CHAPTER 5

CONCLUSION

This study presented a new model of wind tunnel that was designed, constructed, and operated to investigate behavioral responses of *C. megacephala*. The results obtained from laboratory experiments supported this model as a suitable device for behavioral investigation of this fly. Of 16 kinds of animal-origin products, 1-day tainted pork scrap was found to give most attraction to starved *C. megacephala* flies as well as 5-10 day-old, virgin and well-fed flies. To create the most suitable combination of variables for observing behavioral responses of this fly species in the wind tunnel, 60 flies were tested for a 1-hour period between 1 p.m. and 5 p.m. under wind speed of 0.58 m/s and vertical-room light intensity of 341.33 lux and horizontal-tunnel light intensity of 135.93 lux.

Extraction of 1-day tainted pork scrap by simple techniques (air-pumping, absorption and maceration) and solvents (50% and 70% ethanol, distilled water, glycerol, paraffin oil, polyethylene glycol and soybean oil) produced 15 kinds of attractant-extracted solutions. AmDW solution, which was produced by 24-hour aerobic maceration of 1 kg of fresh pork scrap and 500 mL of distilled water, yielded high attraction to the *C. megacephala* tested in the wind tunnel. When testing the attraction of AmDW solution to other laboratory strain fly species, the results demonstrated that more *C. megacephala* flies responded to this solution than *L. cuprina, A. rufifacies, M. domestica* and *P. dux*. At field trials in Chiang Mai

province, *C. megacephala* was the most collected fly species and trap baited with AmDW solution yielded the greatest percentage of this species (61.9%), followed by those baited with 1-day tainted pork scrap, beef scrap and chub mackerel. A larger number of females than males were demonstrated from all baits and most of them were non-gravid. In addition, it was found that attraction of AmDW soltuion to *C. megacephala* held for 1 hour when observation for 2 hours in the rearing cage. Therefore, AmDW solution can be adapted for use with a trap and can hold promise for future control of *C. megacephala* populations.

Other blow fly species in genus *Chrysomya* and blow flies such as *Achoetandrus, Hemipyrellia, Hypopygiopsis* and *Lucilia* were collected also from the field experiments as well as flies in other families such as Drosophilidae, Fanniidae, Muscidae, Piophilidae, Phoridae, Platystomatidae and Sarcophagidae; however, there were fewer of them than *C. megacephala*. Intensive studies on specimens of possible forensic-related fly species collected in this study generated valuable morphological descriptions of immature larval and adult of *H. tumrasvini* as well as male *Atherigona* spp. This information should be useful for future forensic cases in Thailand, which involve these fly species.

By analyses using HS-GC-MS and HS-SPME-GC-MS, the main attractive components for luring *C. megacephala* could be a complex of ammonia, sulfur compounds (dimethyl disulfide, dimethyl trisulfide, dimethyl tetrasulfide and elemental sulfur), short-chain acids (ethanoic acid, butanoic acid, pentanoic acid and methyl pentanoic acid), phenol and indole, since they were detected in volatile profiles of high attractive baits such as 1-day tainted pork scrap and AmDW solution.

Commercial chemical solutions of ammonia, butanone, ethanol, dimethyl disulfide and heptanone, prepared as chemical-based baits (single uses, chemical and volatile mixtures, aqueous dilution and paraffin oil-overlaid formulations, totaling 41 kinds), were tested against *C. megacephala* with both 5 min of rearing cage test and 1 hour of wind tunnel bioassay. The results revealed that their attraction was limited mostly to low potency and only 4 formulations produced medium attraction to *C. megacephala*; 1) ammonia alone, 2) ethanol alone, 3) 1% aqueous dilution of dimethyl disulfide, and 4) volatile mixture of ammonia/dimethyl disulfide/ethanol.

Finally, this study showed the influence of different physiological and environmental conditions on fly behavioral responses of *C. megacephala* to olfactory-related bait. The response of flies to bait was not influenced by mating status, since the responses between virgin and mated flies were comparable, as revealed by wind tunnel experiments. However, as flies get older (5-10 day-old→15-20 day-old→30-35 day-old), their responses gradually decrease (A.I. = 0.59→0.52→0.40, respectively). As for climatic effects, the behavioral response of *C. megacephala* to bait was observed for 5 min by using the rearing cage, which was placed in different climatic conditions such as sunshade, indoors and outdoors. The results revealed that more *C. megacephala* flies responded to AmDW solution at positions of high light intensity and exposure than in medium and low conditions of the sunshade. Also, a large response from this fly to bait was found when cages were set in high temperature and low relative humidity both indoors and outdoors, suggesting that the attraction of AmDW solution to *C. megacephala* positively correlated to temperature, light intensity and exposure, but negatively to relative humidity.