

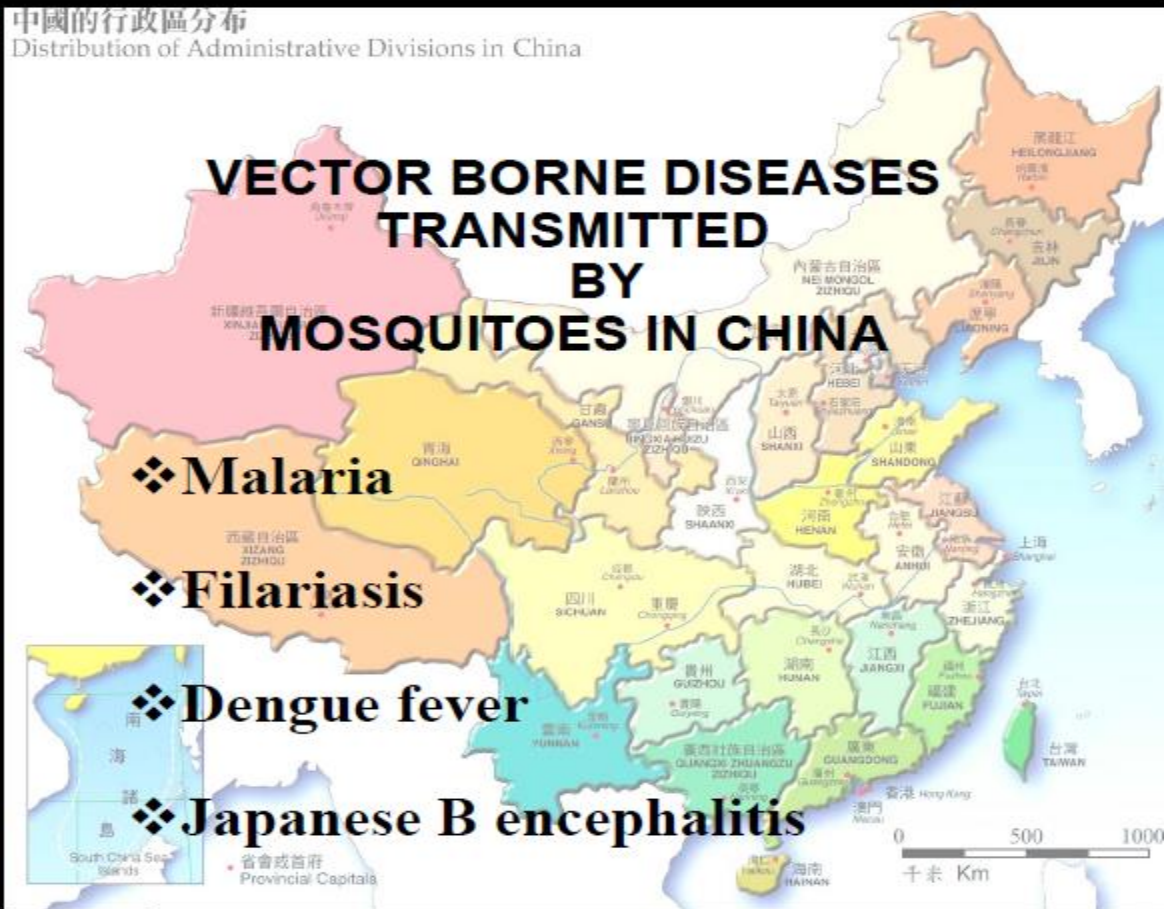
中國的行政區分布

Distribution of Administrative Divisions in China



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Malaria

SYMPTOMS

As the malaria parasites enter the blood stream from a mosquito bite they infect and destroy red blood cells. Destruction of these essential cells leads to fever and flu-like symptoms, such as chills, headache, muscle aches, tiredness, nausea, vomiting and diarrhea. These initial symptoms are non-specific: in other words, they are self-reported symptoms that do not indicate a specific disease process.

There are 4 species of the malaria parasite world wide, *Plasmodium vivax*, is the most prevalent in China as well as in Southeast Asia. *P. vivax* has the added complication of a dormant liver stage, which can be reactivated in the absence of a mosquito bite.

Plasmodium falciparum is responsible for the majority of malaria deaths globally and it is the least prevalent species in China now.

Chloroquine resistant strains occur in Yunnan and Hainan provinces.

Malaria is on the decline in China but remains a problem in some regions.

一类县 75个

Government Goal: By the end of 2020, Elimination of Malaria in the whole China

三类县 1430个

四类县 669个

0 400 800 1,600 Kilometers

Anopheles anthropophagus
An. minimus

MALARIA VECTORS

An. sinensis
An. dirus

LARVAL HABITATS

Larval habitats of malaria vectors varied from clean to brackish water, as well as sewage water, under palm trees, marshland, pools, rice paddies, ponds, drainage, irrigation canals, wells and water containers.

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Filariasis (Elephantiasis)

SYMPTOMS

Swelling of external tissues in the lower limb area due to filarial worms invading the lymphatic system. The disease in some parts of the world can also attack the serous cavity causing abdominal pain because of deep tissue invasion.

There are 2 types of Filariasis in China, Bancroftian Filariasis and Malayan Filariasis. Each type has two vectors that transmit the disease while taking blood meals.

Filariasis has been all but eliminated by the universal use of DEC medicated salt in China

Vector control is not applied unless the mosquitoes carry more than one disease



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BANCROFTIAN FILARIASIS VECTORS

Culex pipiens pallens

Culex pipiens quinquefasciatus

MALAYAN FILARIASIS VECTORS

Anopheles anthropophagus

Anopheles sinensis

LARVAL HABITATS

Larval habitats of filarian vectors vary from sewage water, waste water, marshland, pools, rice paddies, pounds, drainage, irrigation canals, wells and water containers.

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Dengue

SYMPTOMS

The symptoms usually develop within 4-7 days after being bitten by an infected mosquito. Symptoms of classic dengue include:

- High fever (up to 40.6°C)
- Severe headache with retro-orbital (behind the eye) pain
- Severe joint and muscle pain
- Nausea and vomiting
- Body rash which appears on day 3 or 4

Dengue Hemorrhagic Fever is a severe form of dengue fever which can result in death and is characterized by:

- Severe bleeding from the nose, gums, or under the skin causing purplish bruises

Dengue Shock Syndrome is the most severe form which usually occurs in children having a re-infection and is sometimes fatal. It often presents with:

- Massive bleeding
- Shock (very low blood pressure)

OCCURRENCE

All four types of dengue viruses (DEN-1 to 4) have been isolated either from patients, or mosquitoes in China.

**No vaccine or cure; Quarantine;
Integrated Vector Management**

DENGUE FEVER/DENGUE HAEMORRHAGIC FEVER VECTORS

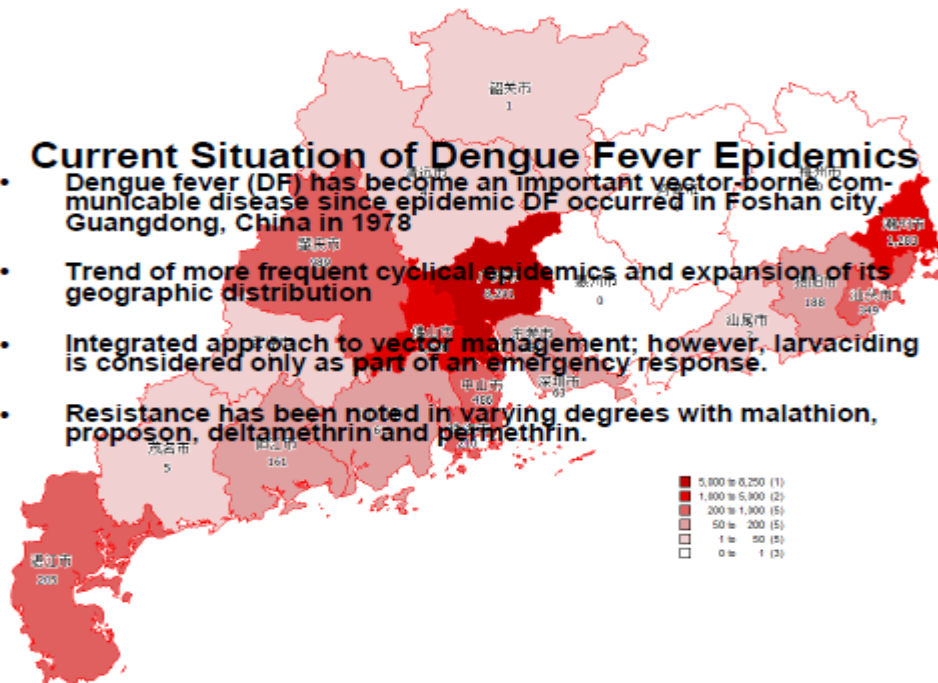
Aedes aegypti is the vector of DF/DHF in Hainan Island and parts of Guangdong and Taiwan. *Ae. albopictus* is the vector of DF on the mainland and probably plays a minor role in transmission in Taiwan.

LARVAL HABITATS

These species are prolific in both rural and urban areas where their larvae are found in ground pools and drinking water containers.

Current Situation of Dengue Fever Epidemics

- Dengue fever (DF) has become an important vector-borne communicable disease since epidemic DF occurred in Foshan city, Guangdong, China in 1978
- Trend of more frequent cyclical epidemics and expansion of its geographic distribution
- Integrated approach to vector management; however, larvaciding is considered only as part of an emergency response.
- Resistance has been noted in varying degrees with malathion, propoxon, deltamethrin and permethrin.



Emergency Response

Emergency Mosquito Control

- ULV and thermal fog for adult control
- Residual sprays on dark surfaces in home and vegetation surrounding the premises with confirmed cases
- Larviciding with temephos and Pyriproxyfen sand granules for larval control in drinking water and functional stagnant water in rural areas
- larval habitats surveillance and elimination household by household,
- Elimination of larval habitats in the household as homework in elementary schools

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Japanese B Encephalitis

SYMPTOMS

Mild infections occur without apparent symptoms other than fever with headache. More severe infection is marked by quick onset, headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially in infants) and spastic paralysis.

Mental retardation developed from this disease usually leads to coma. Mortality of this disease varies but is generally much higher in children.

OCCURRENCE

This tends to be a more rural disease associated with pig production and rice paddies.

Mosquitoes become infected by feeding on domestic pigs and wild birds infected with the Japanese encephalitis virus. Infected mosquitoes then transmit the Japanese encephalitis virus to humans and animals. The Japanese encephalitis virus is amplified in the blood systems of domestic pigs and wild birds, chiefly Ardeid (wading) birds.



Because of successful vaccine, the reported cases declined in the last two decades.

Approximately 33,900 cases occurred in China¹ (excluding Taiwan) in 2012.

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0 500 1000
千米 Km

JAPANESE B ENCEPHALITIS VECTORS

Virus was isolated from 11 species, 7 species can transmit virus under experimental condition. *Cx. tritaeniorhynchus* is now considered main vector of JBE in China.

LARVAL HABITATS

These species are prolific in rural areas where their larvae breed in ground pools such as irrigation ditches, cement tanks, ponds, wetlands, artificial containers and in flooded rice fields.

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Chikungunya

SYMPTOMS

Symptoms of Chikungunya includes fever, debilitating arthralgia (joint pain), swelling of joints, stiffness of joints, myalgia (muscular pain), headache, fatigue (weakness), nausea, vomiting and rash.

OCCURRENCE

03/04/2008: first report of imported cases at Guangzhou Airport: 2 workers, came back from Sri Lanka.

From 03/04/2008 to now:

8 imported cases reported at Guangzhou Airport, from Sri Lanka, Malaysia, Ethiopia, Singapore

1 imported case reported at Shenzhen Airport, Malaysia:

1 imported case reported at Xiamen Airport, Philippines

1 imported case reported at Beijing Airport, India

10/2010

Dongguan, Guangdong.

More than 200 cases in 2 communities.

None death cases, none severe cases.

**No vaccine or cure; Quarantine;
Integrated Vector Management**

CHIKUNGUNYA VECTORS

Aedes aegypti

Aedes albopictus

LARVAL HABITATS

Natural and artificial water-filled containers.

TWO COMPONENTS OF INTEGRATED VECTOR MANAGEMENT

(I) Organization



北京市疾病预防控制中心

Beijing Center for Disease Control and Prevention

Organization constituent

(II) Technology



北京市疾病预防控制中心

Beijing Center for Disease Control and Prevention

Organization constituent

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**ORGANIZATION RESPONSIBILITIES
(Example: Jiangsu)**

- **The Patriotic Health Campaign Committees are in charge of vector control, pesticides purchasing and distribution.**
- **The Patriotic Health Campaign Committees are in charge of evaluation and management of the National Health Cities.**
- **CDCs provide technique supporting, such as training, inspection and evaluation.**
- **CDCs conduct vector population and resistance surveillance, the results are used to direct the vector control practices.**
- **There are lots of pest control companies in Jiangsu. Governments buy their services for vector control at public areas; companies and private houses with vector problems hire them for vector control on private property.**
- **Non-chemical and chemical methods are both applied in Jiangsu.**
- **Generally, non-chemical methods take priority over chemical methods.**
- **In some special cases, such as vector control after and earthquake and flood, chemical methods maybe used first to control the high density vectors.**
- **When there is a vector-borne disease outbreak, the pesticides must be applied to reduce the vector populations quickly.**



CENTRES FOR DISEASE CONTROL

上海市疾控中心 Shanghai CDC

□江苏省疾控中心 Jiangsu CDC

□浙江省疾控中心 Zhejiang CDC

□湖南省疾控中心 Hunan CDC

□陕西省疾控中心 Shanxi CDC

□河南省疾控中心 Henan CDC

□山东省疾控中心 Shandong CDC

□辽宁省疾控中心 Liaoning CDC

□宁夏回族自治区疾控中心 Ningxia CDC

□天津市疾控中心 Tianjin CDC

□吉林省疾控中心 Jilin CDC

□湖北省疾控中心 Hubei CDC

□山西省疾控中心 Hebei CDC

□云南省疾控中心 Yunnan CDC

□四川省疾控中心 Sichuan CDC

□福建省疾控中心 Fujian CDC

□重庆市疾控中心 Chongqing CDC

□安徽省疾控中心 Anhui CDC

□等18个省级单位参加



The Standing Committee of the Provincial Peoples Congress (e.g. Jiangsu) regulates the Patriotic Health Campaign of the Province (e.g. Jiangsu). The Provincial Patriotic Health Campaign Committee Office institutes the provincial inspection and determines the appropriate measures for vector control.

The Patriotic Health Campaign Committees are in charge of the National Health Cities' vector programs in the province.



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MULTINATIONALS SERVICING THE CHINA VECTOR MOSQUITO MARKET

BASF (CHINA) CO., LTD.

Representative: Dr. Zhang Jinyu, Beijing

Larvacides: Abate (temephos) - 1SG, 100EC & 500EC, control of *Anopheles* larvae @ 56-112g ai/ha, WHOPEs approved for drinking water; Agnique (Mono Molecular Film), not approved for drinking water

Adulticides: Fendona (alphacypermethrin) for indoor Residual Sprays & bed net dipping; chlorfenapyr for Indoor Residual Sprays & bed net dipping

Bednets: Interceptor (Fendozin/Fendona)

BASF appears well positioned in China and with WHO as well as the rest of the Asian Pacific rim, Africa and South and Central America to address Dengue, Malaria and Yellow Fever.

Appears to have the right community contacts/networking, i.e. in two townships in Yangon division of Myanmar, BASF and the local Department of Health worked together on a six-month project to control dengue fever.

Mosquiron should be a fit with the BASF product line; starting to see resistance to Abate; Mosquiron is a solid formulation and therefore easier to use compared to liquid formulations.

MULTINATIONALS SERVICING THE CHINA VECTOR MOSQUITO MARKET

BAYER CROP SCIENCE

Representative: Mr. Zhao Tong, Beijing

Larvacides: Starycide SC (480g/l triflumuron) for clean water; chitin synthesis inhibitor; similar or the same as Rimon 10EC, ; Baytex EC (500 g/l fenthion) for dirty water; Aquatain (MMF), none approved for drinking water.

Adulticides: K-Orthrin WP & WG and Ficam WP for IRS; Deltacide EC & Resigen EC, Aqua K-Othrin, Aqua Resigen and FFast for space sprays.

Bed nets and bed net treatments: K-Otab, K-Otab 123 & K-Othrine SC.

Bayer is well positioned in China and Central and South America but appears less so in the Vector markets elsewhere.

Mosquiron should be a fit because it is a preferred solid formulation of a chitin synthesis inhibitor for mosquito larvaciding.

MULTINATIONALS SERVICING THE CHINA VECTOR MOSQUITO MARKET

SYNGENTA CHINA INVESTMENT CO., LTD

Representative: Dr. Xin-Yu Wang, Shanghai

**Larvacides: Actellic 50EC (pirimiphos-methyl);
Bi- Larve 25 WP (diflubenzuron—chitin synthesis
inhibitor); both approved for drinking water**

Adulticide: IRS & Space spray products.

Bed nets and bed net treatments

**Syngenta is positioned in China and probably other
vector markets.**

**Mosquiron should be a fit because it is a preferred
solid formulation of a chitin synthesis inhibitor for
mosquito larviciding and therefore much easier to apply.**

**RETAIL DISTRIBUTORS
Of MOSQUITO CONTROL PRODUCTS IN CHINA**

Nantong Gongcheng Fine Chemical Co., Ltd.

Shenzhen Longrui Technology Co., Ltd.

Beijing Greenleaf Daily Use Chemicals Co., Ltd.

Zhejiang Tlei Pesticides Co., Ltd.

**OTHER COMPANIES
INVOLVED WITH PESTICIDES
IN CHINA**

Shanghai Hanxuan Technology Co., Ltd.

**Guangzhou Ximeng Jiekang Environmental Science and
Technology Co., Ltd.**

Nanjing Ushi Environmental Technology Co., Ltd.

**Comment: Some of these companies carry a full line of
vector mosquito control products including larvacides
such as B.t.i. and adulticides.**

COMPARISON OF MOSQUITO LARVICIDES - AVAILABILITY, USE, EFFECTIVENESS AND NON-TARGET IMPACT

COMPOUNDS	SUPPLIER	WHO	APPLIC'N	WHO	REGIS'D	KILL	EFFECTIVE	TOXICITY TO NON-TARGETS			
		P.W.	EASE	S.W.	CHINA	TIME	RESIDUAL	ARTHROP'S	FISH	BIRD	MAMMAL
B.t.i. WG	Valent	yes	poor	yes	yes (?)	2 hrs	0-7 days	N	N	N	N
Chlorpyrifos EC	NTGC	no	poor	yes	yes	2 hrs	persistent	H	H	M-H	M
Diflubenzuron WP	Syngenta	yes	poor	yes	yes	4-7 days	7-15 days	H	N	N	N
Fenthion EC	Bayer	no	poor	yes	yes	2 hrs	2+ weeks	H	M	H	M
Methoprene ¹	Life Sciences	yes	good	no	no	7 days	12+ wks	V	L	N	N
MMF	Bayer, BASF	no	poor	no	yes	2 hrs	2-10 days	V	N	N	N
Novaluron ² 10EC	Makhteshim	yes	poor	yes	no	2 hrs	16-24 wks	V	N	N	N
Pyrimiphos-methyl EC	Syngenta	yes	poor	yes	yes	≤ 1 day	2-8 days	H	H	M	M
Pyriproxyfen ³ GR, EW	NTGC	yes	good	yes	yes	7 days	4-16 wks	V	L	N	N
Temephos ⁴ GR, EC	BASF	yes	good	yes	yes	2 hrs	6-12 wks	H	V	M-H	N
Triflumuron ⁵ SC	Bayer	no	poor	no	yes	4-7 days	3-7 wks	H	N	N	N
Spinosad DT, EC, GR, SC	DOW	Yes	good	yes	no	≤ 3 days	3 days	V	M	L	L
Mosquiron ² CRD, P	Tumaini	no	good	no	no	2 hrs	24+ wks	V	N	N	N

P.W. Potable Water; S.W. Standing Water; REGIS'D Registered for Use; ARTHROP'S Other Insects, Crabs, Shrimp, etc.; N None; H High;

V Variable; M Moderate; M_H Moderate to High.

Methoprene prevents adult emergence from pupal stage; if used in potable water containers, live larvae will be present.

²Novaluron and Mosquiron are quick acting ((2 hrs) affecting all four larval stages, leaving no live larvae in potable water containers.

³Pyriproxyfen takes up to 7 days to kill larvae; if used in potable water containers, live larvae will be present.

⁴Mosquito larval resistance to Temephos is developing in many parts of the world.

⁵Triflumuron does not kill the later instar larvae; if used in potable water containers, live larvae and pupae will be present.

No information is available on wholesale or retail pricing for competitive products in China.

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CHALLENGES TO MARKETING & SELLING MOSQUIRON IN CHINA



CIRS
CHEMICAL INSPECTION
& REGULATION SERVICE

http://www.cirs-reach.com/China_Chemical_Regulation_FAQ_Pesticide_Registration_China.html

Mosquiron is a mosquito larvacides and is a pesticide,
and as such would be regulated by
The Institute for the Control of Agrochemicals under
the Ministry of Agriculture (ICAMA).

Under the legislation on Pesticide Regulation,
Mosquiron Products must be submitted to
and registered with ICAMA
before manufacturing, selling and distribution.

The Mosquiron data package must be reviewed for type/use
category, data gaps, cost and time by
ICAMA and
the Pesticide Registration Vetting Committee.

All studies shall be arranged upon approval of efficacy studies.
The registration dossiers shall be prepared after study reports
are collected. Then completed dossiers with full information
and reports shall be submitted to ICAMA for evaluation and re-
view.

Certificate of Registration will be issued if dossier is approved.

A Chinese agent is required or CIRS can act as representative

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CHALLENGES TO MARKETING & SELLING MOSQUIRON IN CHINA

REGISTRATION CATEGORIES

1. Field Efficacy Approval, 2. Temporary, 3. Full, 4. Renewal,
5. Repackaging and 6. Emergency

TIME FRAMES

One to 2 years for efficacy studies; one year for ICAMA review

FEES

Registration Application Fee — 2,500 RMB

Field Studies Application Fee — 200 RMB

Field and Residue Studies — ? RMB

POTENTIAL FIELD STUDY COOPERATORS

Chongxing Zhang, Ph.D. Shandong Institute of Parasitic Diseases

Dr. Mao-Qing Gong Shandong Institute of Parasitic Diseases

Dr. Feng-Xia Meng, Institute of Communicable Diseases, CDC, Beijing

**Pestalto will provide the initial data package information
containing the toxicology package and available environmental
impact & efficacy data**

**Contact Barry Tyler if you have an interest in distributing
MOSQUIRON in China**