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## Host preference and anthropophilic behaviour of the invasive mosquito *Aedes koreicus*


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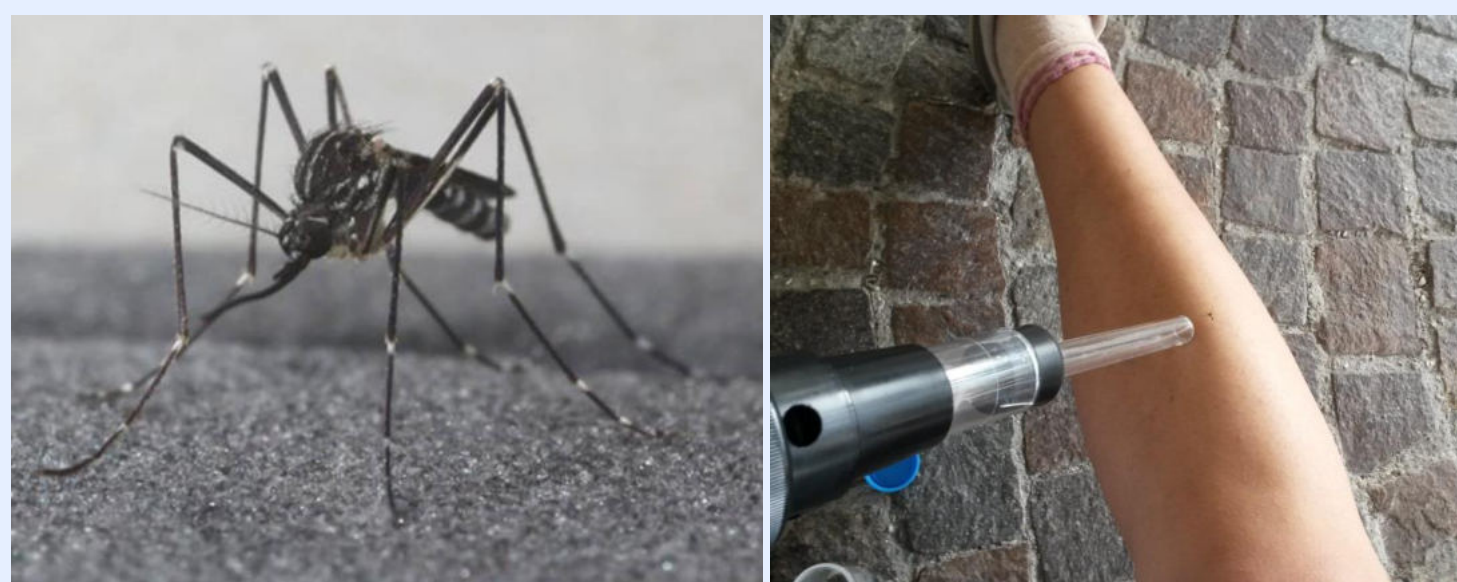
## INTRODUCTION

*Aedes koreicus* is an invasive mosquito species detected in Veneto Region, north-eastern Italy, in 2011 (Capelli et al., 2011). During the last three years data have been collected in order to study the biology, the distribution and the characteristics of breeding sites of this species (Montarsi et al., 2013). Little information is available on its feeding behaviour in colonized areas. The aim of this survey was to assess the feeding preference and the biting activity of *Ae. koreicus*.

## MATERIALS AND METHODS

### Human landing captures

The captures were performed in five sites from May 2014 to present roughly three hours before the dusk (17.00-20.30h) for 30min each one using an handheld aspirator. HLC was compared to simultaneous BG-CO<sub>2</sub> collections.



*Aedes koreicus* and human landing

### Field collections

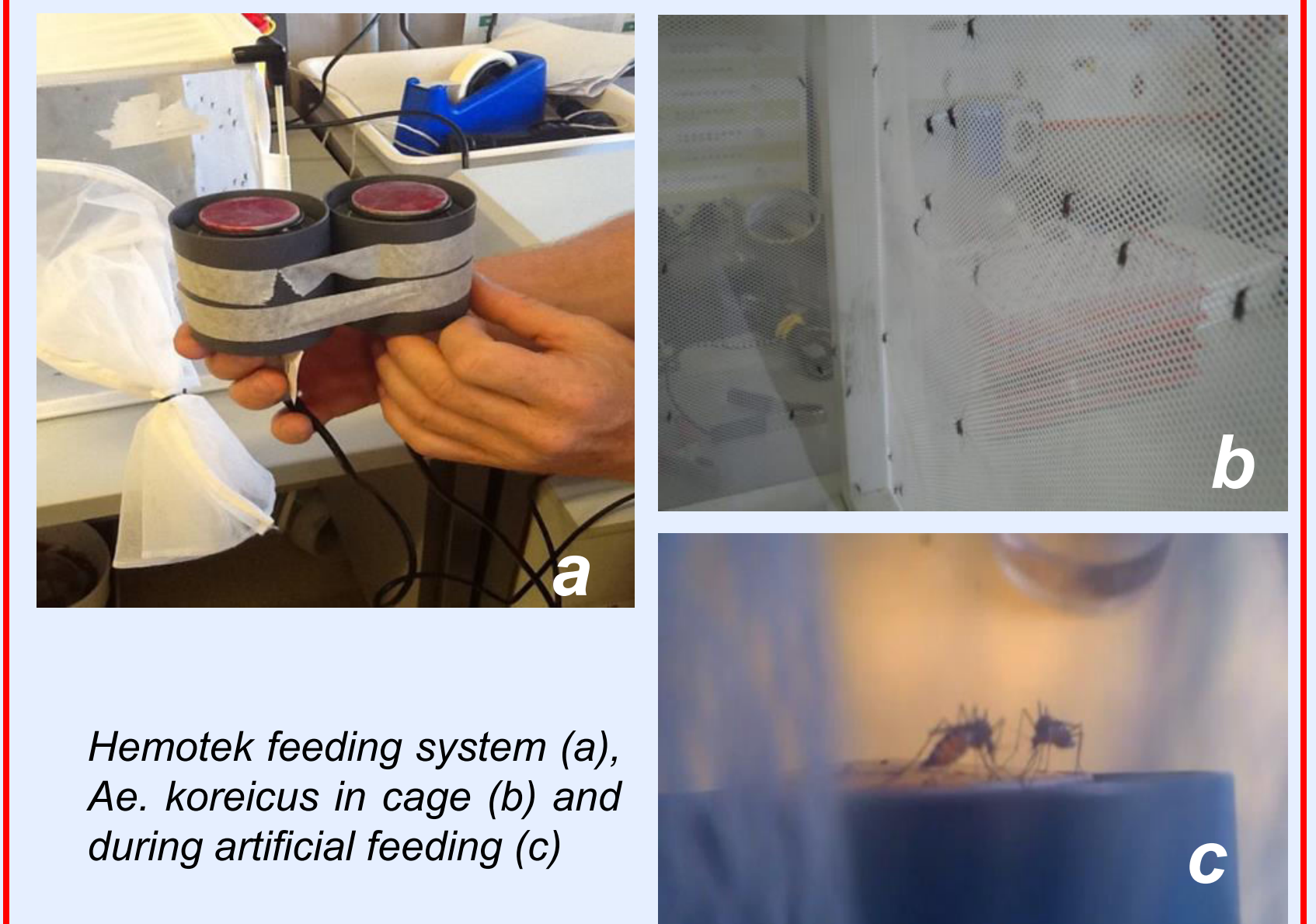
Thirteen sites in the northeastern Italy were sampled from June to September 2013. Mosquitoes engorged were collected by aspiration, CO<sub>2</sub> baited BG-Sentinel traps and sticky traps. DNA was extracted from the blood meal of the engorged females. All samples were analysed by PCR with a specific set of primers described by Alcaide et al., 2009 and the products sequenced.



Samplings by BG-Sentinel traps (above) and aspiration (on left)

### Laboratory studies

*Aedes koreicus* were fed in the laboratory using an artificial feeding system (Hemotek) providing blood from different hosts: human, chicken, turkey, dog and sheep.



Hemotek feeding system (a), *Ae. koreicus* in cage (b) and during artificial feeding (c)

## RESULTS

*Aedes koreicus* and other mosquitoes collected by HLC

Site	Collections	<i>Ae. koreicus</i>	<i>Ae. albopictus</i>	Other species
Feltre	4	4	116	6
Sospirolo	5	3	0	0
Belluno	9	5	84	15
Agnedo	2	2	0	1
Tezze	6	7	190	3
<b>Total</b>	<b>26</b>	<b>21</b>	<b>390</b>	<b>25</b>

*Aedes koreicus* collected by HLC and BG-CO<sub>2</sub> at different hours

Location	Collections	hour	HLC	BG-CO <sub>2</sub>
Feltre	2	17.00	3	
Feltre	4	18.00	1	6
Feltre	4	19.00	0	
Feltre	2	20.00	0	
Sospirolo	4	17.00	1	
Sospirolo	5	18.00	1	0
Sospirolo	5	19.00	1	
Sospirolo	1	20.00	0	
Belluno	7	17.00	0	
Belluno	9	18.00	5	0
Belluno	9	19.00	0	
Belluno	2	20.00	0	
Agnedo	2	17.00	0	
Agnedo	2	18.00	1	0
Agnedo	2	19.00	1	
Agnedo	0	20.00	0	
Tezze	2	17.00	0	
Tezze	5	18.00	3	3
Tezze	6	19.00	1	
Tezze	4	20.00	3	

Twenty-three samples on 239 mosquitoes collected were found positive to blood meal analysis (9.8%). The sequencing data identified human (*Homo sapiens*) blood in 22 samples and cattle (*Bos taurus*) blood in one sample.

Method of collection	n° of mosquitoes
Aspiration	234
BG-CO <sub>2</sub> trap	4
sticky trap	1

Methods of collection and mosquitoes captured



Engorged mosquito

In the laboratory, engorgement and completion of the life cycle (egg laying) was successfully achieved with dog, human and chicken blood.

	Cage 1	Cage 1	Cage 2	Cage 3	Cage 6	Cage 10
Blood	min-max (%)	min-max (%)	min-max (%)	min-max (%)	min-max (%)	min-max (%)
Man (arm)	4.5-36.4	3.7-17.3	3.3-19.7	3.9-4.9	17.6-76.5	
Man (Hemotek)	4.5-31.8		19.7-57.4	7.8-15.7	31.4*	
Chicken (Hemotek)		38.3-65.4	0.0	0.98-14.7	17.6*	18.2*
Turkey (Hemotek)			8.2-8.2	18.6-18.6		
Sheep (hemotek)	4.5-4.5		3.3-3.3	0.0-0.0		9.1*
Dog (hemotek)		83.0-85.0				
<b>Total females</b>	<b>22</b>	<b>164</b>	<b>61</b>	<b>102</b>	<b>51</b>	<b>44</b>

Feeding preference in the laboratory providing different blood. (\*tested only once)

## CONCLUSIONS

In the laboratory studies *Ae. koreicus* fed on dog, human and chicken. In field conditions it clearly showed a preference for humans. The anthropophilic behaviour of this species is confirmed by HLC and by the nuisance reported by the residents in areas where only *Ae. koreicus* occurs (Montarsi et al., 2013). Further studies are needed to assess if humans are preferential hosts or if the anthropophilia is opportunistic. Experimental transmission of Japanese encephalitis virus and *Dirofilaria immitis* has been proven (Feng, 1930; Gutsevich et al., 1971). The knowledge of host preferences of this mosquito species is important to evaluate the risk of transmission of animal and zoonotic vector-borne diseases.

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