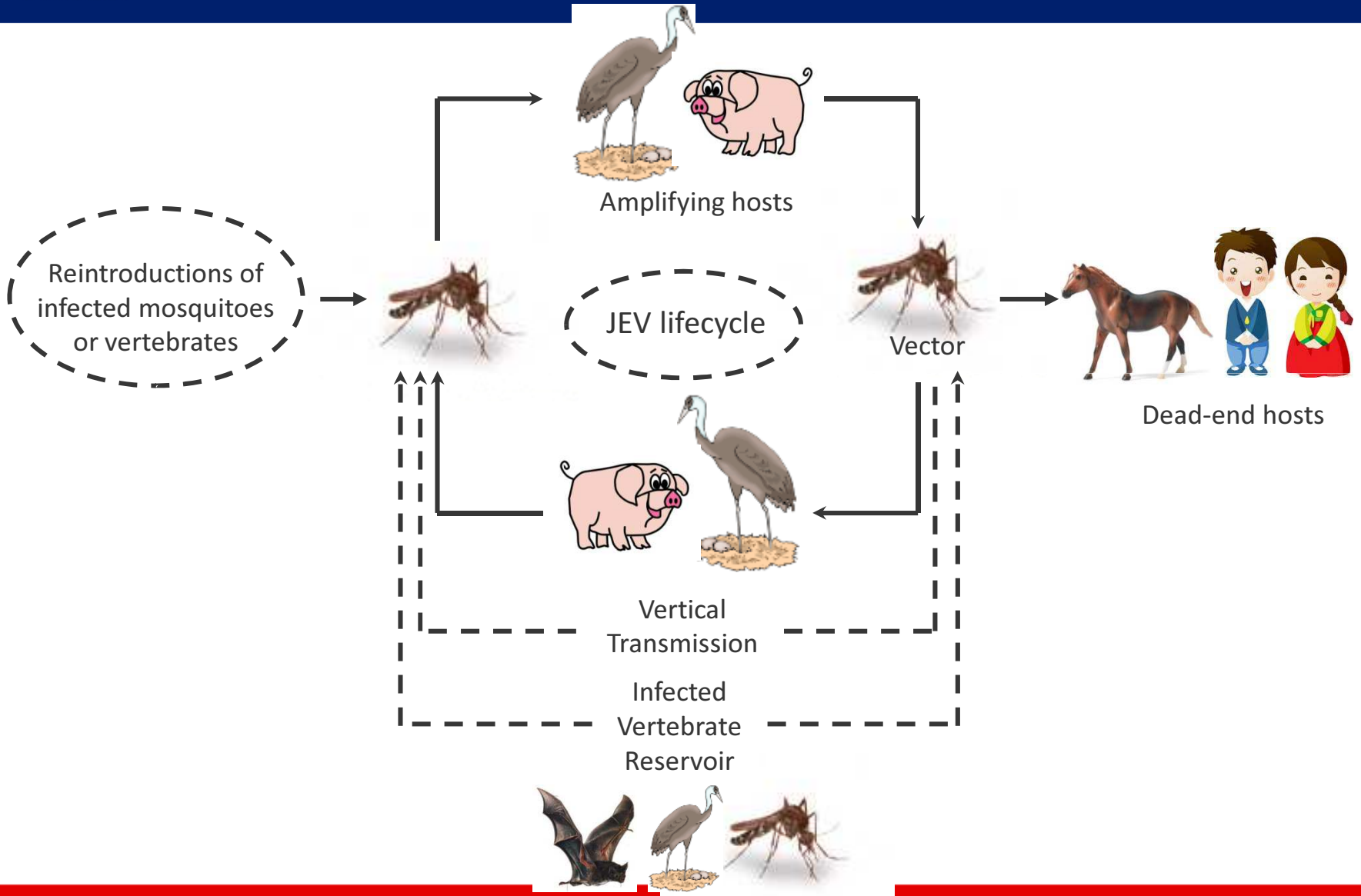
Humans and horses (occasionally cattle) are incidentally infected and can develop fatal encephalitis, because they have transient and low-level viremia, they are “dead-end hosts” that do not normally transmit the virus.

Mammal species with high seroprevalence rates

Pigs, cattle, dogs, goats, and rodents etc.

Speaker name | speaker@email.com

JEV transmission cycle

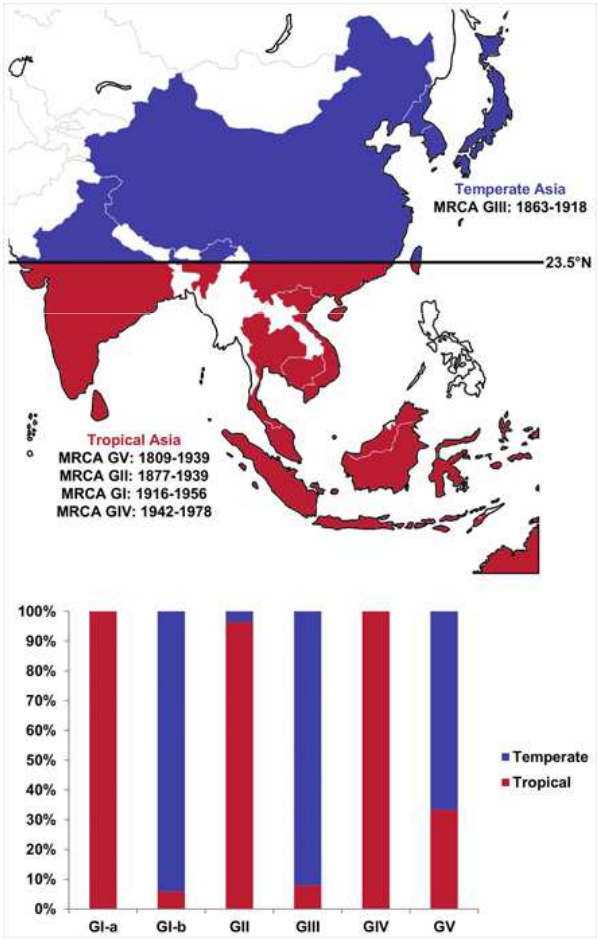


Genotypes and Geographical distribution

Only one serotype

JEV is divided into five genotypes (genotype I, II, III, IV, V), based on nucleotide sequence of E gene.

GI and GIII: mostly in temperate zones
GII and GIV: mostly in tropical zones

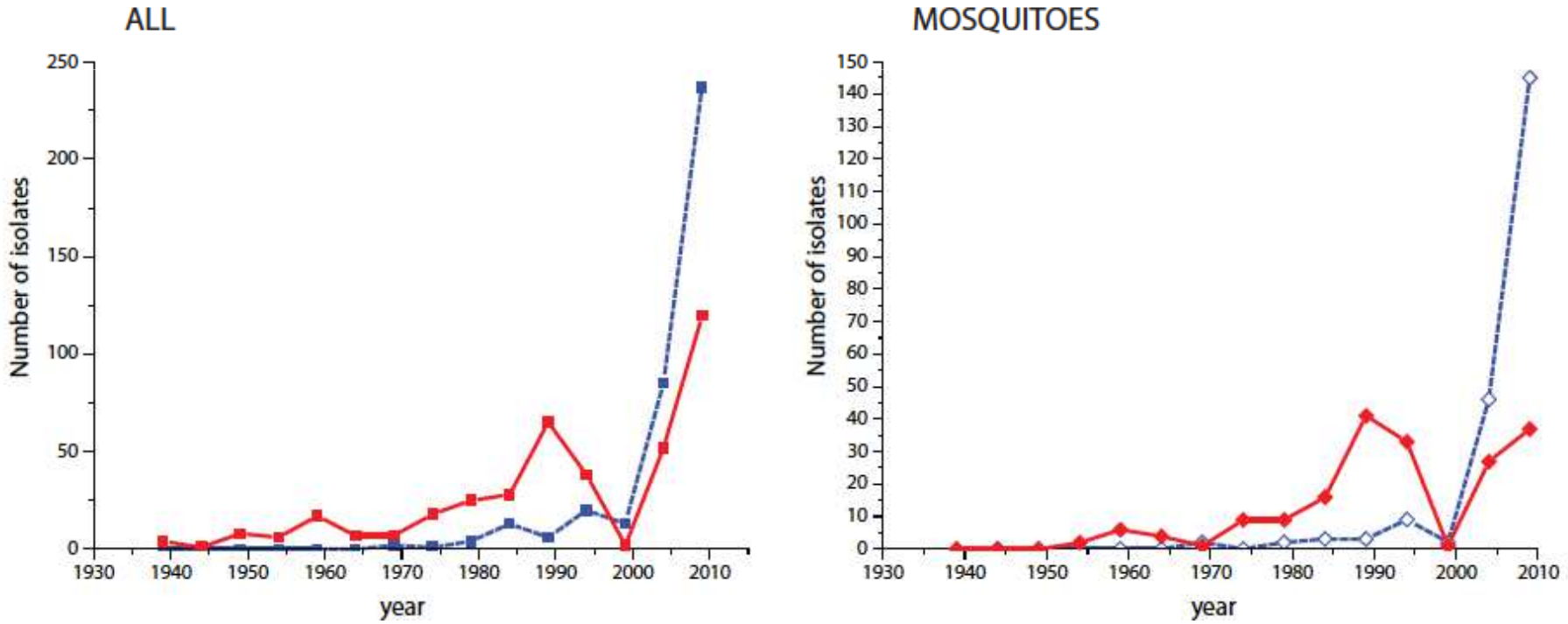


(Amy J. Schuh et al., 2013)

- GI: China, India, Japan, Korea, Laos, Malaysia, Taiwan, Thailand and Vietnam, northern Cambodia, northern Australia.
- GIII: China, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, the former Soviet Union, Taiwan, Thailand and Vietnam.
- GII: sporadically in Indonesia, Korea, Malaysia, Papua New Guinea and southern Thailand, northern Australia,
- GIV: Indonesia from mosquitoes only.
- GV: Malaysia, China and South Korea

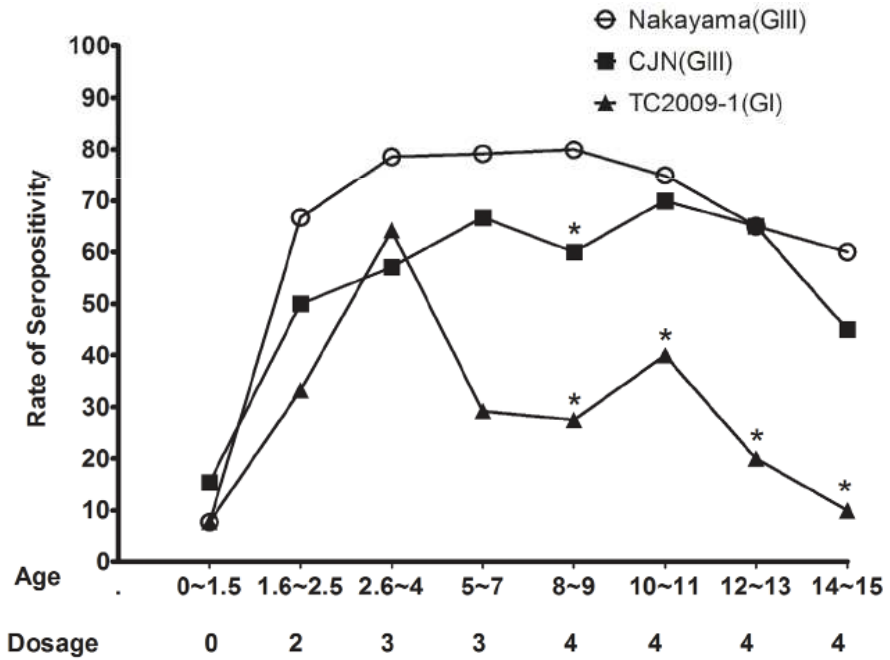
Emerging of JEV genotype I

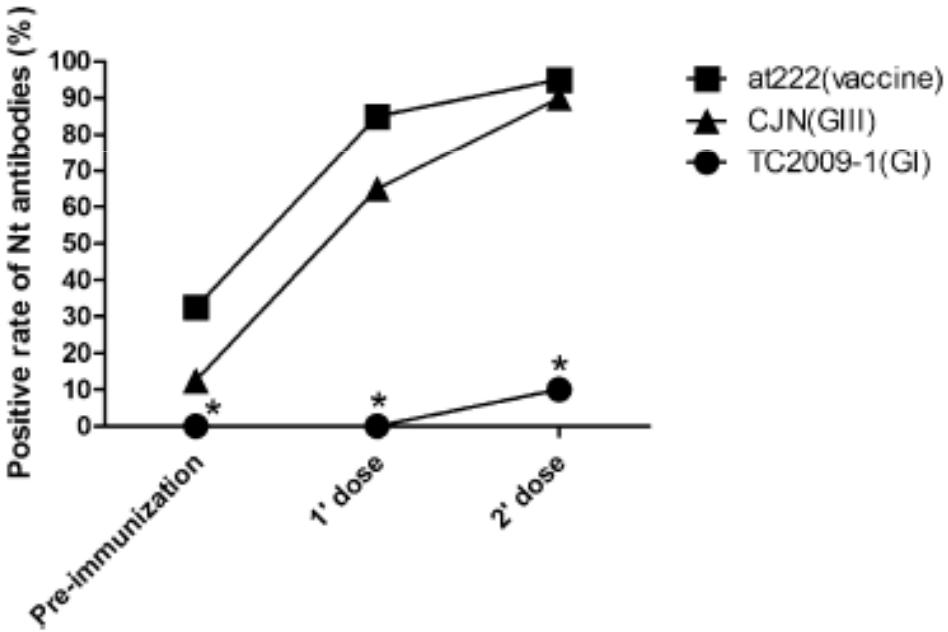
GIII was the most frequently isolated genotype. However, over the past two decades, GI has displaced GIII as the most frequently isolated virus genotype.



Na Han, James Adams, Ping Chen, et al. Journal of Virology,2014,88(19):11469-11479

Protective efficacy of genotype III vaccines





(Yi-Chin Fan et al., 2012, 2013)

Reduced neutralizing antibody titer against genotype I JEV

Reasons responsible for the genotype shift

There are virological, ecological and epidemiological factors associated with JEV genotype shift.

- Climate change.
- GI viruses replicated faster than GIII viruses.
- Adaption to the immune pressure exerted by vaccine.
- ???
- ???

国家国际科技合作专项项目（2014DFE30140）

乙脑病毒优势型别变化的生态流行病学及风险

China-EU international S&T collaboration program by ministry of S&T, China

Eco-epidemiology and risk analysis of genotype shift of Japanese encephalitis virus in pigs and mosquitoes

–Duration: From 1/2015 to 12/2017

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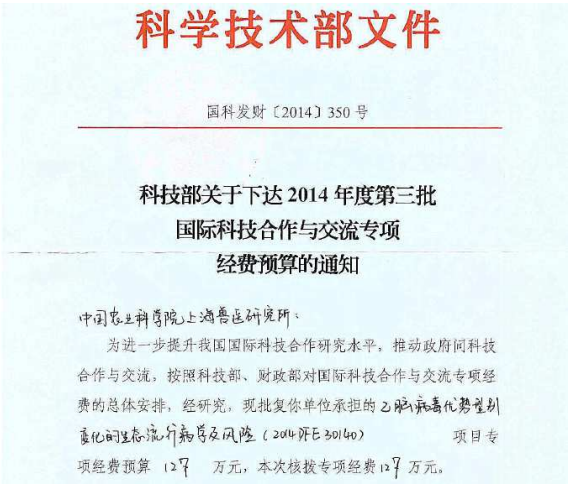


科学技术部文件

国科发财〔2014〕350号

科技部关于下达2014年度第三批
国际科技合作与交流专项
经费预算的通知

中国农业科学院上海兽医研究所：

为进一步提升我国国际科技合作研究水平，推动政府间科技合作与交流，按照科技部、财政部对国际科技合作与交流专项经费的总体安排，经研究，现批复你单位承担的乙脑病毒优势型别变化的生态流行病学及风险（2014DFE30140）项目专项经费预算127万元，本次核拨专项经费127万元。

Objectives

- To explore the mechanisms of JEV genotype shift and identify the ecological and epidemiological factors associated with JEV genotype shift.
- To analyze the risk of JEV genotype shift on JEV control.

Work description

- To isolation of JEV from pigs and mosquitos in pig farms with different climate and identification of genotype of JEV isolates.
- To detection of seroprevalence of JEV genotype I and genotype III in pig farms located at different climatic zones.
- To collection of data necessary for eco-epidemiological analysis, such as pig density, vaccination, mosquito species, geographical distribution, climate, paddy fields, etc..
- To analysis of the ecological and epidemiological factors (e.g. pig density, vaccination, mosquito species, geographical distribution, climate, paddy fields) associated with JEV genotype shift and distribution.
- To analysis of the effect of JEV genotype shift on pig farms and the risk on JEV control.

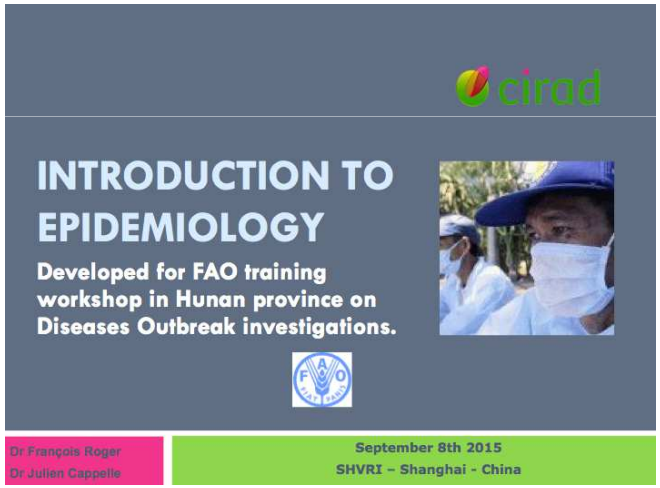
Research progress

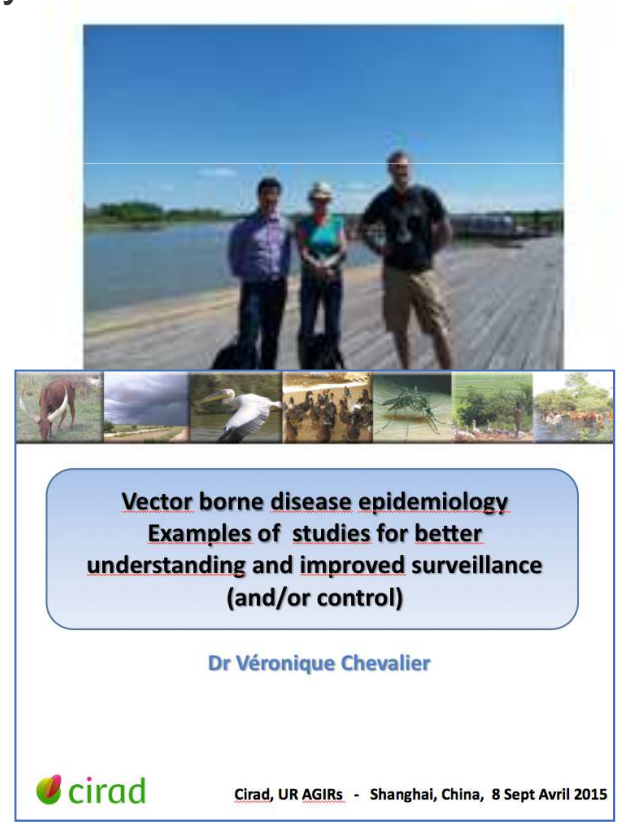
Kick-off meeting

- Two scientists from SVA and one from CReSA visited SHVRI on July 19-23, 2015.
- Between the 4th and 12th of September 2015, two scientists from CIRAD visited SHVRI to participate in the Kick-Off meeting and laboratory experiments.

Research progress

- Discuss and finalize the protocols for sample collection.
- Training in epidemiology.





Research progress

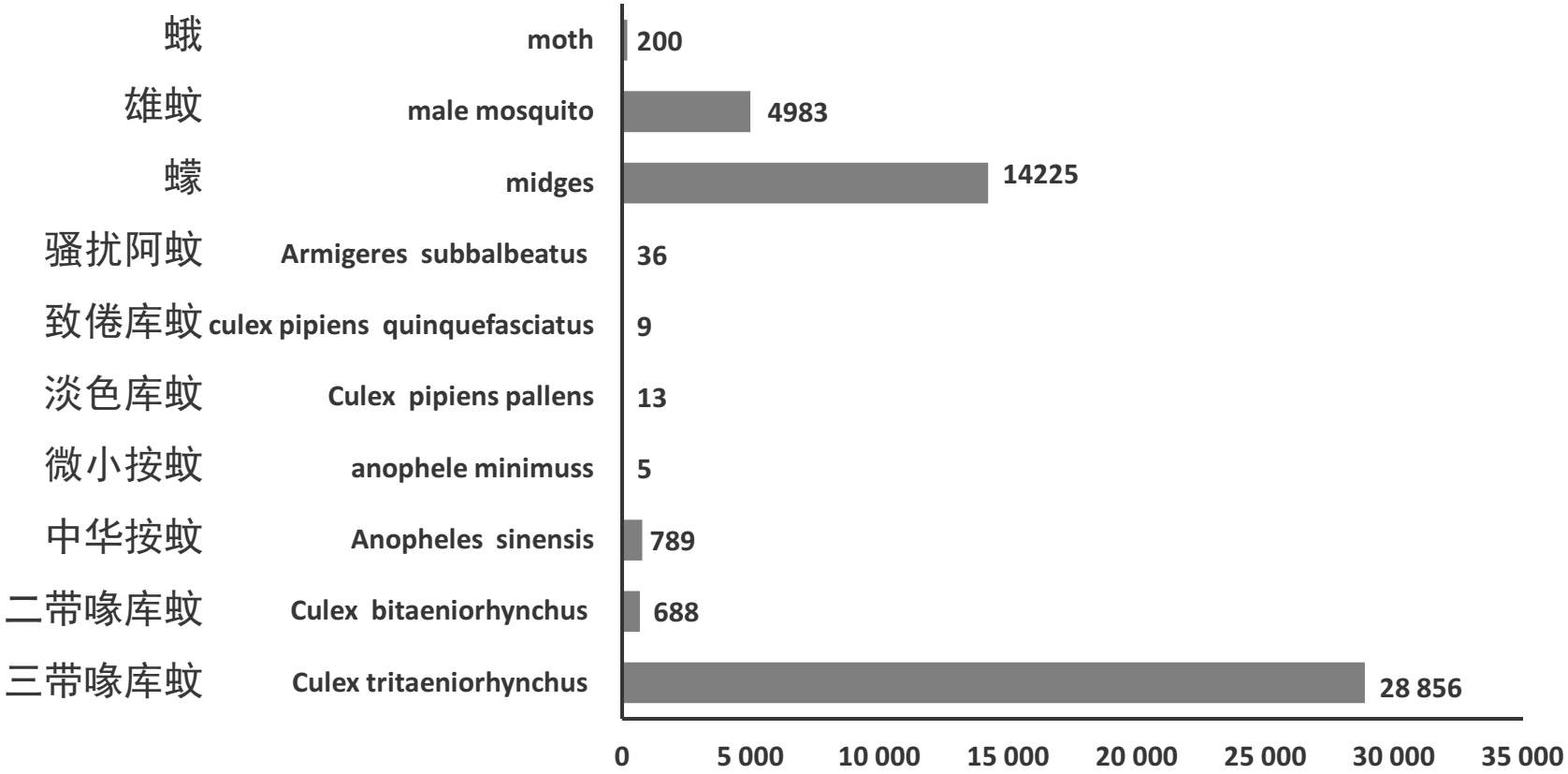
– Visit different pig farms to know about the conditions of pig farming in China.

Research progress

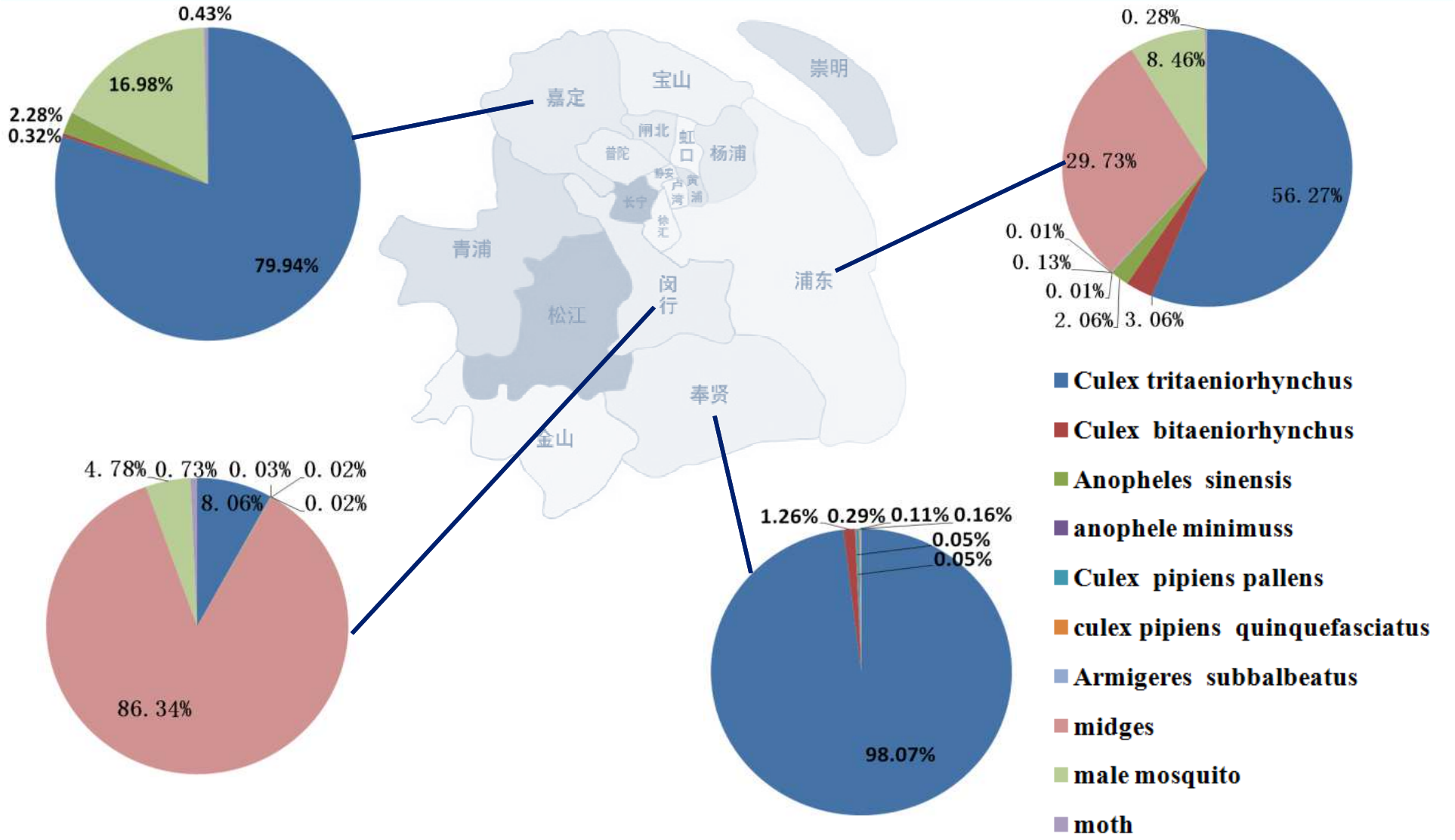
– Mosquito collection

UV light trap that contains a UV light source and fan was set in pig house overnight in June, July and August,

Species of insects collected



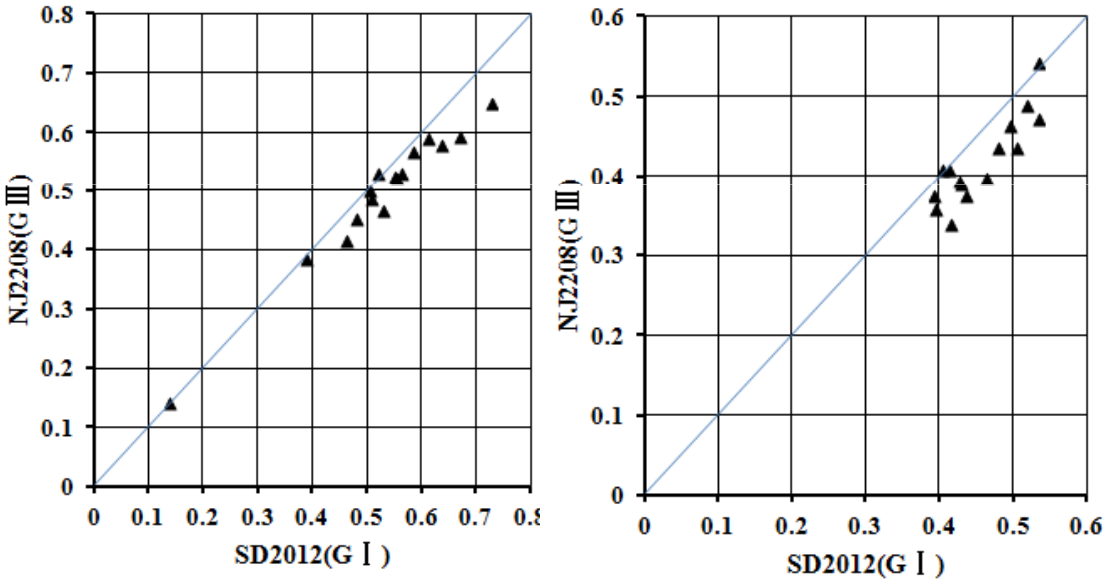
Distribution of insects



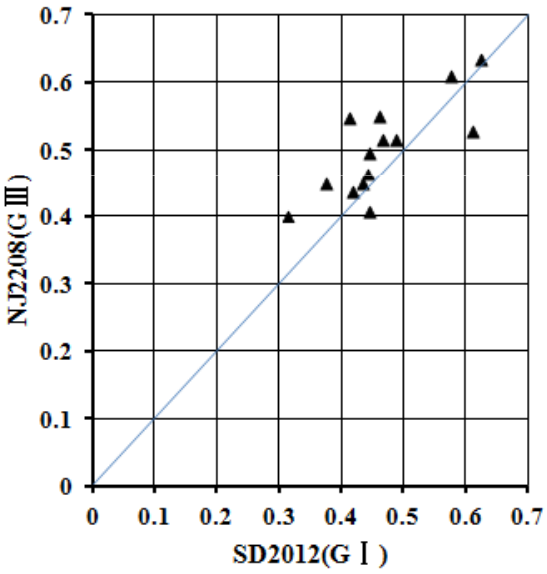
JEV isolated from Shanghai

Isolate	Species	Location	Collection site	Manner of collecting	Cell	CPE (d)	Genotype
FX-2-22	swine	fengxian	Pig pen	\	BHK	6	GI
JD-2	Culex tritaeniorhynchus	jiading	Pig pen	UV Light Trap	C6/36	5	GI
JD-6	Culex tritaeniorhynchus	jiading	Pig pen	UV Light Trap	C6/36	4	GI
JD-15	Anopheles sinensis	jiading	Pig pen	UV Light Trap	C6/36	5	GIII
MH-7	Culex tritaeniorhynchus	minhang	Pig pen	UV Light Trap	C6/36	4	GI
SH-18	unpredominant mosquito mix	shanghai	Pig pen	Landing Collection	C6/36	5	GIII

Distribution of genotypes in pig farms



Genotype I



Genotype III

Gaps between virologists and epidemiologists in JE surveillance

- Most of virologists are not familiar with epidemiology, who are focused on virology and immunology, some epidemiological factors that affect disease status are ignored.
- Less collaboration between virologists and epidemiologists.

Thank you for your attention!

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