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## APPENDIX

### I. DNA sequence of ITS2 region of *An. campestris*-like Form B, E and F.

>ITS2-HCmE12

>1,612 bp

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## II. DNA sequence of COI region of *An. campestris*-like Form B, E and F

>COI-HCmE12

>658 bp

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 GAGCTTTTATTGGAGATGATCAAATTTATAATGTAATGTTACAGCTCATGCTTTTATTATAATTTCTTTATAGTTATACCTATT  
 ATAATTGGAGGATTTGGAACCTGATTAGTGCCTTTAATATTAGGAGCTCCTGATATAGCATTTCCCTCGAATAAATAAATAAAGAT  
 TTGAATATTACCTCCTTCTCTACTTTATTAATTTCTAGAAGTATAGTAGAAAATGGGGCTGGAACCTGGATGAACCTGTTTACCCTC  
 CTTTATCTCTGGGATTGCTCATGCAGGAGCTTCTGTTGATTAGCAATTTTTTATTACATTTAGCAGGAATTTCTCAATTTTA  
 GGAGCAGTAAATTTTATTACTACTGTTATTAATATACGTTCCACCAGGAATTAATCTTGTATCGAATACCTTTATTTGTTTGTATCTGT  
 AGTTATACAGCAGTCTTTTATTATTATCTTTACCAGTGTAGCAGGAGCAATTAATATATTAACTGATCGAATTTAAATA  
 CATCTTTCTTTGACCTTGACAGGAGGAGACCCAATTTTATATCAACATTTATT

>COI-HCmE14

>658 bp

TACTTTATATTTTATTTTGGAGCTTGAGCCGGAATAGTAGGAACCTCTTTAAGTATTCTTATTCGAGCTGAATTAGGTATCCAG  
 GAGCTTTTATTGGAGATGATCAAATTTATAATGTAATGTTACAGCTCATGCTTTTATTATAATTTCTTTATAGTTATACCTATT  
 ATAATTGGAGGATTTGGAACCTGATTAGTGCCTTTAATATTAGGAGCTCCTGATATAGCATTTCCCTCGAATAAATAAATAAAGAT  
 TTGAATATTACCTCCTTCTACTTTATTAATTTCTAGAAGTATAGTAGAAAATGGGGCTGGAACCTGGATGAACCTGTTTACCCTC  
 CTTTATCTCTGGGATTGCTCATGCAGGAGCTTCTGTTGATTAGCAATTTTTTATTACATTTAGCAGGAATTTCTCAATTTTA  
 GGAGCAGTAAATTTTATTACTACTGTTATTAATATACGTTCCACCAGGAATTAATCTTGTATCGAATACCTTTATTTGTTTGTATCTGT  
 AGTTATACAGCAGTCTTTTATTATTATCTTTACCAGTGTAGCAGGAGCAATTAATATATTAACTGATCGAATTTAAATA  
 CATCTTTCTTTGACCTTGACAGGAGGAGACCCAATTTTATATCAACATTTATT









### III. DNA sequence of COII region of *An. campestris*-like Form B, E and F

>COII-HCmE12

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTGTTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT

>COII-HCmE14

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTGTTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT

>COII-HCmE15

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTGTTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
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GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT

>COII-HCmB18

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTGTTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT

>COII-HCmB20

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTGTTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT

>COII-AKpB1

>730 bp

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CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATATTATTTAATAAAATTTACTAACCAGATACCTTACTTCATGGTCAAACAATGAAATTAATTGAACAGTTTACCTGCAATT  
ATTTTAATATTTATTGCATTTCCCTTCTTTACGATTATTATATTTGATAGACGAAATTAATACCCCTTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTCATGAACGTGCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGTTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTTGAAAGTATTC  
CAATAAATTACTTTTATTAATGAATTACTAATAATAACTAATT







TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTGAAAGTATTC  
CAATAAATTACTTTATTAATGAATTACTAATATAACTAATT

>COII-HCtE2

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTTGTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATTATTTAATAAAATTTACTAATCGATACTTACTTCATGGTCAAACAATTGAAATTTATTTGAACAGTTTTACCTGCAATT  
ATTTAATATTTATGCAATTCCTTCTTTACGATTATATATTTGATAGACGAAATTAATACCCCTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATTCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTATGAACCTGTTCCATCATTAGGAGTTAAGGTAGATGCTACACCAGGTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTGAAAGTATTC  
CAATAAATTACTTTATTAATGAATTACTAATATAACTAATT

>COII-HCtF4

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTTGTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATTATTTAATAAAATTTACTAATCCGATACTTACTTCATGGTCAAACAATTGAAATTTATTTGAACAGTTTTACCTGCAATT  
ATTTAATATTTATGCAATTCCTTCTTTACGATTATATATTTGATAGACGAAATTAATACCCCTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATTCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTATGAACCTGTTCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGGTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTGAAAGTATTC  
CAATAAATTACTTTATTAATGAATTACTAATATAACTAATT

>COII-APkF1

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTTGTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATTATTTAATAAAATTTACTAATCGATACTTACTTCATGGTCAAACAATTGAAATTTATTTGAACAGTTTTACCTGCAATT  
ATTTAATATTTATGCAATTCCTTCTTTACGATTATATATTTGATAGACGAAATTAATACCCCTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATTCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTATGAACCTGTTCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGGTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTGAAAGTATTC  
CAATAAATTACTTTATTAATGAATTACTAATATAACTAATT

>COII-ACpE6

>730 bp

ATGAATTTAAGCTTCATATATAAAGATTTTATCTTTTGTAGAAAATGGCAACATGAGCAAATTTAGGTTTACAAGATAGTTCATC  
CCCTTTAATAGAACAATTAATTTTTTTCATGATCATACTTTATTAATTTTAAACAATAATTACAATTTTAGTAGGATACATTATAG  
GAATATTATTTAATAAAATTTACTAATCGATACTTACTTCATGGTCAAACAATTGAAATTTATTTGAACAGTTTTACCTGCAATT  
ATTTAATATTTATGCAATTCCTTCTTTACGATTATATATTTGATAGACGAAATTAATACCCCTCAATTACTCTAAAGTCTGT  
TGGACATCAATGATACTGAAGTTATGAATATTCAGATTTTTTAAATTTAGAATTTGATTCATATATAAATTCCTACAAATGAATTAG  
AAACAAATGGATTCCGATTATTAGATGTAGATAATCGAATTGTATTACCTATAAATAATCAAATTCGAATCCTAGTTACAGCAACA  
GATGTACTTCATTATGAACCTGTTCCCTCATTAGGAGTTAAGGTAGATGCTACACCAGGTCGACTAAATCAAATTAATTTTTTAAT  
TAATCGACCTGGATTATTTTTGGACAATGTTCTGAAATTTGTGGAGCTAATCATAGATTTATACCTATTGTAATTGAAAGTATTC  
CAATAAATTACTTTATTAATGAATTACTAATATAACTAATT

## CURRICULUM VITAE

- Name** Mr. Sorawat Thongsahuan
- Date of birth** May 29, 1984
- Education**
- 2006 B.S. (Medical Technology: second class honors), Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
- Research Emphasis** Medical Entomology
- Grant**
1. Genetic Study of *Anopheles campestris*-like. Thailand Research Fund through the Royal Golden Jubilee Ph. D Program (Grant No. PHD/0082/2549: 2007-2011).
  2. Genetic Study of *Anopheles campestris*-like. The Faculty of Medicine Endowment Fund (CMB), Chiang Mai University (2008-2010).
  3. Population genetic study of *Anopheles barbirostris* and *An. campestris* in Thailand. Biodiversity Research and Training Program (BRT R\_250009)
- Publications**
- 2009 Suwannamit S, Baimai V, Otsuka Y, Saeung A, **Thongsahuan S**, Tuetun B, Apiwathnasorn C, Jariyapan N, Somboon P, Takaoka H, Choochote W.

Cytogenetic and molecular evidence for an additional new species within the taxon *Anopheles barbirostris* (Diptera: Culicidae) in Thailand. *Parasitol Res* 2009; 104: 915-18.

- 2009 **Thongsahuan S**, Baimai V, Otsuka Y, Saeung A, Tuetun B, Jariyapan N, Suwannamit S, Somboon P, Jitpakdi A, Takaoka H, Choochote W. Karyotypic variation and geographic distribution of *Anopheles campestris*-like (Diptera: Culicidae) in Thailand. *Mem Inst Oswaldo Cruz* 2009; 104(4): 558-66.
- 2009 Takaoka H, Otsuka Y, Choochote W, **Thongsahuan S**. Two new and newly recorded species of *Simulium* (*Gomphostilbia*) (Diptera: Simuliidae) from southern Thailand. *Med Entomol Zool* 2009; 60: 259-68.
- 2010 Takaoka H, Otsuka Y, Choochote W, **Thongsahuan S**. A new species of *Simulium* (*Simulium*) (Diptera: Simuliidae) from southern Thailand. *Med Entomol Zool* 2010; 61: 17-25.
- 2010 Takaoka H, Otsuka Y, Choochote W, Aoki C, Hayakawa H, **Thongsahuan S**. Descriptions of the male, pupa and larva of *Simulium* (*Gomphostilbia*) *novemarticulatum* (Diptera: Simuliidae) from Malaysia and Thailand. *Med Entomol Zool* 2010; 61: 59-67.

2010 Jariyapan N, Baimai V, Poovorawan Y, Roytrakul, Saeung A, **Thongsahuan S**, Suwannamit S, Otsuka Y, Choochote W. Analysis of female salivary gland proteins of the *Anopheles barbirostris* complex (Diptera: Culicidae) in Thailand. Parasitol Res 2010; 107: 509-16.

2011 **Thongsahuan S**, Baimai V, Junkum A, Saeung A, Min GS, Joshi D, Park MH, Somboon P, Suwonkerd W, Tippawangkosol P, Jariyapan N, Choochote W. Susceptibility of *Anopheles campestris*-like and *Anopheles barbirostris* species complexes to *Plasmodium falciparum* and *Plasmodium vivax* in Thailand. Mem Inst Oswaldo Cruz 2011; 106: 105-12.

### Training

2011 Certificate in molecular genetics of *Anopheles* vectors. Department of Infectious Disease Control, Faculty of Medicine, Oita University, Oita, Japan, 2011.

### Poster Presentation in International Conferences

2009 **Sorawat Thongsahuan**, Udom Chaithong, Atiporn Saeung, Sittiporn Suwannamit, Wej Choochote. Establishment of an isolate colony of *Anopheles campestris*-like Form E (Diptera: Culicidae). Joint International Tropical Medicine Meeting (JITMM 2009). 3-4 December 2009 in Bangkok, Thailand.



## Oral Presentation

- 2008 **Sorawat Thongsahuan**, Visut Baimai, Yasushi Otsuka, Atiporn Saeung, Anuluck Junkum, Benjawan Tuetun, Benjawan Pitasawat, Wej Choochote. Evidence to support three conspecific cytological races of *Anopheles campestris*-like in Thailand. RGJ seminar Series LVIII “Medical Science: Assembling lines of researches”. 18 February 2008 in Chiang Mai, Thailand.
- 2008 **Sorawat Thongsahuan**. Evidence to support three conspecific cytological races of *Anopheles campestris*-like in Thailand. Post RGJ-Ph.D Congress Seminar Series “Population genetics and insecticide resistance of medically important insects”. 8 April 2008 in Chiang Mai, Thailand.
- 2010 **Sorawat Thongsahuan**, Visut Baimai, Anuluck Junkum, Atiporn Saeung, Narissara Jariyapan, Wej Choochote. Susceptibility of *Anopheles campestris*-like and *Anopheles barbirostris* Species Complexes to *Plasmodium falciparum* and *Plasmodium vivax* in Thailand. RGJ seminar Series LXXIV “From Basic Biomedical Research to Sustainable Development”. 16 September 2010 in Chiang Mai, Thailand.
- Activity**
- 2009 Participation in the IAH Autumn Educational Program 2009 at the Graduate School of Health Sciences, Kobe University, Hyogo, Japan from November 1-7, 2009.

