

CHAPTER V

CONCLUSION

The ultramorphology of the alimentary canal of the mature third instar larva and both sexes of the adult blow fly, *C. megacephala*, was clearly investigated in this study using a combination of LM, SEM and TEM. The alimentary tract of *C. megacephala* is a slender, long tubular organ system. Its anterior region is a straight cylindrical structure situated in the head capsule and the thorax, and the posterior region has a coiled shape which lies in the abdominal segments. This digestive system comprised three main portions which differ structurally and functionally; the anterior foregut or stomodaeum, the midgut or mesenteron, and the posterior hindgut or proctodaeum as well as accessory organs protruding from the main digestive tract. The foregut is composed of a single tube, with the noticeable structures being salivary gland, crop, esophagus and cardia (or proventriculus). The midgut is the longest portion of the alimentary canal, lying convoluted and twisted within the larval cavity. The midgut begins at the gastric caeca located continuous posteriorly of the cardia. Four long tube of the gastric caeca were observed only in the third instar, but not in males and females. The hindgut occupied by the pylorus, Malpighian tubules, ileum, colon, rectum and posterior anus. The Malpighian

tubules emerged from the midgut-hindgut junction are paired proximally; each diverged into two tubular structures, forming four long tubules.

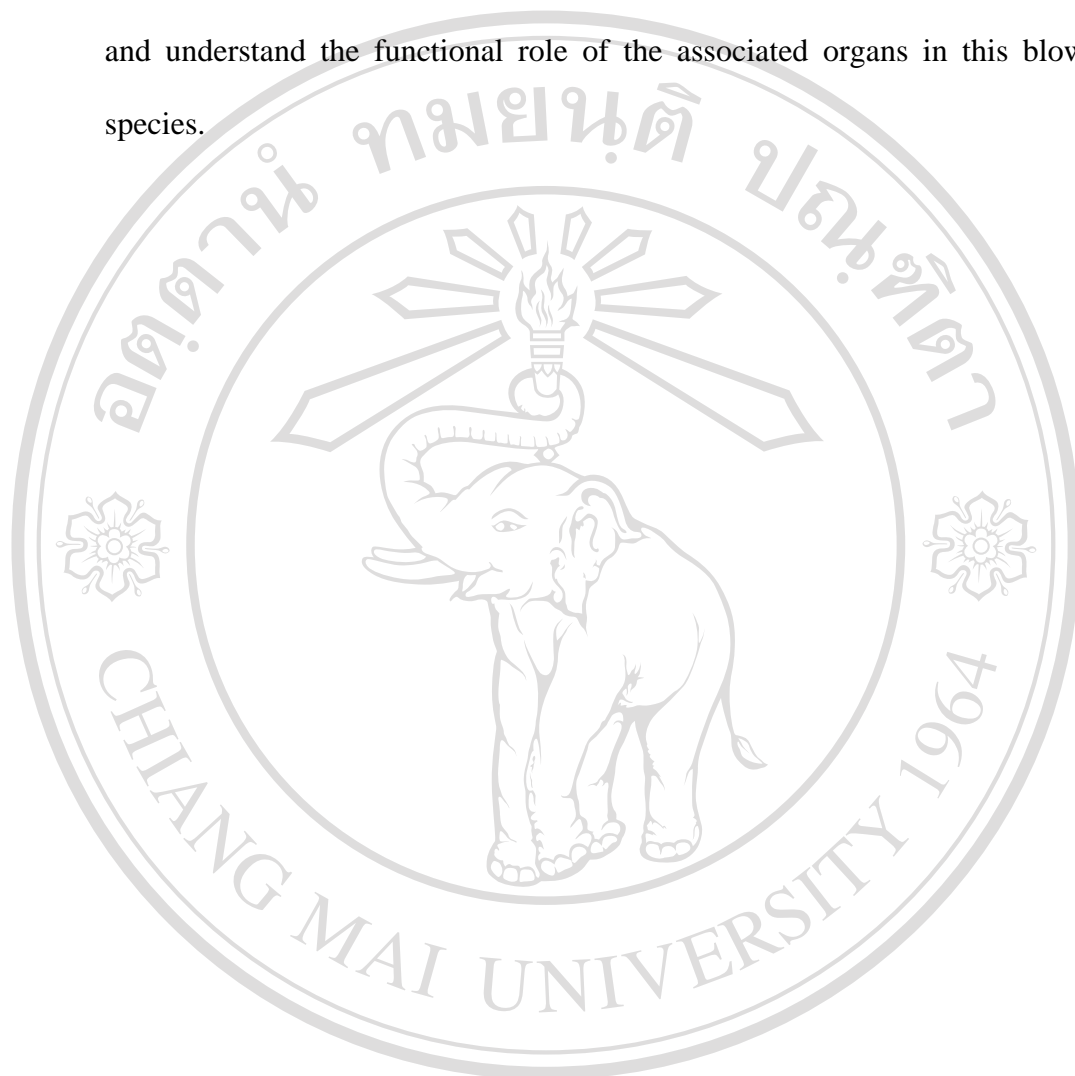
The morphometric evaluation of the alimentary system in the third instar and 7-days-old males and females indicated that the midgut was the longest organ. The medians length of the esophagus, cardia, midgut, ileum, colon and rectum in the third instar were significantly longer than those males and females. This measurement excluded the branches of the salivary gland, crop, gastric caecae and Malpighian tubule. Overall, the median of the entire gut length of the third instar measured 89.15 mm, which was significantly longer than males (36.23 mm) and females (37.73 mm). No significant difference of the median entire gut length was detected between males and females.

In the third instar, the crop presented as a large, swollen sac as a diverticulum of the digestive tube and is lined internally with convoluted cuticle (epicuticle and endocuticle). The salivary structures consist of a single median deferent duct that bifurcates into efferent ducts connected to paired, tubular salivary glands comprised of closely packed conical-shaped epithelial cells with large nuclei. The esophagus is a simple, straight tube internally lined with cuticle and externally encompassed by muscle fibers. The cardia is a bulb-like structure composed of anterior foregut tissue and posterior midgut tissue from which the peritrophic membrane (PM) is produced. The midgut begins within the cardia which is flanked posteriorly by four tubular gastric caeca that are lined internally with 4-5 layers of cuboidal epithelial cells bearing microvilli. Midgut tissue was lined with simple cuboidal epithelium whose cells were filled with numerous secretory granules and possessed long microvilli facing the

lumen. Peritrophic membrane was contained within the midgut lumen. The larval hindgut consisted of the pylorus, Malpighian tubules, ileum, colon, rectum and anus posteriorly. The pylorus is characterized by a single layer of epithelial cells encircled by a muscular layer and the presence of PM within the lumen. Malpighian tubules each diverged into two tubular structures totalling four long tubules of long chained cuboidal cells bearing microvilli internally. The wall of the ileum is comprised primarily of a monolayer of cuboidal epithelial cells with large oval nuclei and more intense muscular fibers surrounding the periphery. A cuticular layer surrounds the lumen containing the PM. This inner cuticle consists of a thin epicuticle that is electron-dense; whereas, the endocuticle is much thicker but less electron-dense. Myo-epithelial cells are intense in the anal region, where the PM persists.

For males and females, no significant difference was observed in the morphology of alimentary canal between males and females. Although the overall of the alimentary canal of adults was similar to that of the third instar, some distinctive organ was detected, in particular the absence gastric caecae, difference shape of salivary gland, crop and rectum. The salivary gland of the adult flies presented coiled shape of the long tubular gland. The outer most layers adjacent to the lumen were double-layered, with some part showing secretion of materials from the cells. Variable size of dark-stained secretory materials and vesicles was observed in cytoplasm. The crop appeared as bilobed crop connected to the straight, slender tube. The rectum appeared as a muscular cone-shaped sac-like structure, bearing four muscle-free rectal pads. Only circular muscle was observed covering the rectum. The results of this

study provided a step toward information on the ultramorphology of the alimentary canal of *C. megacephala*, which should help enable us to ascertain and understand the functional role of the associated organs in this blow fly species.



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