

LITERATURE CITED

- Ansari M.A. and R.K. Razdan. 2000. Relative efficacy of insecticide treated mosquito nets (Diptera: Culicidae) under field conditions. **J. Med. Entomol.** Jan, 37(1): 201-4.
- Ariaratnam, V. and G.P. Georgiou. 1975. Carbamate resistance in *Anopheles albimanus*. Penetration and metabolism of carbaryl in Propoxur- selected larvae. **Bull World Health Organ.** ; 52. (1): 91-6.
- Ayurakit-Kosol, L., M.E.Griffith. 1963. Progress toward malaria eradication in Thailand. **Proc Ninth Pac Sci Congress** 17:122-136.
- Baimai, V., 1989. Speciation and species complexes of the *Anopheles* malaria vectors in Thailand. **Proceeding of the Third Conference on Malaria Research, Thailand.** October 18-20, 1989, 146-162.
- Brogdon William G., R. F. Beach, J. M. Stewart and L. Castanaza. 1988. Microplate assay analysis of the distribution of organophosphate and carbamate resistance in Guatemalan *Anopheles albimanus*. **Bull World Health Organ.** 66(3): 339-346.
- Butraporn P, C. Prasittisuk, S. Krachaiklin, and P. Chareonjai. 1995. Behaviors in self-prevention of malaria among mobile population in east Thailand. **Southeast Asian J Trop Med Public Health.** Jun; 26(2): 213-8.
- _____, S. Sornmani, and T. Hungsapruet. 1986. Social, behavioural, housing factors and their interactive effects associated with malaria occurrence in east Thailand. **Southeast Asian J Trop Med Public Health** 17: 386-92.

- Busvine, J.R. 1958. Experiments concerned with the development of World Health Organization test for resistance in adult mosquitoes. **Indian J Malariol** 12: 279-286.
- Carson, R. 1962. Silent spring.
- Chadd EM. 1990. Use of an electrostatic sprayer for control of anopheline mosquitoes. **Med Vet Entomol**. Jan; 4(1): 97-104.
- Chandre, F., F. Darriet, et al. 1997. Distribution of organophosphate and carbamate resistance in *Culex pipiens quinquefasciatus* (Diptera: Culicidae) in West Africa. **J Med Entomol**. 34 (6): 664-71.
- Chapin, G. and R. Wasserstrom. 1981. Agricultural production and malaria resurgence in Central America and India. **Nature**. 293 (5829): 181-185.
- Chareonviriyaphap, T., A. Prabaripai, and M.J. Bangs. 2004. Excito-repellency of deltamethrin on the malaria vectors, *Anopheles minimus*, *Anopheles dirus*, *Anopheles swadiwongporni*, and *Anopheles maculatus*, in Thailand. **J. Am. Mosq. Control Assoc**. 20(1): 45-54.
- _____, A. Prabaripai, , M.J. Bangs, and B. Aum-Aung. 2003. Seasonal abundance and blood feeding activity of *Anopheles minimus* Theobald (Diptera: Culicidae) in Thailand. **J Med Entomol** 40(6): 876-881.
- _____, A. Prabaripai, and S. Sungvornyothin. . 2002. An improved excito-repellency for mosquito behavioral test. **J. Vector Ecol**. 27(2): 250-252.
- _____, B. Aum-aung, and S. Ratanatham. 1999. Current insecticide resistance patterns in mosquito vectors in Thailand. **Southeast Asian J Trop Met Public Health** 30(1): 184-194.

Chareonviriyaphap, T., D.R. Roberts, R.G. Andre, H. Harlan and M.J. Bangs. 1997.

Pesticide avoidance behavior in *Anopheles albimanus* Wiedemann. **J. Am.**

Mosq. Control Assoc. 13(2): 171-183.

_____, M. Kongmee, et al. 2006. "Influence of nutritional and

physiological status on behavioral responses of *Aedes aegypti* (Diptera:

Culicidae) to deltamethrin and cypermethrin." **J Vector Ecol** 31(1): 89-101

_____, S. Sungvornnyothin, S. Ratanatham, A. Prabaripai. 2001.

Pesticide-induced behavioral responses of *Anopheles minimus*, a malaria vector in Thailand. **J. Am. Mosq. Control Assoc.** 17(1): 13-22.

Chuckpaiwong S, S. Panvisavas and P. Wilairatana. 1999. Health Status in Bongtee,

Saiyok, Kanchanaburi: Prevalence of Malaria and Intestinal Parasitic Infections

Report I. **J. Trop Med Parasitol.** 22(21): 71-6.

Das NG, M. Bhuyan and S.C. Das. 2000. Entomological and epidemiological

studies on malaria in Rajmahal range, Bihar. **Indian J Malario.**

Sep-Dec; 37(3-4): 88-96.

Davidson, G. 1953. Experiments on the effect of residual insecticides in houses against

Anopheles gambiae and *Anopheles funestus*. **Bull. Entomol. Res.** 44: 231-255

Department of Communicable Disease control. 1985-2001. **Annual Malaria Reports.**

Malaria Division, Department of Communicable Disease Control, Ministry of Public Health. Nontaburi, Thailand.

Dev V, M.A. Ansari, C.R. Hira and K. Barman. 2001. An outbreak of Plasmodium

falciparum malaria due to *Anopheles minimus* in central Assam, **India.**

Indian J Malariol. Mar-Jun;38(1-2):32-8.

- Evans, R.G. 1993. Laboratory evaluation of the irritancy of bendiocarb, lambdacyhalothrin, and DDT to *Anopheles gambiae*. **J Am Mosq Control Assoc** 9(3): 285-293.
- Extension Toxicology Network (EXTOXNET). 1995.
- Extension Toxicology Network, 2001. Pesticide Information Profile, Carbaryl. 5123 Comstock Hall Cornell University, Ithaca, New York 14853-0901, PMEP Webmaster.
- Fungladda W, A. Ittiravivongs, and P. Lukkanatinapom. 1991. Assessment of utilization of chloroquine and other antimalarial drugs in malaria endemic communities. Final Report: Project ID 870399 WHO-TDR.
- Fungladda W and P. Butraporn. 1992. Malaria-Related Social and Behavioral Risk Factors in Thailand: A Review. **Southeast Asian J Trop Med Public Health**. 23(Suppl 1): 57-62.
- _____, P. Butraporn, K. Okanurak, and S. Sornmani. 1982. Illness behaviour of malaria and febrile cases in Nong Rhee Canton, Kanchanaburi Thailand. Report of Social and Economic Research Unit, Department of Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand.
- _____ and S. Sornmani. 1986. Health behavior, treatment-seeking patterns, and cost of treatment for patients visiting malaria clinics in western Thailand. **Southeast Asian J Trop Med Public Health** 17: 379-85.
- _____, S. Sornmani, K. Klongkamnuankarn, and T. Hungsapruet. 1987. Sociodemographic and behavioral factors associated with malaria patients in Kanchanaburi, Thailand. **J. Trop Med Hyg.** 90: 233-37.

- Grieco, J. E., L. N. Achee, R.M. Sardelis, K. R. Chauhan and D. R. Roberts. 2005. A novel high-throughput screening system to evaluate the behavioral response of adult mosquitoes to chemicals. **Journal of the American Mosquito Control Association**, 21 (4): 404-411,
- Georghiou, G.P. 1990b. The effect of agrochemicals on vector population. In: Roush RT., Tabashnik BE. Eds. Pesticide resistance in arthropods. New York: Chapman and Hall: 183-202.
- Georghiou, G.P., V. Ariaratnam, and S.G. Breeland. 1971. *Anopheles albimanus*: development of carbamate and organophosphorus resistance in nature. **Bull World Health Org.** 46: 551-554.
- Green, C.A., R.F. Gass and L.E. Munstermann. 1990. Population genetic evidence for two species in *Anopheles minimus* in Thailand. **Med Vet Entomol** 4(1): 25-34.
- Green, C.A., R.F. Gass, L.E. Mustermann and V. Baimai. 1990. Population genetic evidence for two species in *Anophelles minimus* in Thailand. **Med Vet Entomol.** 4(1): 25-34.
- _____, R. Rattanarithikul, and A. Charoensub. 1992. Population genetic confirmation of species status of malaria vectors *Anopheles willmori* and *An. pseudowillmori* in Thailand and chromosome phylogeny of *maculatus* group of mosquitoes. **Med Vet Entomol** 6(4): 335-341.
- Hall, M., G. Closs, and R. Riley. 1998. The relationship between landuse and invertebrate communities in the water of Leith. New Zealand. Pp. 15-17. In Taieri and Southern Rivers Program, Annual report No. 5, Department of Zoology, University of Otago, New Zealand.

Harbach, R. E., J. B. Gingrich, and W. P. Lorrin. 1987. Some entomological observations on malaria transmission in a remote village in Northwestern Thailand. **J. Amer. Mos. Cont. Assoc.** 3: 296-301.

Harrison, B.A., 1980. The Myzomyia Series of Anopheles (Cellia) in Thailand, with Emphasis on intra-interspecific variations (Diptera: Culicidae). **Medical entomology studies-XIII. Contr Am Entomol Inst** 17(4): 1-195.

Hongvivatana T, P. Leerapan, and M. Chaiteeranuwasiri. 1985. Knowledge perception and behavior of malaria-Monograph Series. Center for Health Policy studies, Mahidol University, Nakornpathom, Thailand,

Ismail, I.A.H., S. Phinichpongse and P. Boonrasri. 1978. Responses of *Anopheles minimus* to DDT residual spraying in a cleared forested foothill area in central Thailand. **Acta Trop** 35(1): 69-82.

_____, V. Notananda, and J. Schepens. 1974. Studies on malaria and Responses of *Anopheles balabacensis balabacensis* and *Anopheles minimus* to DDT residual spraying in Thailand. Part I. Pre-spraying observations. **Acta Trop, Basel.** 31(2): 129-163.

_____, _____, _____. 1975. Studies on malaria and responses of *Anopheles balabacensis balabacensis* and *An. minimus* to DDT residual spraying in Thailand. Part II. Postspraying observations. **Acta Trop, Basel.** 32(3): 206-231.

Jungbluth, F. 1996. Crop protection policy in Thailand. Economic and political factors influencing pesticide use. Hannover University, Germany; Pesticide policy Project publication. : 5.

- Kamolratanakul, P., P. Butraporn, M. Prasittisuk, C. Prasittisuk. and K. Indaratna.
2001. Cost effectiveness and sustainability of lambda-cyhalothrin treated mosquito nets in comparison to DDT spraying for malaria control in western Thailand. **Am J Trop Med Hyg.** 65(4): 279-284.
- Kennedy J.S., 1946. The excitant and repellent effects mosquitoes of sub-lethal contacts with DDT. **Bull Entomol. Res.** 37: 593-607.
- Ketrangsee S, S. Suvannadabba, K. Thimasarn, C. Prasittisuk and W. Rooney.
1991. Malaria situation in Thailand with special reference to forest related malaria. In: Forest Malaria in Southeast Asia. Proceeding of an Informal Consultative Meeting, V.P. Sharma and A.V. Kondrashin eds. New Delhi: **World Health Organization /Medical Research Council.**
- Kleinbaum, D. G. 1995. Survival analysis. Springer, New York.
- Kongmee, M., A. Prabaripai, P. Akkratanakul, M. J. Bangs, and T. Chareonviriyaphap.
2004. Behavioral responses of *Aedes aegypti* (Diptera: Culicidae) exposed to deltamethrin and possible implications for disease control. **J. Med. Entomol.** 41(6): 1055-1063.
- Lien, J.C., 1991. Anopheline mosquitoes and malaria parasites in Taiwan. **Gaoxiong Yi Xue Za Zhi** 7(5): 207-223.
- Lines, J.D. 1988. Do agricultural insecticides select for insecticide resistance in mosquitoes? A look at the evidence. **Parasitol Today.** 4(7): S17-S20.
- Malaria Division. Annual report. 1999. Nonthaburi: Division of Communicable Disease Control, Ministry of Public Health. In press.
- _____. 2005. Nonthaburi: Division of Communicable Disease Control, Ministry of Public Health. In press.

Mantel, N., and W. Haenzel. 1959. Statistic aspects of the analysis of data from retrospective studies of disease. **J. Natl. Cancer Inst.** 22(4): 719-748.

Mittal, P.K., T. Adak, O.P. Singh, K. Raghavendra, and S.K. Subbarao. 2002. Reduced susceptibility to deltamethrin in *Anopheles culicifacies sensu lato*, in Ramnathapuram district, Tamil Nadu –Selection of a pyrethroid – resistant strain. **CURRENT SCIENCE**. 82(2): 185 -188.

Molineaux L. 1991. Priority areas for operational research on forest related malaria. In: Forest Malaria in Southeast Asia. Proceeding of an Informal Consultative Meeting, V.P. Sharma and A.V. Kondrashin, eds. New Delhi: World Health Organization/Medical Research Council.

Mostafa AA and K.A. Allam. 2001. Studies on the present status of insecticides resistance on mosquitoes using the diagnostic dosages in El-Fayium Governorate, a spot area of malaria in Egypt. **J Egypt Soc Parasitol.** Apr;31(1): 177-86.

Muirhead-Thomson, R.C. 1960. The significance of irritability, behaviouristic avoidance and allied phenomena in malaria eradication. *Bull. Wld. Hlth. Oegan.* 22: 721-734.

_____. 1940a. Studies on the behavior of *Anopheles minimus*. Part1. The selection of the breeding place and the influence of light and shade. **J. Malaria Inst. India.** 3: 265-294.

Mulla, MS., L.S. Mian, and N.G. Gratz. 1987. Agricultural management practices- Their impacts on production of vector and pest mosquitoes. **J. Agric. Entomol.** 4(2): 97-131.

- Notananda, V. 1973. Problems facing the interruption of malaria transmission in Thailand. In: Yow-Cheeng, C., Kilok, C. and Beng- Chuan, H. (Eds). Vector control in Southeast Asia Proceeding of the first SEAMEO workshop.
- Nutsathapana, S., P. Sawasdiwongphorn, V. Chiprarop, J.R.Cullen. 1986. The behavior of *Anopheles minimus* Theobald (Diptera: Culicidae) subjected to differing levels of DDT selection pressure in northern Thailand. **Bull Entomol Res** 76(2): 303-312.
- Orica Limited, 1998. Insecticide-Karate, CAN 004 145 868.
- Overgaard, H.J., B. Ekbom, W. Suwonkerd and M. Takagi. 2003. Effect of landscape structure on anopheline mosquito density and diversity in northern Thailand; Implications for malaria transmission and control. **Lands Ecol.** 18:605-19.
- Overgaard, H.J., S.R. Sandve. and W. Suwonkerd. 2005. Evidence of anopheline mosquito resistance to agrochemicals in northern Thailand. **Southeast Asian J Trop Med Public Health.** 35 (4): 152-157.
- _____, Y. Tsuda, W. Suwonkerd, and M. Takagi. 2002. Characteristics of *Anopheles minimus* (Diptera: Culicidae) Larval Habitats in Northern Thailand. **Environ. Entomol.** 31(1): 134-141.
- Parajuli, M.B., S.L. Shrestha, R.G. Vaidya and G.B. White. 1981. Nationwide disappearance of *Anopheles minimus* Theobald, 1901, previously the principal malaria vector in Nepal. **Trans R Soc Trop Med Hyg** 75: 603.
- Patipong, S. 2000. Protecting against mosquito bites. **Mekong Malaria Forum** 5: 86-88.

- Peyton, E.L. and J.E. Scanlon. 1966. Illustrated Key to the Female Anopheles Mosquitoes of Thailand. Bangkok, Thailand: U.S. Army Medical Component, **Southeast Asia Treaty Organization**.
- Potikasikorn, J., T. Chareonviriyaphap, M.J. Bangs, and A. Prabaripai. 2005. Behavioral responses to DDT and pyrethroids between *Anopheles minimus* species A and C, malaria vectors in Thailand. **Am J Trop Med Hyg.** 73(2): 343-349.
- Prasittisuk, C. 1985. Present status of malaria in Thailand. **Southeast Asian J Trop Met Public Health.** 16: 141-145.
- Prasittisuk, M. 1994. Comparative study of pyrethroids impregnated nets with DDT Residual spraying for malaria control in Thailand. Ph.D. Thesis. Faculty of Graduate studies, Mahidol University. 221pp.
- Rao, T.R. 1984. The anopheline of India. Pp 1-518. **Indian Council of Medical Research, New Delhi:** 1-518
- Rattanaarithikul, R and C.A. Green. 1986. Formal recognition of the species of the *Anopheles maculatus* group (Diptera: Culicidae) occurring in Thailand, including the description of two new species and a preliminary key to females. **Mosq Syst** 18: 246- 278.
- _____, C.A. Green, S. Panyim, C. Noigamol, S. Chanaimongkol, and P. Mahapibul. 1995. Larval habitats of malaria vectors and other *Anopheles* mosquitoes around a transmission focus in northwestern Thailand. **J. Am. Mosq. Control Assoc.** 11: 428-433.
- _____, E. Konishi, and K. Linthicum. 1996. Observations on nocturnal biting activity and host preference of Anophelines collected in southern Thailand. **J. Amer. Mosq. Cont. Assoc.** 12: 52-57.

- Rattanarithikul, R and P. Panthusiri. 1994. Illustrated keys to the medically important mosquitoes of Thailand. **Southeast Asian J. Trop. Med. Publ. Hlth.** 25 (Suppl): 1-66.
- Ratanatham, S., E. S. Upatham, C. Prasittisuk, W. Rojanasunan, N. Theerasilp, A. Tremongkol, and V. Viyanant. 1988. Bionomics of *Anopheles minimus* and its role in malaria transmission in Thailand. **Southeast Asian J. Trop. Med. Publ. Hlth.** 19(2): 283-289.
- Reid, J.A. 1968. Anopheles mosquitoes of Malaya and Borneo. **Stud Inst Med Res Malaysia, Kualalumpur.** 31: 310-325.
- Roberts, D.R. 1993. Insecticide repellency in malaria vector control: a position paper. VBC Report no. 81131. USAID, Arlington, VA. 72 pp.
- Roberts, D.R and R. G. Andre. 1994. Insecticide resistance issues in vector-borne disease control. **Am J Trop Med Hyg** 50(6): 21-34.
- _____, T. Chareonviriyaphap, H. H. Harlan, and P. Hshieh. 1997. Methods for testing and analyzing excito-repellency responses of malaria vectors to insecticides. **J Am Mosq Control Assoc** 13(1): 13-17.
- _____, and WD Alecrim. 1991. Behavioral response of *Anopheles darlingi* to DDT sprayed house walls in Amazonia. **PAHO Bull** 25: 210-217.
- _____, _____, A.M. Tavares and K.M. McNeil. 1984. Influence of physiological condition on the behavioral response of *Anopheles darlingi* to DDT. **Mosq News** 4(3): 357 – 361.

- Roberts, D.R, WD Alecrim, P. Hshish, J.P. Grieco, M.J. Bangs, R.G. Andre and T. Chareonviriyaphap. 2000. A probability model of vector behavior: effects of DDT repellency, irritancy, and toxicity in malaria control. **J Vector Ecol** 25(1): 48-61
- Rongnoparut, P., D.M. Ugsang, V. Baimai, K. Honda and R. Sithiprasasna. 2005. Use of a remote sensing-loaded geographic information system in the characterizing spatial patterns for *Anopheles minimus* A and C breeding habitats in western Thailand. **Southeast Asian J. Trop. Med. Publ. Hlth.** 86(5): 1145-52.
- Rutledge, L.C., N.M. Echana and R.K. Gupta. 1999. Responses of male and female mosquitoes to repellents in the World Health Organization insecticide irritability test system. **J. Am. Mosq. Contr. Assoc.** 15: 60-64.
- Rwegoshora, R.T., R.G. Sharpe, K.J. Baisley, and P. Kittayapong. 2002. Biting behavior and seasonal variation in The abundance of *Anopheles minimus* species A and C in Thailand. **Southeast Asian J. Trop. Med. Publ. Hlth.** 33(4): 694-701.
- Sambasivan, G., 1953. Report of the Thai Government UNICEF Malaria Control Demonstration Project, Thailand, **SEA/MAL unpublished report to WHO, New Delhi, India.**
- Sampath, TR., R.S. Yadav, V.P. Sharma, and T. Adak. 1998. Evaluation of lambda cyhalothrin – impregnated bed nets in a malaria endemic area of India. Part 1. Implementation and acceptability of the trial. **J Am Mosq Control Assoc.** 14(4): 431-6.

- Savage, H. M., E. Rejmankova, J. I. Arredondo-Jimenez, DC Roberts, and M. H. Rodriguez. 1990. Limnological and botanical characterization of larval habitats for two primary malarial vectors, *Anopheles albimanus* and *Anopheles pseudopunctipennis*, in coastal areas of Chiapas state Mexico. **J. Am. Mosq. Control Assoc.** 6: 612-620.
- Singhanetra-Renard A. 1986. Population movement, socio-economic behavior and the transmission of malaria in northern Thailand. **Southeast Asian J Trop Med Public Health** 17: 396-405.
- _____. 1993. Malaria and mobility in Thailand. **Soc Sci Med.** 37: 1147-54.
- Smyth, T, Jr. and C. C. Roys. 1955. Chemoreceptor in insects and the action of DDT. **Biol. Bull.** 108: 66-76.
- Soliman, S.A. and L.K. Cutkomp 1963. A comparison of chemoreceptor and whole-fly responses to DDT and parathion. **J. Econ. Entomol.** 56: 492-494.
- Somboon, P., A. Aramrattana, J. Lines and R. Webber. 1998. Entomological and Epidemiological investigations of Malaria Transmission in relation to population Movements in Forest areas of North-West Thailand. **Southeast Asian J Trop Med Public Health.** 29(1): 3-9.
- _____, L.A. Prapanthadara and W. Suwonkerd. 2003. Insecticide susceptibility tests of *Anopheles minimus* s.l., *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* in northern Thailand. **Southeast Asian J Trop Med Public Health.** 2003 Mar; 34(1): 87-93.

- Sornmani S, P. Butraporn, W. Fungladda, K. Okanurak and S. Dissapongsa. 1983. Migration and disease problems: a study of pattern of migration in an endemic area of malaria in Thailand. **Southeast Asian J Trop Med Public Health** 14: 64-68.
- SPSS Base 11, 2001. SPSS
- Subbarao, S.K. 1998. Anopheline species complexes in south-east Asia. Tech. Pub., SEARO No. 18, **Wld. Hlth. Org.**, New Delhi. 82 pp.
- Sucharit, S., K. Surathinth, U. Chaisri, S. Thongrunkiat, and Y. Samang. 1995. New evidence for the differed characters of *Anopheles minimus* species complex. Mosquitoes-Borne Diseases Bulletin. 12(1): 1-6.
- _____, M. Koma amisra, S. Leemingsawat, C. Apiwathnasorn, S. Thongrunkiat, 1988. Population genetic studies on the *Anopheles minimus* complex in Thailand. **Southeast Asian J Trop Med Public Health** 19(4): 717-723.
- Sucharit, S. and W. Choochote. 1982. Hybridization of *Anopheles minimus* and *Anopheles aconitus* (Ditera: Culicidae) in Thailand. **J Med Entomol** 19(3): 290-292.
- Sungvornyothin S., T. Chareonviriyaphap, A. Prabaripai, T. Trirakupt, S. Rattanatham, and M.J. Bangs. 2001. Effects of nutritional and physiological status on behavioral avoidance of *Anopheles minimus* (Diptera: Culicidae) to DDT, deltamethrin and lambdacyhalothrin. **J Vec Ecol** 26(2): 202-215.
- Suwonkerd, W., M. Takagi., B. Amg-Ung and S. Prajalawong. 1995. Seasonal and spatial distribution of 3 malaria vectors at three mountainous villages in north Thailand. **Jpn. J. Trop. Med. Hyg.** 23(3): 183-187.

- Teng, H.J., Y.L. Wu, S.J. Wang, and C. Lin. 1998. Effects of environmental factors on abundance of *Anopheles minimus* (Diptera: Culicidae) larvae and their seasonal fluctuation in Taiwan. **Environ. Entomol.** 27: 324-328.
- Thanaphum, S., C.A. Green, V. Baimai, R.F. Gass, G.B. Gingrich. 1990. Genetic Linkage relationships of eight enzyme/electromorph loci in *Anopheles minimus*. **Genetica** 82: 63-72.
- Thomson, W.T. 1992. Agricultural Chemicals Book I: Insecticides.
- Van Bortel, W., H.D. Trung, N.D. Manh, P. Roelants, P. Verle, and M. Cosemans. 1999. Identification of two species within the *Anopheles minimus* complex in northern Vietnam and their behavioral divergences. **Trop Med Int Health.** 4(4): 257-265.
- Van Bortel, W., H.D. Trung, P. Roelants, R.E. Harbach, T. Backeljau and M. Coosemans. 2000. Molecular identification of *Anopheles minimus* s.l. beyond distinguishing the members of the species complex. **Insect Mol Biol** 9(3): 35-340.
- U.S. Environmental Protection Agency, Office of Drinking Water. Carbaryl Health Advisory. Draft Report. August 1987.
- U.S. Environmental Protection Agency (EPA). 2002. Malathion for mosquito control. URL: <http://www.epa.gov/pesticides/factsheets/malathion4mosquitos.htm>
- U.S. Environmental Protection Agency (EPA). 2002. Synthetic Pyrethroids for mosquito control. URL:
- U.S. Environmental Protection Agency (EPA), 1972. DDT Ban Takes Effect. URL: <http://www.epa.gov/history/topics/ddt/01.htm>

World Health Organization. 1992. Vector Resistance to Insecticide. Geneva: World Health Organization. Fifteenth report of the WHO Expert Committee on Vector Biology and Control. No. 818.

World Health Organization. 1995. Vector control for malaria and other mosquito-borne diseases. **Wld. Hlth. Org. Tech. Rep. Ser.** No. 857. 91 pp.

Worthing, C.R., 1983. The Pesticide Manual: A world Compendium. Seventh edition. Published by The British Crop Protection Council. Ziegler, K., 1978. New strategy in the fight against malaria. **Z Gesamte Inn Med** 33(13): 436-439.

Ziegler, K., 1978. New strategy in the fight against malaria. **Z Gesamte Inn Med** 33 (13): 436-439.

<http://en.wikipedia.org/wiki/DDT>

APPENDIX

Appendix part1.1 Stratification of Malarious Areas

The Thai Malaria Control Programme stratifies the country into 4 categories :

(1) Control area with transmission (referred to as A)

This category is divided into **A1** and **A2**

- Perennial transmission area, where transmission is reported throughout the year or at least 6 months per year, is designated as **A₁**

- Periodic transmission area, where transmission is reported 5 months or less per year, is designated as **A₂**

(2) Control area without transmission (referred to as B)

This category is divided into two subcategorized, namely **B₁** and **B₂**.

- High risk are **B₁**, transmission was not reported within the last 3 years but primary or secondary vectors are found. Consequently, the area is potentially suitable for malaria transmission (high and moderate receptivity).

- Low risk areas **B₂**, transmission was not reported within the last 3 years and both primary and secondary vectors are not found. Suspected vector, however, may be found (low and non receptivity).

Appendix part1.2. Questionnaire 1

QUESTIONNAIRE 1 (Q1)**1. General information**

Q1 No. _____

1. Date: _____
2. Address / Location: House no.: _____ Village: _____
 Tambon: _____ Amphoe: _____ Province: _____
3. Respondant's name: _____ ☐ Male ☐ Female. Age: _____
4. Is respondant the head of the household? ☐ Yes ☐ No

If "No", then ask the questions in the box below. Otherwise continue to Question 9.

Please try to interview household heads only!

5. What is your relation with household head? I am the
☐ Husband ☐ Wife ☐ Father ☐ Mother ☐ Other:
 of the household head.
6. Name of household head: _____ ☐ Male ☐ Female
7. Age of household head: _____
8. What is the main occupation of household head? *(multiple choice possible)*
☐ Farmer ☐ Business ☐ Trader ☐ Merchant ☐ Housewife
☐ Government service ☐ Forest activity ☐ Factory ☐ Office
☐ Unemployed ☐ Other:

9. What is your ethnic group?
☐ Thai ☐ Karen ☐ Akha ☐ Mong ☐ Chinese ☐ Other:

10. No. of adults and children in household: Adults: _____ Children: _____

11. How long have you lived in this village:

☐ Less than 1 year ☐ 1-5 years ☐ 5-10 years ☐ More than 10 years

12. What is your main occupation? (*multiple choice possible*)

☐ Farmer ☐ Business ☐ Trader ☐ Merchant ☐ Housewife
☐ Government ☐ Forest activity ☐ Factory ☐ Office ☐ Unemployed
☐ Other:.....

If “Farmer” go to Questionnaire 2 after finishing Questionnaire 1.

13. Name the 3 biggest problems in your village:

1.....
 2.....
 3.....

14. Name the 3 most important diseases in your village:

1.....
 2.....
 3.....

15. Do you ever travel outside of your village? ☐ Yes ☐ No

If “Yes”, then ask the questions in the box below. Otherwise continue to Question 21.

16. How often do you travel outside village? ☐ Less than once per year ☐ Once per year ☐ Twice per year ☐ 3-6 times per year ☐ More than 6 times per year 17. Where do you travel? ☐ Within tambon ☐ Within amphoe ☐ Within province ☐ Other provinces ☐ Outside country (name country) 18. For how long time do you usually stay outside village? ☐ Less than one week ☐ 1-4 weeks ☐ From 1-6 months ☐ More than 6 months ☐ Other 19. For what reason do you travel outside village? ☐ Work (Labor) ☐ Purchases ☐ Visit relatives/friends ☐ Leisure ☐ Business (what kind?) ☐ Other ☐ Unwilling to answer 20. If for work, what kind of work do you do outside village? ☐ Unwilling to answer

2. Malaria Knowledge

21. Do you know the disease malaria? ☐ Yes ☐ No

If “Yes”, then ask the questions in the box below. Otherwise continue to Question 33.

22. Which malaria symptoms can you mention? (*multiple choice possible*)
☐ Fever ☐ Headaches ☐ Shivering ☐ Muscle pain
☐ Nausea/vomiting ☐ Others:
23. Have you ever had malaria? ☐ Yes ☐ No (***If “No” continue to Question 30***)
24. If “Yes”, how many times? ☐ Once ☐ 2-3 times ☐ More than 3 times
25. When was the last time?
☐ Within last 3 months ☐ Between 3-12 months ago
☐ Between 1-5 years ago ☐ More than 5 years ago
26. When you got malaria the last time where were you treated?
☐ Malaria clinic (MC) ☐ Health clinic ☐ Hospital
☐ Traditional medical practitioner ☐ Treat yourself ☐ No treatment
☐ Other
27. How far from your home is the place where you got treated (in km)? -----
28. Did you take the full course of treatment? ☐ Yes ☐ No
29. How is malaria transmitted? ☐ Mosquito bite ☐ Don’t know ☐ Other.....
30. In what season is malaria transmitted? (*multiple choice possible*)
☐ Rainy season (June-October) ☐ Cold season (November-February)
☐ Hot season (March-May)
31. When do malaria mosquitoes bite? (*multiple choice possible*)
☐ Early morning (4.00-6.00) ☐ Day time (6.00-16.00)
☐ Early evening (16.00-20.00) ☐ Late evening (20.00-24.00)
☐ Night time (00.00-04.00) ☐ Don’t know
32. Where do malaria mosquitoes breed? (*multiple choice possible*)
☐ Stagnant clean water ☐ Water reservoirs ☐ Slow-moving streams
☐ Rice fields ☐ Ground pools ☐ Others:.....
☐ Don’t know

33. Do you know the difference between *Anophelines* (Yung Konplong) and *Culicines* (Yung Lai) by sight? ☐ Yes ☐ No

34. Which preventive measures against malaria (or mosquitoes) do you use?

(multiple choice possible)

Cleaning of water streams ☐ Yes ☐ No

Cleaning around the house ☐ Yes ☐ No

Using impregnated mosquito bednets ☐ Yes ☐ No

Using non-impregnated mosquito bednets ☐ Yes ☐ No

Use of cloth(long sleeve) for prevention ☐ Yes ☐ No

Spraying inside and outside the house ☐ Yes ☐ No

Use commercial repellent ☐ Yes ☐ No

Use of mosquito coils ☐ Yes ☐ No

Use traditional repellents (give details)

Others:

35. Are there more or less mosquitoes inside your house after application of insecticides in your fields?

☐ More ☐ Less ☐ No difference ☐ Don't know

36. Additional information on malaria and mosquitoes given by respondent (optional)

3. Risk factors

3.1. Work related

37. How often do you sleep in a field hut?

- ☐ Never ☐ Once a month ☐ 2-3 nights/month ☐ 4 or more
 times/month ☐ 1 or more times per week ☐ Other

If “Never” continue to Question 41.

38. What season do you sleep in a field hut? (*multiple choice possible*)

- ☐ Rainy season (June-October) ☐ Cold season (November-February)
☐ Hot season (March-May)

39. How do you protect yourself from mosquito bites when you sleep in the field hut?

(multiple choice possible)

- | | | |
|--|------------------------------|-----------------------------|
| Using impregnated mosquito bednets | ☐ Yes | ☐ No |
| Using non-impregnated mosquito bednets | ☐ Yes | ☐ No |
| Use of cloth(long sleeve) for prevention | ☐ Yes | ☐ No |
| Spraying inside and outside the house | ☐ Yes | ☐ No |
| Use commercial repellent | ☐ Yes | ☐ No |
| Use of mosquito coils | ☐ Yes | ☐ No |

Use traditional repellents (give details)

.....

Others:

40. How often do you sleep in the forest?

- ☐ Never ☐ Once a month ☐ 2-3 nights/month
☐ 4 or more times/month ☐ 1 or more times per week ☐ Other

If “Never” continue to Question 44.

41. What season do you sleep in the forest? *(multiple choice possible)*

☐ Rainy season (June-October) ☐ Cold season (November-February)

☐ Hot season (March-May)

42. Do you use a bed net when you sleep in the forest?

(multiple choice possible)

Using impregnated mosquito bednets ☐ Yes ☐ No

Using non-impregnated mosquito bednets ☐ Yes ☐ No

Use of cloth(long sleeve) for prevention ☐ Yes ☐ No

Spraying inside and outside the house ☐ Yes ☐ No

Use commercial repellent ☐ Yes ☐ No

Use of mosquito coils ☐ Yes ☐ No

Use traditional repellents (give details)

.....

Others:

3.2. Living area

43. Distance to water (irrigation stream/scheme/river/lake/wetland)

☐ Less than 100 meters ☐ More than 100 meters

44. Distance to forest ☐ Less than 100 meters ☐ More than 100 meters

45. Distance to agricultural field ☐ Less than 100 meters ☐ More than 100 meters

46. Distance to fruit orchard ☐ Less than 100 meters ☐ More than 100 meters

47. Housing construction

- ☐ Wood ☐ Bamboo ☐ Concrete ☐ Other:

48. When was your house constructed?

- ☐ During the last year ☐ 1-5 years ago ☐ 5-10 years ago
☐ More than 10 years ago

49. Screening of windows? (multiple choice possible) ☐ Yes ☐ No

50. What kind of screening of windows?

- ☐ Window curtain ☐ Mosquito netting ☐ Pane
☐ Other

51. Availability of mosquito bednets in household? ☐ Yes ☐ No

52. Number of mosquito bednets used in household? _____

53. How many persons sleep in the house during the night? _____

No. of children _____ No. of adults _____

3.3. Animals near or in the house

54. Are there animals around the house? ☐ Yes ☐ No

If “No” continue to Question 58.

55. What kind? (multiple choice possible)

- ☐ Cows ☐ Buffalo ☐ Pigs ☐ Chicken ☐ Ducks
☐ Others:☐ Domestic animals: ☐ Dog ☐ Cat ☐ Birds ☐ Others.....

56. Do cattle (cows/buffaloes) stay around the house at night? ☐ Yes ☐ No

57. Are there animals in your house? ☐ Yes ☐ No

If “No” finish interview.

58. What kind? (*multiple choice possible*)

☐ Domestic animals: ☐ Dog ☐ Cat ☐ Birds ☐ Others.....

Appendix part1.3. Questionnaire 2

QUESTIONNAIRE 2 (Q2)

Q2 No. _____

General information

1. Date: _____

2. Address / Location: House no.: _____ Village: _____

Tambon: _____ Amphoe: _____ Province: _____.

3. Respondant's name: _____ ☐ Male ☐ Female

Crop information

4. What are your three most important crops (most important in terms of income)?

1. ☐ annual or ☐ perennial2. ☐ annual or ☐ perennial3. ☐ annual or ☐ perennial5. What are your three major PERENNIAL (fruit) crops (in terms of area)?

Crop P1 has the largest area; crop P2 the second largest and crop P3 the third largest.

PERENNIAL CROP	P1	P2	P3
Crop			
Area (rai)			
Age (months or yrs)			
Yield (kg/rai)			
Harvest time (which month)			
Pesticide information	Details in question 7	Details in question 8	Details in question 9

P=Perennial

6. What are your three major ANNUAL crops (in terms of area)?

Crop A1 has the largest area; crop A2 the second largest and crop A3 the third largest.

ANNUAL CROP	A1	A2	A3
Crop			
Area (rai)			
Age (months or yrs)			
Yield (kg/rai)			
Harvest time (which month)			
Pesticide information	Details in question 10	Details in question 11	Details in question 12

A=Annual

Pesticide information (Continue on pages 129)

Date.....

Respondant name.....

Pesticide used in.....

No.	Brand name	AI (%)	Target pest org.	When applied (month)	How often applied	Quantity applied	Mixed with	How applied	Additional inf.