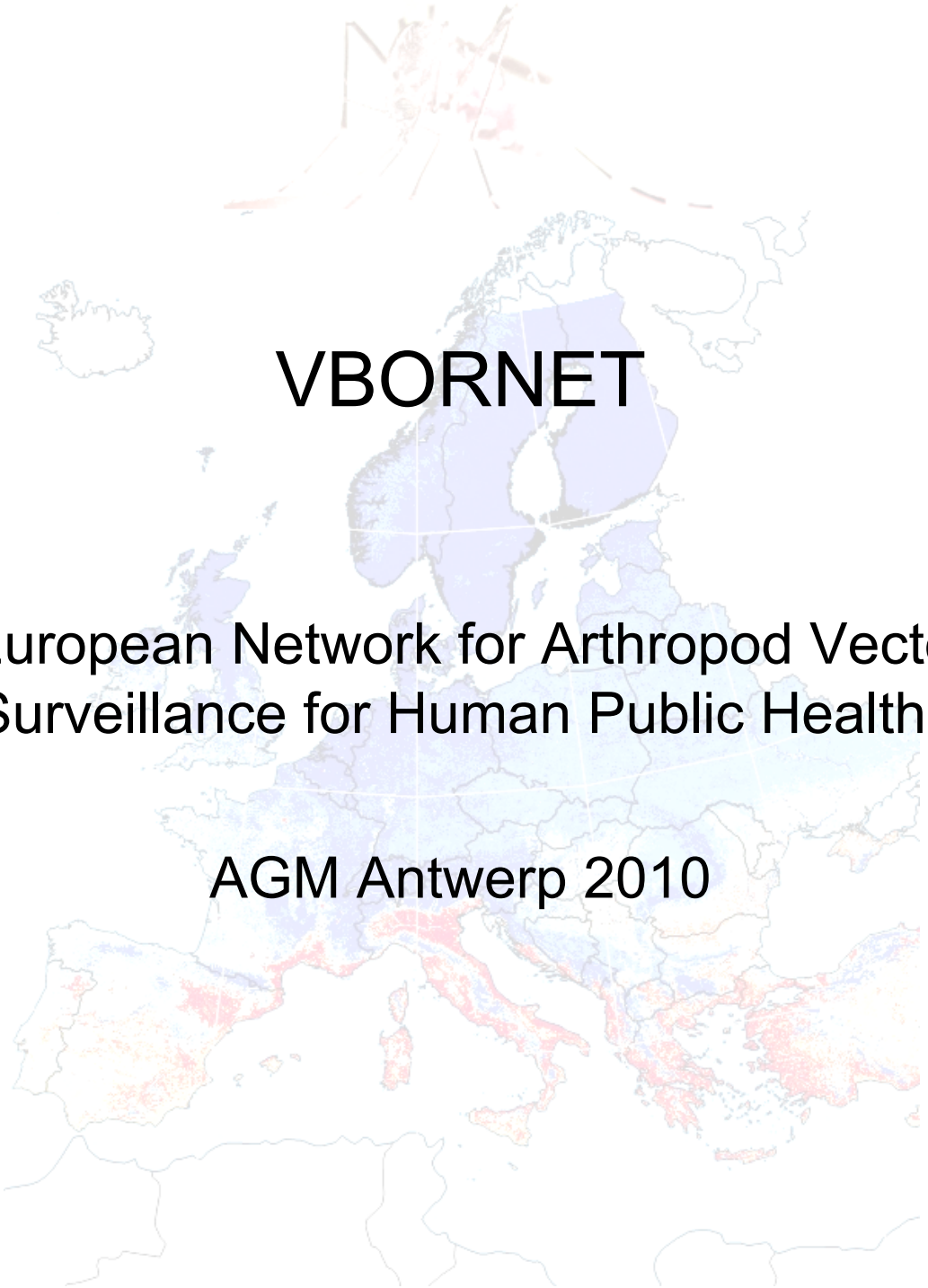


VBORNET

"European Network for Arthropod Vector Surveillance for Human Public Health"

AGM Antwerp 2010

WP 2.2

- Ad-hoc technical support
  - Objectives
  - Achievements
  - Suggestions for future activities
- Coordinated by Jolyon Medlock
  - Medical Entomology group, Health Protection Agency, United Kingdom

Objectives

- Provide ad-hoc technical support as required by VBORNET and ECDC
- Deliverables:
  - Produce (with assistance as required) two risk assessments on vector-related issues
  - Produce two factsheets related to emerging issues with VBORNET priorities for the first year
- Other activities in WP2.2
  - Provide articles to special issue newsletters
  - Provide reviews of published work to newsletters

Emerging VBD issues

- Invasive mosquitoes
  - Factsheet and risk assessment draft to ECDC
    - By end May 2010
- Spread of *Ixodes ricinus*
  - Factsheet and risk assessment draft to ECDC
    - By mid July 2010
- *Hyalomma* ticks
  - Factsheet and risk assessment draft to ECDC
    - By mid July 2010

Achievements so far….

1. Developed factsheet and risk assessment templates and agreed by ECDC (Dec 09)
2. Five factsheets produced (in draft for consultation) on five invasive mosquitoes
   - *Aedes albopictus*
   - *Aedes aegypti*
   - *Aedes japonicus*
   - *Aedes atropalpus*
   - *Aedes triseriatus*
3. One risk assessment incorporating all five invasive mosquitoes

Achievements so far….

4. Three articles for special issue newsletters on:
   - *Public health importance of the invasive mosquitoes of Europe*
   - *Invasive mosquitoes in the British Overseas Territories*
   - *Surveillance of ticks in Europe based on tick presence reporting*
5. Review contributions to monthly newsletters

Why produce factsheets?

- Provide a single source of information for each vector species of concern
- Update regularly as new information becomes available
- Inform the public and policy makers
- Not intended to be an entomological document
- Documents (agreed by VBORNET) will appear on ECDC website

Who contributes to the factsheets?

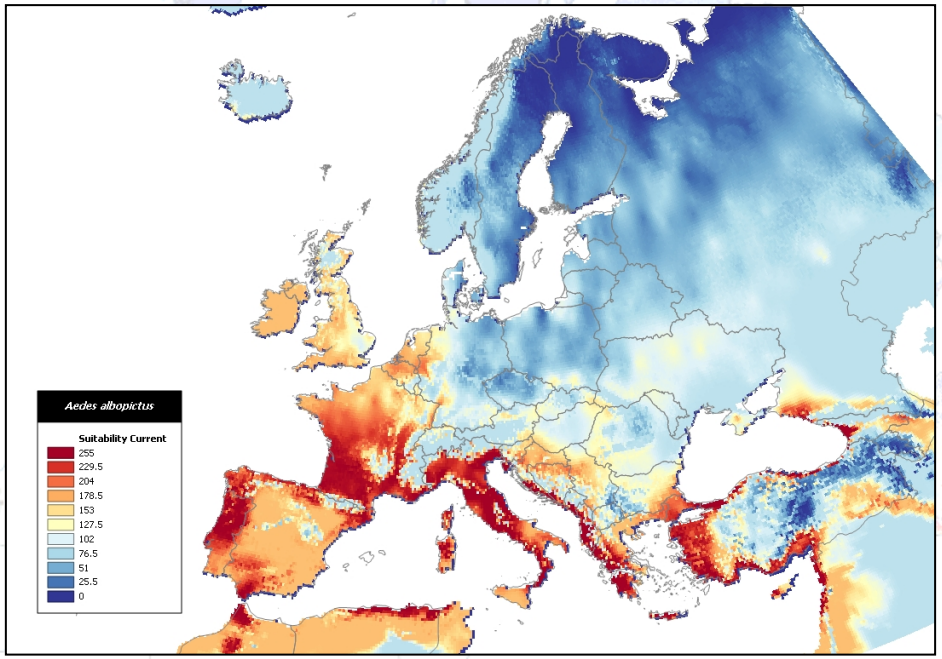
- Coordinated by HPA, UK (Med. Entomol. Group)
- VBORNET partners/collaborators
- We need your local or unpublished information…
- So far, an exhaustive review of all English-speaking literature
- We need papers from national journals, government reports
- Assistance with translation may be required!

What's in the factsheet?

- 1. Overview of current hazards associated with mosquito species (e.g. *Aedes albopictus*)
  - Top 100 invasive species; most invasive mosquito
  - Introduced to Europe via used-tyres, Lucky bamboo
  - Widely established in Albania, Italy etc., also spreading in France, Spain…
  - Establishment is contingent on temperate/tropical strain
  - Risk mapping suggests further spread
  - Known vector of CHIKV, DENV, *Dirofilaria*, VC for …..
  - Involvement in Italian CHIKV outbreak
  - Biting nuisance
  - Ecological plasticity: cold acclimation, winter diapause

What's in the factsheet?

- 2. Geographical distribution globally
  - Needs to link into latest mapping from VBORNET
- 3. Brief history of spread and possible future expansion



What's in the factsheet?

- 4. Entomological factors of importance
  - Synonyms
  - Morphology and similar species (to aid surveillance)
  - Life history – diapausing tendencies
  - Seasonal abundance (of larvae and adult females)
  - Voltinism
  - Host preferences – disease implications
  - Aquatic/Terrestrial habits – inc. adaptation
  - Biting/resting habits (end/exophily, endo/exophagy, biting periodicity)
  - Environmental thresholds/constraints
    - Establishment thresholds
    - Diapausing cues
    - Re-activation cues
    - Cessation of adult activity
    - Dispersal range

What's in the factsheet?

- 5. Epidemiology & Transmission of pathogens

Daily Mail, Wednesday, August 6, 2003 V1 Page 31

Monster mosquito

Carrier of 23 illnesses could be in Britain

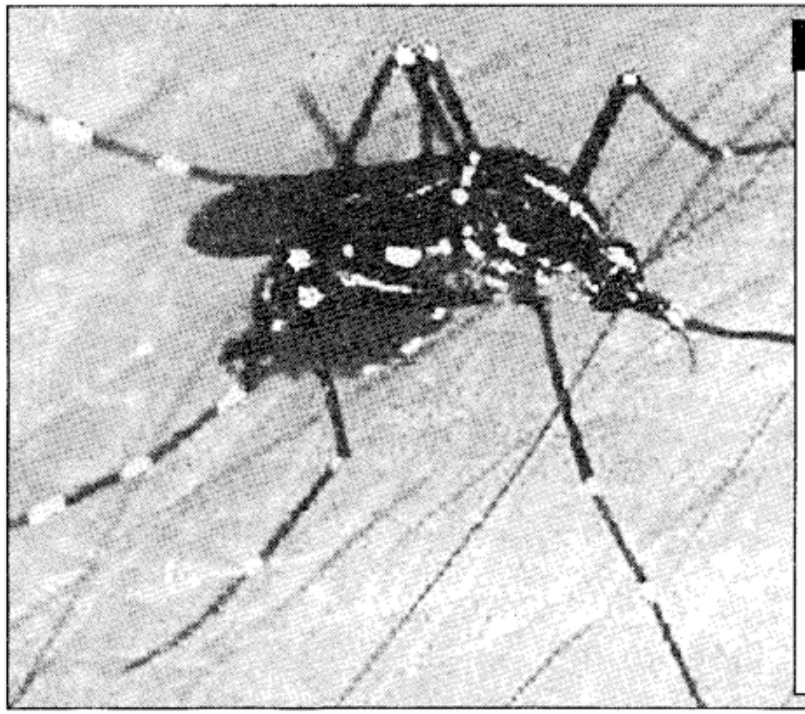
By **Beezy Marsh**
Health Correspondent

A VORACIOUS mosquito which carries a host of deadly diseases is feared to have entered Britain.

The Asian tiger mosquito, which can transmit up to 23 infections – including West Nile virus and dengue fever – is believed to have stowed away in used tyres being shipped from the Far East to this country for retreading.

Illnesses passed on when the aggressive insect bites humans include a parasitic worm which attaches itself to one of the lung's arteries, causing serious breathing complications.

The mosquito lays its eggs in small amounts of water that collect in



The bloodsucker

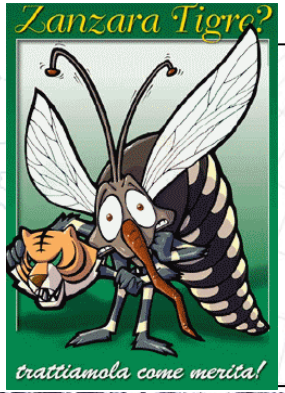
- THERE are more than 2,500 described species of mosquito.
- THEY are responsible for more human death through diseases such as malaria than any other creature.
- THE Asian tiger mosquito, pictured, is so called because of its stripes.
- IN total, including its legs, the insect may measure up to one centimetre – a little larger than most mosquitoes.
- LIKE all mosquitoes, only the female feeds on blood – to get vital protein for developing eggs.
- IT lays 100 to 300 eggs at a time and one female may average 1,000 to 3,000 offspring during its lifetime.
- IN 1985, the Asian tiger mosquito was found in used tyres in Texas. Two years later, it had spread to 17 states.
- JUST a quarter-inch of water is enough for it to lay eggs. In the U.S., it has even been found breeding in the fingerholes of ten-pin bowling balls.
- UNLIKE other species, it cannot be eradicated by mass spraying or draining marshy breeding grounds.
- BECAUSE it stays close to the ground, children playing are particularly at risk of being bitten. It also attacks cats, dogs and other mammals as well as birds.

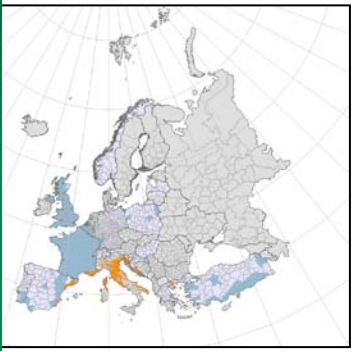
What's in the factsheet?

- 5. Epidemiology & Transmission of pathogens
  - Known vector status (in field, experimental transmission)
    - *Aedes albopictus* – CHIKV, DENV, *Dirofilaria,* other arboviruses?
    - *Aedes aegypti* – CHIKV, DENV, YF, Zika?
    - *Aedes atropalpus* – lab competence for WNV?
    - *Aedes japonicus* – lab competence for WNV, JEV?
    - *Aedes triseriatus* – La Crosse virus, other arboviruses?
  - Role as enzootic or bridge vector
  - Link to Public Health WP on clinical features
  - Factors driving/impacting on transmission cycles

What's in the factsheet?

- 6. Control/Interventions
  - Species specific control measures
    - Insecticide
    - Public health education
    - Source reduction
- 7. Surveillance
  - Link to surveillance WP
    - Global activities
    - European activities
  - Appropriate sampling strategies
    - Aquatic larval sampling
    - Adult traps
- 8. Key areas of uncertainty





Risk assessment

- Aims to focus on salient issues and summarise key risks associated with invasive mosquitoes
- Sections:
  - 1.0 Summary
  - 2.0 Introduction/Risk question
  - 3.0 Hazard Identification
    - For each species
  - 4.0 Risk assessment
    - 4.1 Geographical distribution
    - 4.2 Risk pathways into Europe
      - Used tyres
      - Lucky bamboo
      - Public/private transport
      - Air/sea transport
    - 4.3 Biotic and abiotic factors constraining establishment in Europe
    - 4.4 Epidemiology and public health significance
  - 5.0 Surveillance and control
    - Effectiveness of control methods
    - Surveillance in Europe
  - 6.0 Conclusions

Conclusions

- *Aedes aegypti*
  - Re-colonised Madeira; potential spread to mainland Europe
  - Highly anthropophagic and synanthropic
  - Important disease vector: YF, DENV, CHIKV
  - Intolerance of cold temperatures will limit northerly spread
- *Aedes japonicus*
  - Reported in Belgium, France, Germany, Switzerland
  - Rapid establishment and spread in Switzerland
  - Nuisance species; possible WNV vector, status unclear
  - Tolerance of cold temperatures will not limit spread

Conclusions

- *Aedes atropalpus*
  - North American species; reported in Italy, France and Netherlands – climate assessments suggest spread
  - Readily bites humans; nuisance species
  - Positive for WNV in US; vector status not clear
  - Limited information on ecology/biology

- *Aedes triseriatus*
  - Reported in France; no evidence of further spread
  - Primary LACv vector in North America
  - Container species; winter diapause
  - Limited information on ecology/biology

So what next? – invasive mosquitoes

- Consultation with VBORNET partners:
  - Accuracy
  - New information on status of all species particularly *japonicus, atropalpus, triseriatus, koreicus etc…*
  - Guidance of morphological considerations
  - Available public health material
  - Entomological variables:
    - Seasonal abundance
    - Resting, biting habits
    - Favoured aquatic habitats
  - Opinions on involvement in disease transmission cycles
  - Surveying techniques
  - Models or local risk assessments
  - Published work in non-English written journals
  - Unpublished/ ‘in press’ information

So what next? – ticks

- Confirm content on tick factsheets
  - Latitudinal/altitudinal spread of *Ixodes ricinus*
    - Need information from partners on where this is a concern and or is occurring
    - What are the driving forces
      - Climate
      - Animal movements
      - Land-use changes etc.
  - Status and ecology of *Hyalomma marginatum*
    - Need information on
      - Distribution
      - Seasonal activity
      - Habitats
      - Biting preferences etc.

So what next? VBORNET year 2

- Phlebotomine sand-flies?
- *Rhipicephalus sanguineus?*
- *Dermacentor reticulatus?*
- Status of *Culex pipiens* across Europe?
- *Aedes vexans?*

- Comments please

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