ความหลากหลายและลำดับการเข้ากินซากของสัตว์ขาปล้องที่พบในซากสุกร *Sus scrofa domestica* ภายใต้สภาวะที่ต่างกันในจังหวัดน่าน ประเทศไทย

นางสาวสุธาภรณ์ สุขจิต

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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ปีการศึกษา 2554

DIVERSITY AND SUCCESSION OF CARRION ARTHROPODS ON PIG *SUS SCROFA DOMESTICA* CARCASSES UNDER DIFFERENT CONDITIONS IN NAN PROVINCE, THAILAND

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สุธาภรณ์ สุขจิต: ความหลากหลายและลำดับการเข้ากินซากของสัตว์ขาปล้องที่พบในซากสุกร *Sus scrofa domestica* ภายใต้สภาวะที่ต่างกันในจังหวัดน่าน ประเทศไทย (DIVERSITY AND SUCCESSION OF CARRION ARTHROPODS ON PIG *SUS SCROFA DOMESTICA* CARCASSES UNDER DIFFERENT CONDITIONS IN NAN PROVINCE, THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก : อ.ดร. บัณฑิกา อารีย์กุล บุทเชอร์, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ผศ.ดร. สุรีรัตน์ เดี่ยววาณิชย์, 236 หน้า.

งานวิจัยครั้งนี้จัดทำข้อมูลพื้นฐานของแมลงกินซาก จาก การศึกษาการย่อยสลายของซากและลำดับการเข้ากิ นซากของแมลงโดยใช้หมู บ้านเป็นสัตว์ทดลอง การศึกษาทดลองภาคสนามศึกษาในจังหวัดน่าน ทำการศึกษาในช่วงปี พ.ศ. 2553 – 2554 โดยแบ่งเป็น 2 พื้นที่ (พื้นที่ในป่าและพื้นที่เขตชานเมือง) ศึกษา 3 ฤดู (ฤดูฝน ฤดูหนาวและฤดูร้อน) และศึกษาเปรียบเทียบลักษณะการเสียชีวิตที่แตกต่ างกัน 2 แบบ ของสัตว์ทดลอง คือ ถูกแขวนบริเวณคอและวางบนพื้นดิน จากการศึกษาพบว่าพื้นที่ ฤดูกาล และลักษณะการเสียชีวิตมีผลต่ออัตราการย่อยสลายของซาก โดยในฤดูฝนและฤดูหนาวพบว่าตัว ที่อยู่บนพื้นมีอัตราการย่อยสลายของซากที่เร็วกว่าซากที่แขวนคอไว้ แมลงที่เข้ามากินซาก หมูทั้ง 2 ลักษณะการเสียชีวิต มีชนิดที่แตกต่างกันตาม พื้นที่และฤดูกาล โดยพบแมลงวันหัวเขียว *Chrysomya megacephala* และ *Achoetandrus rufifacies* เป็นชนิดหลักที่พบในทุกพื้นที่ ทุกฤดูกาล และพบทั้งในซากที่แขวนคอและวางกับพื้น นอกจากนี้พบสัตว์ขาข้อชนิดอื่น เช่น แมลงในอั นดับ Coleoptera, Hymenoptera, Orthoptera, Hemiptera, Blattodea, Isoptera, Acari, Scorpiones และ Araneae ความหลากหลายของแมลงที่เข้ากินซากในฤดูฝนจะมีความหลากหลายมากที่สุด รองลงมาคือฤดูร้อนและฤดูหนาว ตามลำดับ

ภาควิชา ชีววิทยา ลายมือชื่อนิสิต……..

สาขาวิชา สัตววิทยา ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก…….....

ปีการศึกษา 2554 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม…….

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SUTAPORN SUKJIT: DIVERSITY AND SUCCESSION OF CARRION ARTHROPODS ON PIG *SUS SCROFA DOMESTICA* CARCASSES UNDER DIFFERENT CONDITIONS IN NAN PROVINCE, THAILAND. ADVISOR: BUNTIKA AREEKUL BUTCHER, Ph.D., CO-ADVISOR: ASST. PROF. SUREERAT DEOWANICH, Dr. Agr., 236 pp.

This research aimed to establish the basic preliminary data base of insect species associated with decomposing cadavers and the main succession trends to develop forensic entomology in Thailand. Insect succession and rate of decomposition were studied on domestic pig (20-25 kg) carcasses during 2010-2011, in Nan province, Thailand. Three major differences were considered, the affect of habitat (mixed deciduous forest and rural area), season (monsoon wet, winter and summer seasons) and spatial position / access (carcasses were hung on a tree or laid on the ground). The ambient temperature and relative humidity in the vicinity of the carcass, the internal carcass temperature and the rate of carcass decomposition were compared with the insect succession stages for each experimental variable. Habitats, seasons and spatial positions of the carcasses directly affect the decomposition rate of the carcasses, being greater in ground-laid carcasses than hanging carcass in the wet and winter seasons. Patterns of insect succession occurred in a predictable sequence that varied across the different habitats, seasons and conditions. About 40 taxa were collected and identified. *Chrysomya megacephala* and *Achoetandrus rufifacies* were the dominant fly species in every season. The diversity of carrion insect was highest in monsoon wet season, followed by summer and winter seasons, respectively.

Department: Biology Student's Signature…….

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CHAPTER I

INTRODUCTION

Forensic entomology is the use of insects, and is typically extended to include their arthropod relatives, in legal investigations, including cases of medicolegal, urban and stored products. The urban aspect deals with the insects that affect man and his immediate environment. Urban pests are of great economic importance, and forensic entomologists may be involved in civil proceedings over monetary claims for damage to establish likely causes and fault of such damage. Here, however, I focus on the aspects of entomology used in medicolegal investigations (Hall, 2001)

When human remains are found, the most important questions usually are where, when, how and why the person died. One of the most essential applications of forensic entomology in this context is in the estimation of the postmortem interval (PMI). In recently deceased cadavers the PMI can be estimated through observation of taphonomic factors via measurement of the body condition, such as the core body temperature, muscular flaccidity, rigor mortis, lividity and pallor of the skin, as well as changes in biochemical catabolites and autolytic products, and so on (Henβge and Madea, 2004; Amendt et al., 2007). However, such factors are only reliable over a relatively short PMI and do not readily address movement of the cadaver. In contrast, entomological specimens found associating with the corpse can be reliable indicators for estimating the PMI in the early through to advanced stages of cadaver decomposition, and may even provide data to support moving of the cadaver post death or frozen or arthropod-excluding storage prior to disposal (Amendte et al., 2007).

Insects, and indeed other arthropods, have typically predictable life histories, habitats, known distributions, and developmental rates, albeit dependent upon biotic and abiotic factors and so show local and regional variations. Thus, within this

biogeoclimatic variation lies a general broad pattern such that the presence/absence and size (developmental stadia) of specific arthropod species at the crime scene, especially in homicide cases, can provide important information about when, where, why and how a particular crime occurred. In addition, the naturally limited distribution ranges of many arthropods or the distribution of genetic variants within broader ranges can be used to support the movement of cadavers between locations, whilst differences in arthropod succession can support prior freezing, burial or water submersion of a cadaver prior to dumping at the final site (or *vice versa*). Insects and other arthropods play a naturally important role in the decomposition of carrion in the environment, consuming the decomposing organic materials and recycling the energy and nutrients as part of their life cycle. When an organism dies, its immune system shuts down, therefore repair and regeneration of tissues and cells ceases. In a matter of hours, the build up of toxins and depletion of nutrients leads to cell death and degradation, whilst these cellular remains serve as food for the bacteria, microbes and parasites that rapidly expand in numbers. Their catabolism, and especially the initial anaerobic processes, produce gaseous and volatile liquids that act semiochemically to attracting scavengers, necrobionts and predatory arthropods, such as flies and beetles (Tomberlin et al., 2011).

A wide variety of carrion insects can visit and colonize a body, but importantly this occurs at different stages of decomposition such insects include flies (Diptera), beetles (Coleoptera), bees, wasps, ants (Hymenoptera), butterflies and moths (Lepidoptera). However, this is not purely random but rather follows a relatively predictable order of insect visitors inter-related between the decomposition stages of the cadaver and the prior or current presence of other arthropods and microbes. This temporal and hierarchical order of visitations is called “succession” and is used by

forensic entomologists, for example to set the PMI (Smith, 1986; Greenberg, 1991; Byrd and Castner, 2001; Wells and King, 2001).

Blow flies have complete metamorphosis, comprising 4 stages in its life cycle – egg, larva, pupa and adult. Females can be attracted to living human and animals; however, the odors emanating from a decomposing cadaver attract significantly, usually within hours of death, sometimes minutes. Adult females lay their eggs not only on the open areas of the body (eyes, nose, ears, mouth, anus) and any wounds, but in folds of clothing, the cadaver skin, along the interface between the body and the substrate on which it is laid (Smith, 1986; Catts and Goff, 1992; Anderson, 2001; Byrd and Castner, 2001; Amendt, Krettek, and Zehner, 2004) Thereafter, the eggs hatch into the first instar, before developing to be the second instar, the third instars and the pupa, respectively. Although the egg, larva and pupa of flies can be collected from the cadaver, however, the larval stage is the most frequently one. To be used in forensic entomology application, information of insect's biology in particular those of forensic importance should be investigated. Such information includes the morphology of egg, larva and pupa, which will be used primarily in species identification, the developmental rate of these immature stages and the insect succession, which will be employed to estimate the PMI. According to the variable of the world (e.g., Europe, North America, Oriental, Afrotropic, Australasia and etc.), these information are needed in each part. Several cases reported from North America and Europe were finally achieved by using the evidence of insect found associating with the corpse to be used in forensic investigations (Denno and Cothran, 1975; Early and Goff, 1986; Baumgartner, 1988; Bourel et.al., 1999; Davis and Goff, 2000). In Southeast Asia, studies in forensic entomology have been specifically focused in Thailand, India and Malaysia (e.g., Sukontason et al., 2001, 2007; Bharti and Singh, 2003; Chin et al., 2010). In Thailand, information pertaining to the morphology of immature stages of forensically important

flies has been published for the identification purpose (e.g., Sukontason et al., 2003, 2007); while the larval developmental rate of the two most forensically important flies (*Chrysomya megacephala* and *Achoetandrus rufifacies*) has been reported for estimating the PMI (Sukontason et al., 2008). As for the study of insect succession, information of this part is relatively limited. The experiments related to insect succession were only reported from Nakornpathom province (Champathet, 2005), and Pathumthani province (Sukjit, 2008), using the domestic pig (*Sus scrofa* L.) as the animal model. Study of Vitta et al. (2007) in Phitsanulok was performed only in 30 days period, from mid February to mid March, 2005; while Sukjit's study (2008) compared insect succession and decomposition rate in 2 different habitats, field and shaded areas. Therefore, investigations of insect succession throughout the whole year covering three different seasons and/or simulated corpse conditions are still lacking. Regarding this, the objective of this study was to investigate the succession of carrion arthropods fauna in the north region of Thailand, in order to provide the baseline data of arthropods succession which may be applied for forensic entomology purpose in the future.

OBJECTIVES

1. To investigate the succession of carrion arthropods fauna on pig carcasses in Nan province throughout the year.
2. To determine the potential forensically important arthropod species in Nan province in different seasons of the year.
3. To determine the stages of decomposition in two different carcasses conditions.

CHAPTER II

LITERATURE REVIEW

Forensic entomology combines the study of insects and other arthropods to help resolve a criminal investigation. When a crime is committed insects can accumulate on and around the victim's body. When forensic entomology is involved, the insects become part of the evidence. Forensic entomologists can estimate time of death, whether the body has been moved and whether drugs or toxins were involved in the crime.

The first documented forensic entomology case was recorded from China in the thirteenth century in a book "Hsi yuan chi lu" which can be translated as "The Washing Away of Wrongs" by Sung Tz'u. The book describes the application of forensic entomology used in a criminal case in the small Chinese village. The case involved the stabbing of an individual near a rice field. One day after the murder, the investigator requested the workers to lay down all sickles on the floor. Blow flies were attracted to invisible traces of blood on a single sickle. When the owner of the sickle was confronted, he broke down and confessed to the murder. Subsequently, most authors cited this book as the first text to deal with forensic entomology (Catts and Haskell, 1990; Benecke, 2001; Hall, 2001).

In 1855, the French physician, Bergeret, used insect succession as a tool to solve a case near Paris, France (reported in Benecke, 2001). In the mid-1880s, J.P. Mégnin, also in France, published "La Faune des Cadavres: Application de Entomologie à la Medicin Legale". The recognition by Mégnin of a sequence and progression of decomposition of a corpse was recorded in this work and importantly he observed changes in the insect assemblages in association with this decomposition progression (Haskell, Hall, and Clark, 1997; Benecke, 1998). This early interest in insects and

decomposition led to a study on insect succession on human corpses in Quebcec, Canada, in 1897 by Wyatt Johnston and Geoffrey Villeneuve (Anderson, 2001; Benecke, 2001). At the same time in the United States, Murray Motter systematically tabulated the insect fauna from 150 exhumed corpses from the Washington, D.C. area (Haskell et al., 1997; Benecke, 2001).

Carrion insects, along with the microbes they bring with them, are highly efficient decomposers of animal corpses (including humans), and without them decomposition would be significantly delayed. Five to six stages of decomposition have been described to assist the entomologist in assessing the remains at a crime scene: fresh, bloated, active decay, post-decay, mummification and skeletonization (Catts and Haskell, 1990). Each stage has a series of characteristic components relating the appearance of the body to its associated insect activity.

2.1 SUCCESSION

Succession is the predictable progression of faunal specimens that visit a cadaver. Type and composition of fauna found on a corpse are indicative of its stage of decomposition (Mégnin, 1894; Reed, 1958; Payne, 1965), the environmental conditions, and the length of exposure. Therefore, knowledge of successional patterns can help estimate the PMI. Patterns of succession can be affected by a variety of factors, including ambient temperature, changes to the cadaver temperature (sun, wind or rain exposure, maggot mass size, etc), relative humidity, rain fall, and whether or not the body is covered or inside a structure and finally disturbance (being mauled) by vertebrate scavengers. Information on the diversity of species, number of individuals of each species, life stages present, and the number of individuals of each life stage can be determined from succession studies. This information can then be used to estimate

the PMI, particularly when the individual has been dead for only a couple of weeks (Keh, 1985).

The sequence of arthropod colonization on cadavers remains broadly constant at the family level among localities (Early and Goff, 1986). However, at the genus and species level, colonization is environmentally and location-specific based on the zoogeographic region (Payne, 1965; Early and Goff, 1986) if not the biogeoclimatic region. Therefore, successional patterns at the genus and species level are only predictable within the parameters of the location where a cadaver is found (Anderson, 2001; Rodriquez and Bass, 1983). The composition of taxa found on a corpse at the time of discovery is compared with the composition of the arthropod assemblage at a given period of time derived from an animal model in the same biogeoclimatic zone to estimate the PMI based on successional patterns (Schoenly et al., 1996).

Carcass size and type can also influence the decomposition rates and successional patterns (Watson and Carlton, 2003). Catts and Goff (1992) suggested that the most appropriate animal model to use in forensic successional studies is the domestic pig, *Sus scrofa domestica,* at a size of 22-23 kg. Twenty-three kilograms is considered the most desirable because it is approximately the same size as an average adult human body. In addition, the domestic pig is the most accepted human model due to its skin type, gut bacteria, and relative lack of hair (Catts and Goff, 1992; Anderson 2001). Moreover, it has been shown that the patterns of arthropod succession do not differ significantly between pig carcasses with moderate differences in size (Hewadikaram and Goff, 1991).

A number of studies on the successional patterns of arthropods have been conducted throughout the world in climactically different areas using various animal models.

Bornemissza (1957) characterized the succession of organisms on guinea pig carcasses in the Mediterranean-type environment of Western Australia. Five stages of decomposition were identified (initial decay, putrefaction, black putrefaction, butyric fermentation, and dry decay) and these were correlated with the fauna that were present. In addition, a diagram of succession patterns was developed. Of note was that the carrion decomposition was found to affect the physical properties of the soil and of its arthropod population to a depth of 14 cm.

Reed (1958) studied the insects associated with dog carcasses in Tennessee. Forty-three carcasses were distributed among wooded and non-wooded areas and placed at study sites at different times throughout the year. Reed classified the arthropods into groups according to the stage of decomposition during which they were most frequently found. Arthropods in the fresh stage of decomposition consisted primarily of the carrion feeding house flies (Muscidae) and blow flies (Calliphoridae) from Diptera; those in the bloated stage, included the carrion feeding Muscidae, Calliphoridae and flesh flies (Sarcophagidae) from Diptera, and the carrion feeding carrion beetles (Silphidae) and predatory clown beetles (Histeridae) and rove beetles (Staphylinidae) in Coleoptera. Those in the decay stage included the carrion and scavenger feeding coffin flies (Phoridae), cheese flies (Piophilidae) and black scavenger flies (Sepsidae) from Diptera, and the Silphidae and predatory clown beetles (Histeridae) from Coleoptera. In the dry stage the principal insects included the scavenger checkered beetles (Cleridae), skin beetles (Dermestidae) and hide beetles (Trogidae) from Coleoptera. This breakdown of insect taxonomic groups by stages was shown to vary seasonally, and between different land-types (wooded and non-wooded).

In another study, Payne (1965) described the faunal successional patterns on newborn carcasses of the domestic pig, *S. scrofa domestica*, in a hardwood-pine community in South Carolina. Six stages of decomposition were delimited for carrion

exposed to arthropods. As in the previous study by Reed (1958), each stage was found to be colonized by a characteristic group of arthropods. Members of the dipteran families Sarcophagidae and Calliphoridae deposited eggs during the fresh stage of decomposition. In the bloated stage, dipteran species from Calliphoridae, Muscidae and Sarcophagidae increased in number, while members of the carrion feeding dipteran Piophilidae and generalist flesh feeding and predatory lance flies (Lonchaeidae) were observed for the first time. Several beetle families, such as the scavenging scarab beetles (Scarabaeidae) and the predatory Histeridae and Staphylinidae, were also present. Staphylinidae and Histeridae increased in number and the first carrion feeding beetles (Silphidae) were observed in the active decay stage. Dipteran maggots fed actively on the carrion during this stage. At the advanced decay stage, most of the flesh had been removed from the carcass. Dipterans greatly decreased in number, whilst for Coleoptera (Trogidae) arrived at the carcass at night, and Staphylinidae and Histeridae remained during the day. The final stage, the dry stage, was characterized by the absence of most dipterans, reduced numbers of the predatory and carrion feeding Coleopteran (e.g. Histeridae, Staphylinidae and Silphidae) and by an increase in the number of centipedes, millipedes and for Coleoptera members of the non-flesh eating scavengers beetles of families Dermestidae and Cleridae. A total of 422 insect species representing 11 orders, 107 families and 283 genera were identified (Payne 1965).

Early and Goff (1986) described arthropod succession patterns in exposed domestic cat carcasses in Hawaii and reported similar stages of decomposition to those described by Bornemissza (1957) in Australia, although the stages progressed more rapidly. The sequence of arthropod succession at the family and genus level was similar to that observed in studies conducted in other climates, while there was the expected local variation at the species level and timing.

Rodriguez and Bass (1983) collected successional data in one of the few studies on human cadavers within a decay research facility located in an open wooded area in Tennessee of the U.S. The cadavers were placed outside during different times of the year (seasons) and daily observations were made. A direct correlation between the rate of decay and the rate of succession of arthropod (insect) families and species found in association with the remains was found. However, only four separate stages of decay were described for the un-embalmed, uncovered cadavers, being the fresh, bloated, decay and dry stages (Rodriquez and Bass, 1983).

Smeeton et al. (1984) performed the first published succession study conducted in New Zealand using human cadavers. However, most of the 50 corpses used in the study were only allowed to decompose for two weeks or less, and so the species identified from the study were essentially early-arrivers. Certain species were found to first oviposit within a few hours following death, and thereafter throughout the study.

Anderson and VanLaerhoven (1996) conducted succession studies in British Columbia, Canada using pig carcasses. A database of insect successional patterns over time in an open, sunlit sub urban area in summer was developed. The authors noted that some species of insects, such as the Piophilidae, were collected earlier in the decomposition process than expected based on studies in other regions. They also found that the soil fauna under the carcasses changed considerably, in terms of both species composition and the number of species observed, over the decomposition period.

Watson and Carlton (2003) monitored black bear, white-tailed deer, alligator, and swine carcasses throughout their respective decomposition processes in spring and summer in Louisiana, USA. A total number of 93 arthropod species from 46 families were collected from the carcasses. However, only 19 of the 78 insect species reported

were collected on all four of the carcass types, demonstrating the likely relevance of carcass type when performing succession studies using animal models.

Numerous other succession studies have been performed in a variety of localities throughout the world. These include within the USA in California (James, 1955), Hawaii (Goff et al., 1986; Goff, Omori, and Gunatilaka, 1988; Goff, 1991), Mississippi (Goddard and Lago, 1985), Missouri (Hall and Doisy, 1993), Virginia (Hall and Townsend, 1977), Illinois (Baumgartner, 1988), Arizona (Deonier, 1942; Baumgartner, 1986; Galloway et al., 1989), Colorado (Adair, 1999), Maryland (Introna, Suman, and Smialek, 1991), West Virginia (Joy, Herrell, and Rogers, 2002), Louisiana (Tessmer, Meek, Wright, 1995; Watson and Carlton, 2003) and South Carolina (Tomberlin and Adler, 1998), within England (Lane, 1975), India (Bharti and Singh, 2003), Australia (Archer and Elgar, 2003), Argentina (Centeno, Maldonado, and Oliva, 2002) and France (Bourel et al., 1999).

However, studies in tropical Asia are exceedingly limited. In Thailand, Champatet (2005) was the first study on the insects found on pig carcasse. Sukjit (2008) studied the decomposition process and insect succession and diversity using pig carcasses in two neighboring habitats (open field and a shaded area) in Pathumthani province. Here, a potentially significant different rate of pig decomposition was found between the two different areas, being faster in the open field then in the shaded area. Insects that were found on all the carcasses were the dipteran genera from Calliphoridae (*Chrysomya* spp., *Lucillia* spp., *Hemipyrellia* spp. and *Calliphora* spp.), Muscidae (*Musca* spp., *Atherigona* spp. and *Hydrotaea* spp.), Sarcophagidae (*Sarcophaga* spp.), Piophilidae (*Piophila* spp.) and Phoridae (*Megaselia* spp.).

2.2 DECOMPOSITION

Although the processes of decomposition (and insect succession) is continuous and varies in its rate and characteristics depending on the environment, it can, however, be defined across all biogeoclimatic zones for all vertebrate cadavers in clear stages with only minimal overlap, using the key observable physical (visual and olfactory) changes to the state of the carcass. These, in turn, correlate to and so can be characterized by insect activities at each point in the decomposition. The pattern of insect succession in turn correlates to depend on different carrion insects being attracted to the varying biological, chemical and physical changes the carcass undergoes throughout the process of the decay.

The study of important carrion insects has been conducted mainly through the use of non-human animal models. Stages of decomposition have been studied worldwide, using a wide range of animal carcasses, including dogs (Jiron and Cartin, 1981, Early and Goff, 1986, Richards and Goff, 1997), cats (Early and Goff, 1986), alligators (Watson and Carlton, 2003), voles (Lane, 1975), rats (Greenberg, 1990; Tomberlin and Adler, 1998; Faucherre, Cherix, and Wyss, 1999; Kocarek 2001), rodents (Johnson, 1975), deer (Watson and Carlton, 2003), foxes (Easton and Smith, 1970; Smith, 1975), herring gulls (Lord and Burger, 1984a), harbor seals (Lord and Burger, 1984b), guinea pigs (Bornemissza, 1957), mice (Putnam, 1978; Blackith and Blackith, 1989), lizards and toads (Cornaby, 1974), raccoons (Joy et al., 2002), turtles (Abell, Wasti, and Hartman, 1982), poultry (Hall and Doisy, 1993, Tessmer et al., 1995), sheep (Deonier, 1940), rabbits (Denno and Cothran, 1975; Tantawi et al., 1996; Bourel et al., 1999), elephants (Coe, 1978), opossums (Goddard and Lago, 1985), black bears (Anderson, 1998; Peters, 2003; Watson and Carlton, 2003), impala (Braack, 1981) and pigs (Payne, 1965; Tullis and Goff, 1987; Anderson and VanLaerhoven, 1996; Tessmer and Meek, 1996; Richards and Goff, 1997; deCarvalho et al., 1999; Shahid et al., 1999;

Davis and Goff, 2000; deCarvalho and Linhares, 2001; Wolff et al., 2001; Tenorio, Olson, and Coates, 2003; Watson and Carlton, 2003) However, the only complete faunal succession research on human remains was conducted in Tennessee (Rodriguez and Bass 1983, reviewed in Catts and Haskell 1990), although a short term study (2 weeks only) was also reported in New Zealand (Smeeton et al., 1984). The lack of research on human cadavers reflects the fact human cadavers are not easily obtained for detailed decomposition studies. Pigs (*S. scrofa domestica*) are omnivorous, have similar gut fauna, are relatively hairless and have skin that is very similar to that of humans (Anderson and VanLaerhoven, 1996). The putrefaction of pigs proceeds approximately at the same rate as for human bodies of the same weight (Campobasso, Vella, and Introna, 2001). Haskell studied in Tennessee compared the insect community structure and decomposition rates between adult and infant human remains to pig carcasses and found no significant difference in the composition of the insect communities in human and pig carcasses (Haskell et al., 1997; Campobasso et al., 2001).

Beginning with Mégnin's (1894) work, eight waves of arthropod invasion on human bodies have been described. Other forensic entomologists have since reduced the number of stages in attempts to define biological communities, but ultimately this reduction complicated and lessened the forensic applicability. Payne (1965) defined the associated insect community and analyzed the percentage abundance of species attracted to the various stages of decay. He condensed the decomposition process to six stages of decay: fresh, bloated, active, advanced, dry and remains. Bornemissza (1957) and Lord and Burger (1984a) recognized five stages of carcass decomposition. According to Smith (1986), there exists a broad general agreement in the observations of Mégnin (1894), Bornemissza (1957), Reed (1958) and Payne (Payne, 1965; Payne and King, 1970) as follows:

(1) Fresh stage, typically 0-2 days after death, begins at the moment after death when the circulatory system stops functioning. Cells start to breakdown and autolysis commences. Microbes and especially anaerobic bacteria and yeasts, that before death were feeding on the contents of the intestine begin to digest the intestine itself and finally break out of the intestine and move in the accumulating extracellular serous fluids and start digesting the surrounding internal organs. The digestive enzymes from the intestine and later stomach also spread through the body, contributing to its decomposition. The body temperature will also begin to acclimate to the environment. Without breathing and blood circulation, the passive oxygen entry by diffusion into the body through natural openings and dermal wounds is insufficient for the increasing microbial metabolism and the environment quickly becomes increasingly anaerobic and selects for anaerobic metabolism.

From the moment of death, the first insects that arrive at a corpse are usually blow flies (Calliphoridae), although ants are often also early arrivals. Blow flies are able to lay eggs around open wounds and natural body openings, such as the mouth, nose, eyes and anus. These eggs hatch and move into the body, often within 24 hours. The life cycle of calliphorid flies from egg to maggot to fly typically takes from two to three weeks, but the rate of insect development is affected by various factors that alter their temperature, such as ambient temperature, sunlight, maggot feeding masses, and so on, as well as exposure to certain metabolites (drugs). Ambient temperatures dramatically affect the rate of insect development, which can take considerably longer at low temperatures. Note however that the community feeding behavior of maggot masses can cause significant changes in the microdomain temperature of the cadaver and so increase their developmental rate, but this is dependent upon the cadaver size and feeding maggot mass size as well as ambient temperature and weather.

(2) Bloated stage (3-7 days) this stage marks the beginning of putrefaction. The breakdown of the body through autolysis and microbial degradation (putrefaction and rancidity) continues in this stage but it is mainly anaerobic leading to the production of a significant volume of gases and volatile compounds and so a putrid smell develops and the body color changes. The trapped gases cause bloating of the body, initially in the stomach region but this can spread to the entire carcass. The gases produced by the anaerobic metabolic activities include methane and hydrogen, sulfur containing compounds like hydrogen sulphide, and amines such as cadaverine and putrescine largely from the protein component but as fats are utilized increasing levels of butyrate, propionate and esters are produced. The gases are at first contained in the body cavity but as they enter the vascular system, or as tissues are forced apart or liquefy and connective tissues barriers tear, they can spread to other parts entering the neck and face, causing swelling of the mouth, lips and tongue. The skin can blister and accumulate a serous fluid inside from tissue liquefaction. The skin also becomes fragile, leading to skin slippage, making it difficult to move a body. The body hair comes off easily and the body color changes from green to brown, which marks the transition of the early stage of putrefaction to the advanced decomposition stages.

The bloated stage is attractive to a variety of other insects. First instar larvae commence feeding just under the skin where there is sufficient oxygen and move as a maggot mass, benefiting from communal heat and shared digestive secretions. Assuming no prior mauling by vertebrate scavengers, the skin can rupture under the gas pressure or be broken by insect feeding activity leading to escape of the gases (and semiochemical attraction of other insects). Such breaks allow air to enter and so a localized reversal back to an aerobic environment in that region and allowing further feeding insect penetration and commencement of the active decay stage. Calliphorid

numbers usually peak during this stage. Also in this stage, the soil beneath the corpse tends to become alkaline, affecting the normal soil fauna.

(3) Active decay stage (8-14 days). This stage begins when bloating is finished and its onset is marked by the deflation of the carcass. The loosened, weakened and stretched skin is broken due to the masses of feeding dipteran larvae. The rate of decay and body temperature increases, the changing smells and body fluids that emanate from the body attract more blow flies, flesh flies and beetles. The greatest percentage of biomass is removed during this stage, largely as a result of the feeding maggot masses. The third instar non-feeding dipteran larvae migrate away from the cadaver before pupation. Although dipteran larvae, which form large maggot masses, are predominant in this stage, large numbers of coleopterans, both carrion eating /scavengers and also predatory, also begin to arrive and lay their eggs in the corpse and their larvae then hatch out and feed on the feeding dipteran larvae or decaying flesh, respectively, or both in some cases. Parasitoid wasps and tachinid flies (if present) are much more common at this stage, laying their eggs inside maggots and pupae (or near coleopteran larvae for the tachinid flies).

By the end of the decay stage, most of the flesh has been removed from the corpse and most of the Calliphoridae and Sarcophagidae larvae have departed from the remains to pupate.

(4) Post-decay stage (15-60 days). This stage follows the end of the active decay process. All the remaining flesh is removed over this period and the body dries out, with a slow rate of decay. It has a somewhat cheesy smell, caused by the production of fatty acids and esters from lipid catabolism, such as butyric acid, and this smell attracts a new suite of organisms. The surface of the body that is in contact with the ground becomes covered with mould as the body ferments. Maggots will migrate away from the body to pupate and parasitoid wasps that lay their eggs inside maggots

and / or inside pupae start to appear. Beetles, such as members of Dermestidae and Trogidae, and other insects and mites feed on the skin and ligaments. The dermestids (Coleoptera) are usually the predominant species during this stage when the remains have been reduced to skin, cartilage, and bones.

(5) Skeletonization. In this stage, most the body has been reduced to bones, hair and some connective tissues. There is no biomass available to support a diverse insect colonization, except for some specialist beetles and mites that may colonize this stage for feeding on other insects and the connective tissue (Early and Goff 1986; Goff, 1993).

Many insects occur on or near the corpse, but not all of them are useful in determining the PMI. Some insects are simply opportunistic, and others are accidentals, and do not play a role in PMI estimation. Goff (1993) outlines four basic arthropod-corpse relationships that have generally been accepted:

Temperature and access to the body are the two most important factors affecting the insect succession pattern. Temperature is the most important variable influencing the rate of maggot development, where a high temperature generally reduces the development time of Diptera. In addition, many species have limited ranges, above or below which females will not oviposit on the carcass or the larvae will cease to develop and so on, and so these variations in temperature outside of each species tolerant range can significantly influence the succession community.

Importantly, the large gathering of dipteran larvae (maggot masses) generates sufficient heat due to their activities and fast metabolism that they can significantly raise the local temperature around them above that of the environmental temperature (Campobasso et al., 2001). The heat of the maggot masses is related to the density of the mass and the size of the carcass (weight and mass). The size of maggot masses and the degree to which the corpse is either exposed to the environment affects the amount of heat absorbed or dissipated, which in turn has a significant effect upon the

rate of larval development and the decomposition of a corpse. Goodbrod and Goff (1990) studied the effects of maggot-generated heat during the development cycle of *C. megacephala* and *C. rufifaces* in experimental cultures and found an inverse relationship between the maggot density and the duration of the larval stage.

Insects that colonize corpses vary in species depending on the biogeoclimatic zone in which the remains are found. Each zone has different habitat types, vegetation, soil pH, soil type, flora and fauna, altitude and climatic conditions that directly affect the insect species present. Decomposition is also affected by the time of year, and the location in which the remains are found (Anderson, 2001).

Many blow fly species vary in abundance depend on season and time of the day. The presence or absence of sunlight or shade can effect which blow fly species will colonize a corpse. For example, blow fly *Phaenicia sericata* prefer heated surfaces and will not oviposit on carcasses that have surface temperatures below 30° C (Cragg, 1956). Results of a sun-exposed versus shaded pig carrion study indicated that more *Lucilia illustris* and *Phormia regina* were observed at the sun-exposed pig whereas *Calliphora vomitoria* were observed in greater numbers at the shaded pig (Shean, Messinger, and Papworth, 1993).

In addition the local distribution pattern or habitat preferences of species will affect their availability. For example, blow flies can be found in both urban and sub urban areas but some species may be found only in wooded areas and blow flies (and other fly families) primarily associated with corpses are usually found in urban areas. This can be informative, as the presence of certain species of blow flies (and other insects) found on a body may indicate that the body was moved from an urban to a sub urban environment or *vice versa* (Erzinclioglu, 1985; Catts and Haskell, 1990). Of course, this can be expanded where required by the use of genetic markers to include different genetically distinct subpopulations of any given insect, but the considerably

extra time and resources to both develop the markers and to assay the samples means this is not a routine approach. Blow flies are capable of colonizing corpses inside dwellings and cars, depending upon how well they are sealed.

CHAPTER III

MATERIALS AND METHODS

3.1 STUDY SITES

The experiments were performed during May 2010 - August 2011 at two different sites (habitat types) in Nan province, Northern Thailand (Figure 3.1). The province is located in a mountainous area. Nan still has several complex ecosystems with a high species biodiversity whilst there is a consistently high homicide rate in the area and so potential need for forensic entomology (Warangrath Ek-anankul, Interview, 22 October 2009).

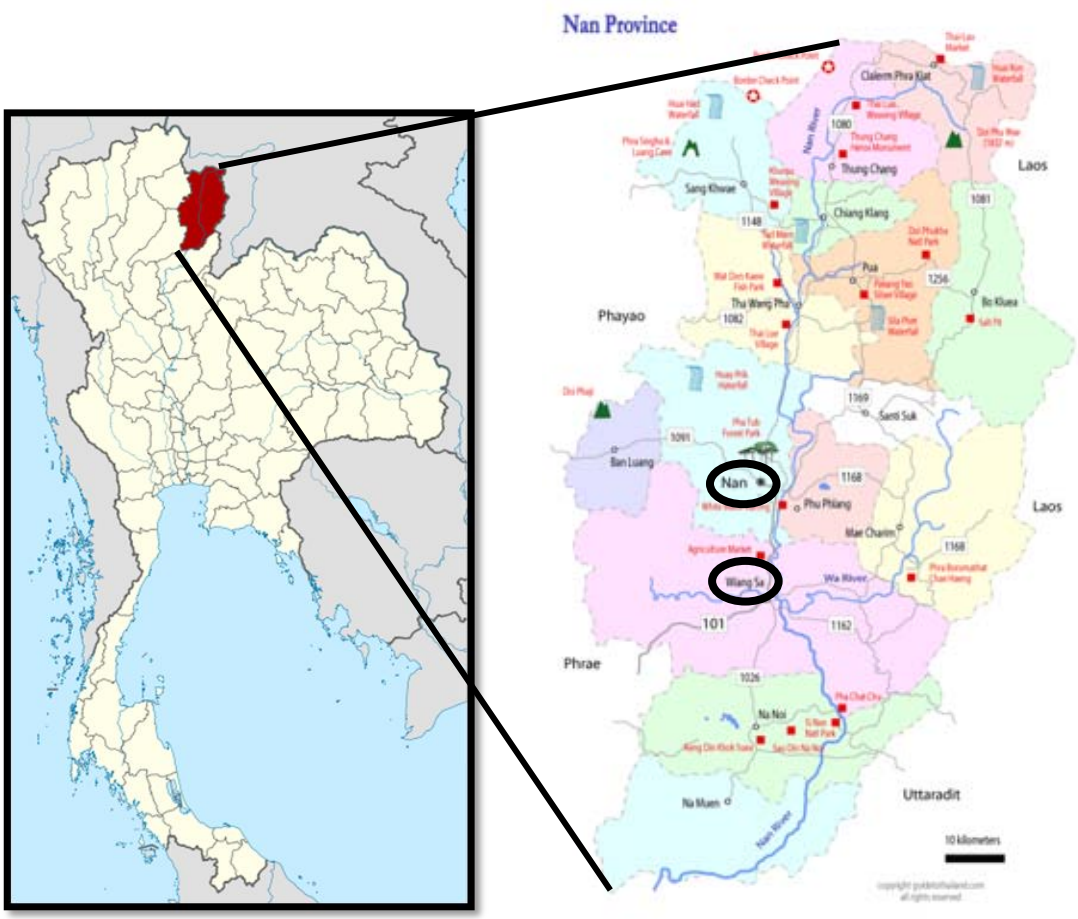


Figure 3.1 Map of Thailand showing the location of the two study sites in Nan province, at Wieng Sa district and Muang Nan district (http://www.guidetothailand.com).

The two research sites were situated in different types of habitats, and were located about 41 km apart. Within both site locations, two major factors were determined for differences in carrion arthropods; the effect of seasons (monsoon wet, winter and summer) and spatial position / access (carcasses were hung on a tree above the ground or were laid directly on the ground). The monsoon wet is accounted in June – September, while winter is October – February and summer is accounted for February – May.

The first site (Site 1), located in Wieng sa district, was situated at 225.44 m above mean sea level in a mixed deciduous forest (18 33' 33.431" N, 100 47' 51.950" E) in which Dipterocapaceae are dominant, especially *Shorea obtuse* and *Dipterocarpus tuberculatus*, plus an admixture of two species of Guttiferae (*Cratoxylum cochinchinense* and *Cratoxylum formosum*) (Gajaseni, Dumrongrojwatthana, and Yumuang, 2005).

The second site (Site 2), at Muang nan district was situated in a sub urban area (18 47' 28.806" N, 100 43' 55.135" E) at 215.55 m above mean sea level within a rubber plantation farm in which young rubber trees (*Hevea brasiliensis*) were the dominant plant species.

One of the two enclosures at each site and representative examples of a fresh pig carcass laid on and hung above the ground are shown in Figure 3.2.

At each site, two spatial positions for the pig carcasses were used, that is the carcasses were either laid in direct contact with the ground (Figures 3.2C and 3.2D) or were hung from a tree above the ground such that the lowest part of the pig was 1.2 m above the ground surface (Figures 3.2E and 3.2F). The position of the two enclosed carcasses was approximately 50 m apart at each site so as to minimize crossover of insects. Within each season, one pig was used at each site and spatial position.

Figure 3.2 Photographic images of the two study sites. Shown are the partially constructed vertebrate exclusion cage for the pig carcass (A, B), and a clothed pig carcass laid in direct contact on the ground (C, D) or hung from a tree above the ground (E, F) for Site 1 (mixed deciduous forest at Wieng Sa district) (A, C and E) and Site 2 (sub urban area at Muang nan district) (B, D and F).

3.2 ANIMAL MODEL

In the absence of the ability to use donated fresh human corpses, the domestic pigs, *Sus scrofa domestica*, was used as an animal model, because they have been established and characterized as reasonably good surrogate models for human corpses in the temperate regions (Anderson 2001). In total 12 pigs weighing from 20 - 25 kg (Figure 3.3) were used (Protocol review No. 1023003), one per position (hanging above or laid on the ground), per site (sites 1 and 2) per season (monsoon wet, winter and summer).

Figure 3.3 Domestic pig, *S. scrofa domestica*, used as animal model

It would have been more ideal to use at least three pigs for each condition (total of 36 pigs), as well as to examine dressed versus undressed pigs (then a total of at least 72 pigs). However, based on the logistics of the cost and, more importantly, the time required for arthropod collection in each sample site as well as the subsequently process of specimens in laboratory made this implausible. The pigs were obtained from a local farm and were killed at the farm by a blow to the head and then immediately transported in insect-proof plastic bags to the research sites, being placed *in situ* within

1 h after death. Thus the observations of arthropod activity commence 1 h and not immediately after death, because it was not possible to arrange for live pig delivery and *in situ* humane killing.

At each location and each season, one pig carcass was laid directly on the ground and the other was suspended by its neck from a branch of the tree using a nylon rope tide to a height such that the lowest portion of the carcass, the hind legs, were approximately 1.20 m above the ground. The ground laying carcass was enclosed in wooden cages of 2 m x 2 m and of 2.5 m height at site 1 (mixed deciduous forest) (Figure 3.2A) and a wooden framed net cage of 2 m x 2 m and of 1 m height at site 2 (sub urban area) (Figure 3.2B). Therefore, both cages were allowed the access of arthropods to the carcass and prevent disturbing from carnivorous vertebrates. In each site, two cages were located approximately 90 m for apart. The size and material on the cages do not have the effect of insect's succession because all cages received the direct sunlight most of the day.

Carcasses were dressed in suitably sized cotton shirts and shorts with a plastic rope waistband. A common death is the decomposition of clothed human remains, which the main factor contributing to variation in the pattern of insect succession onto remains is the degree of insect access to the body. When a body decomposes in an enclosed environment or is wrapped in some way, carcass attendance by individual insect species may be delayed or prevented, altering the timing and expected pattern of insect succession. The rate of decomposition can also be affected by a reduction in insect numbers due to the slower removal of total biomass through larval feeding. All carcasses were examined for arthropod activities immediately after positioning.

3.3 FIELD PROTOCOLS

Each carcass had a data logger (DT-171) to record the ambient temperature and relative humidity every 30 min throughout the experiment, with the hygro-thermometer probes (Figure 3.4) being inserted into the mouth, abdomen, anus and maggot masses to record the internal carcass temperature.

Figure 3.4 Forensic entomology instruments and tools.

Carcasses in both habitats were observed between 9.00 and 14.00. In site 1, carcasses were visited between 12.00 and 14.00 and between 9.00 and 11.00 in site 2. Carcasses were visited every day for the first two weeks after placement, then every other day for the third week, later every week until the carcasses were in the final stage of decomposition (dry skin, cartilage and bones).

At each visit, the ambient temperature, ground temperature at 5 cm depth about 1 m from the carcass, relative humidity, and the carcass's internal temperatures were recorded. Observations were made for the visual and olfactory (in terms of the investigators sense of smell only), physical conditions of each carcass, the visible insects and other arthropod activities in, on and around the carcasses. In addition the carcasses were photographed to record the physical changes (Figure 3.5).

Figure 3.5 Insect succession and decomposition stages of each carcass were photographically recorded using a video recorder. Shown here is a stage 1 decomposition (fresh stage) pig laid on the ground at site 1.

After such observations, representative specimens were collected, including eggs, larvae (maggots), puparia and adults from on, in, under and around the carcass (head abdomen and anus) by direct capture with forceps or by hand. Adult insects were collected using aerial net sweeps above and around the carcass.

Specimens were labeled with the date and time of collection. The carcass ID number and site location then were placed in sealed vials to prevent evaporation of the ethanol. Eggs, puparia and adult specimens were preserved in an excess (>> 5:1 v/v) ethanol: sample) of 75% (v/v) ethanol (Figure 3.6). The dipteran larvae were first killed by being immersed for 10-15 seconds in water at 60-70 ^{o}C then preserved in 95% (v/v) ethanol. All specimens were then taken to the Integrated Ecology Laboratory, Chulalongkorn University, for identification with the aid of a stereo light microscope. Preservation in 95% (v/v) at an at least 5:1 ethanol: insect (v/v) ratio was utilized to allow

subsequent molecular based analysis (PCR amplification and sequencing of gene fragments) in the future.

Figure 3.6 The insect specimens (adults, pupae, larvae (maggots) and eggs) were preserved with their labels in sealed vials in ethanol.

Blow fly (Calliphoridae) specimens (eggs, maggots, puparia and adults) were identified using the key for identification of Thai species (Sukontason, 2010) and in comparison with the insect collections of The Queen Sirikit Department of Sericulture. Other arthropod specimens were identified using the insect of Australia volume I and II (CSIRO, 2000) and in comparison with the arthropods collections of Museum of Natural History, Chulalongkorn University. Voucher specimens of all identified species and the morphospecies mentioned in this thesis are maintained at the Museum of Natural History, Chulalongkorn University, Thailand.

CHAPTER IV

RESULTS

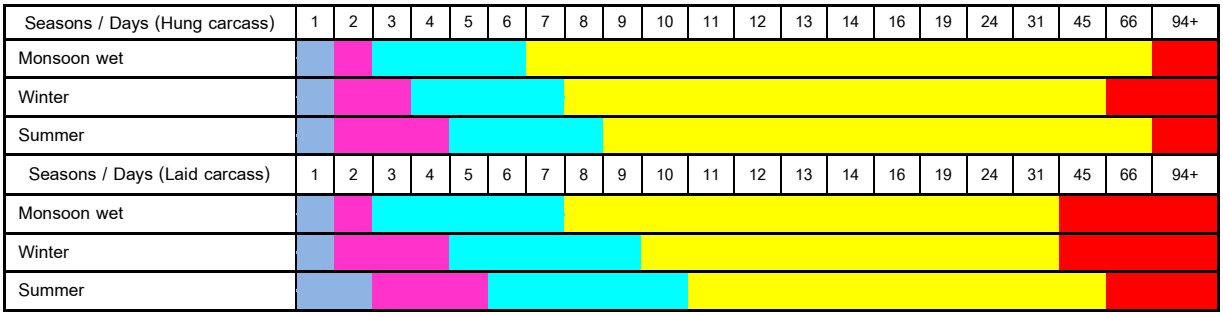
4.1 STAGES OF DECOMPOSITION

Decomposition is a continuous process that varies in its rate and characteristics depending on the environment. However, as outlined in section 2.2, decomposition can be defined across all biogeoclimatic zones for all vertebrate carcasss in five (or six if mummification is included) clear stages with only minimal overlap, using the key observable physical (visual and olfactory) changes to the state of the carcass. The pattern of insect succession depends on different carrion and predatory insects being attracted to the varying biotic and abiotic mediated biological, chemical and physical changes the carcass undergoes throughout the process of the decay. In this study, as with previous reports, the decomposition of the pig carcasses was divided into the five discernible stages of the fresh, bloated, active decay, post decay and skeletonization stages, since no mummification was observed. Therefore, we used the stages of decomposition as defined by Gennard (2006) to describe our observations.

4.1.1 Stages and rate of decomposition of pig carcasses at site 1 (mixed deciduous forest of Wieng Sa district)

The progression and duration of each decomposition stage in the pig carcasses at site 1 are summarized in table 4.1 (see also Figures. 5.1-5.3 in the next chapter)

Table 4.1 Summary of the onset and completion of each stage of decomposition of the pig carcasses at site 1 (mixed deciduous forest of Wieng Sa district, Nan province): fresh ( ), bloated ( ), active decay ( ), post decay ( ), and skeletonization ( ).



The fresh stage of decomposition was found up to the end of the first day after death in most of the carcasses, the exception being but the laid on the ground carcass in summer where the fresh stage lasted for two days. This stage, chemical breakdown of the body occurs, but morphological changes were hardly observed.

The second or bloated stage showed the same trends as described for the carcasses at site 2 (Table 4.1). This stage lasted for 1-3 days being shortest (1 day) in the monsoon wet season (Figures 4.1A, 4.1B) and longest in summer (3 days) (Figures 4.1E, 4.1F). The only variation in duration with respect to carcass orientation was in the winter season (Figures 4.1C, 4.1D). However, 2-3 days after death in summer, heavy rainfall resulted delay in this stage. Because many eggs and larvae being drowned. Fresh eggs were laid and development proceeded unusualness.

Figure 4.1 Photographic images of the pig carcasses in the bloated stage of decomposition at site 1 of Wieng Sa district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

The third or active stage of decomposition showed the same morphological changes of laid carcasses in all seasons, including the complete deflation of the carcasses, due to the feeding dipteran larvae breaking the skin (Figure 4.2) as per that at site 2. The carcasses had a strong putrid smell and were very wet, due to decomposition. The carcass mass was reduced and dipteran maggot masses were found throughout the body. The duration of this stage was variable among the seasons. However, the decomposition of carcasses hung off the ground (Figure 4.2B, 4.2D, 4.2F) was slightly faster than those laid (Figure 4.2A, 4.2C, 4.2E).

Figure 4.2 Photographic images of the pig carcasses in the active stage of decomposition at site 1 of Wieng Sa district, Nan province. Images shown are heavily infested maggots (arrows) on pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

The fourth or post decay stage, much of the fresh had been removed (Figure 4.3A-F). Maggots left the remains as puparia during this stage (Figure 4.3C).

Skeletonization was the final stage of decomposition observed in this study, in that no mummification was noted but some skeletal remains were still present at the end of 94 days observation period. Only the bones were left in the monsoon wet (Figures 4.4A, 4.4B) and summer (Figures 4.4E, 4.4F), but in the winter and some skin was found perhaps due to the strong wind and sunlight in the winter season (Figures 4.4C, 4.4D).

Figure 4.3 Photographic images of the pig carcasses in the post decay stage of decomposition at site 1 at Wieng Sa district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

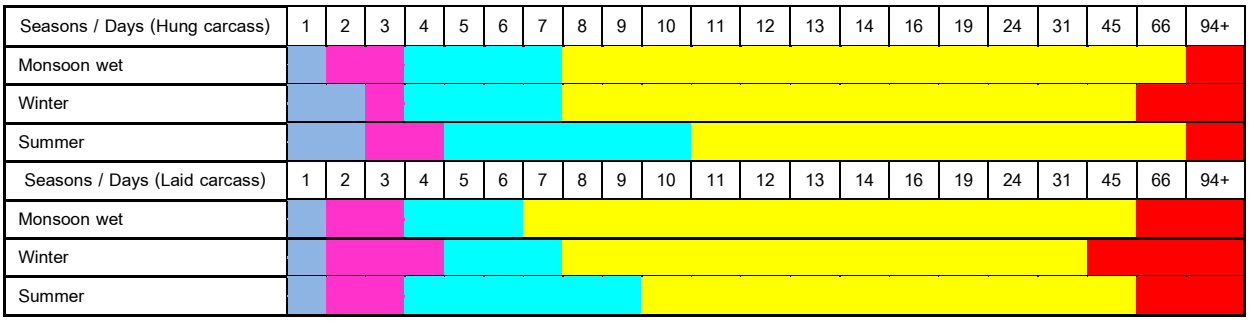
Figure 4.4 Photographic images of the pig carcasses in the skeletonized stage of decomposition at site 1 at Wieng Sa district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

4.1.2 Stages and rate of decomposition of pig carcasses at site 2 (sub urban area of Muang Nan district)

The progression and duration of each decomposition stage in the pig carcasses at site 2 are summarized in table 4.2 (and see Figures. 5.1-5.3), and were broadly comparable between positions (hung above or laid on the ground) within seasons (Table 4.2).

The trend was for a shorter bloated stage (2 not 3 days) in the carcasses hung above the ground in winter and in that laid on the ground in summer, therefore shows no dominant position or season influence (see also figures. 5.1-5.3 in the next chapter). The active decay stage was longest in the summer (6-7 days), followed by winter (4-5 days) and in monsoon wet (3 days), respectively.

Table 4.2 Summary of the onset and completion of each stage of decomposition of the pig carcasses at site 2 (sub urban of Muang Nan district, Nan province): fresh ( ) bloated ( ), active decay ( ), post decay ( ), and skeletonization ( ).



The fresh stage of decomposition was found up to the end of the first day after death in all cases. This is where no physical appearance (visual or human olfactory) of decomposition is evident, although many changes are going on internally unseen to the external visual appearance, such as cellular and tissue autolysis, pooling of anaerobic

blood and the initiation of microbial putrefaction in the lungs and intestine. As the body temperature equilibrates to the temperature of the environment, Calliphoridae will start to lay eggs on the carcass.

The bloated stage, showed the typical external signs of decomposition, such as bloating within the stomach region spreading throughout the carcass with time, changes in the body color from pink to modulated light and turn to dark green, expulsion of fecal materials from the body (Figure 4.5) and the onset of an increasingly putrid smell emanating from the body. This stage lasted 2 days in summer and 3 days in monsoon wet and winter. Adult flies, in particular blow flies, were found around the carcasses. Fly larvae, mostly at the second stage, were apparent, particularly around wounds and natural openings.

Figure 4.5 Photographic images of the pig carcasses in the bloated stage of decomposition at site 2 at Muang Nan district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

The active stage was considerately more variable in duration between seasons, lasting the longest (6-7 days) in summer (Table 4.2, Figures 4.6E, 4.6F) and shortest (3 days) in the monsoon wet season (Figures 4.6A, 4.6B). Its onset-completion time thus ranged from 3-10 days after death. With respect to the visual observations, the body darkened in color from green to almost purple green and finally almost black. The bloating subsided, caused by the rupturing of the abdomen and releasing of the gases formed during the previous stage. The body skin, weakened by autolysis, stretching and degradation from the bloated stage, slipped and / or was broken from the effect of the feeding of the growing dipteran larval masses (and gas pressure), allowing infiltration of the larval masses into the carcass and leakage of the decomposition fluids to form a carcass decomposition island. Likewise, in hung carcass, the greatest percentage of carcass biomass estimated by visual appearance was also removed at this stage as a result of the mass of maggots feeding masses, whilst tissues and fluid leaked out onto the ground (for hung carcass) (Figures 4.6B, 4.6D, 4.6F) or around (for laid carcass) (Figures 4.6A, C, 4.6E). The end of this stage was marked by the remaining materials from the carcasses and dipteran larvae falling towards the ground (in the hung carcasses) or spilling out around the carcass (in laid one). The third instars were observed migrating to nearby sites for pupation. At this stage the bones and cartilage of the carcasses started to become visible.

Figure 4.6 Photographic images of the pig carcasses in the active stage of decomposition at site 2 at Muang Nan district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

The duration of post decay stage was markedly varied between hung and laid carcasses (Table 4.2). For hung carcass, duration in summer was the shortest, initiating from day 11th to day 19th, however, that in monsoon wet was the longest period, initiating from day 8th to day 45th. Regarding the laid carcass, the post decay decomposition was shortest in summer, covering day 11th to 31st. Interestingly, the duration at this stage in monsoon wet and winter were similar (Table 4.2). At this stage, the carcass remnants starts to dry and fall apart, and the remaining dipteran and most other insect larvae dissipated. The offensive (putrid) smells had largely decreased, reflecting the decline in putrefaction and the loss of volatile products. The remaining organs and tissues were largely dissipated.

Skeletonization was the final stage of decomposition observed in this study, in that no mummification was noted, but some skeletal remains were still present at the end of the observation period (Figure 4.8A-F).

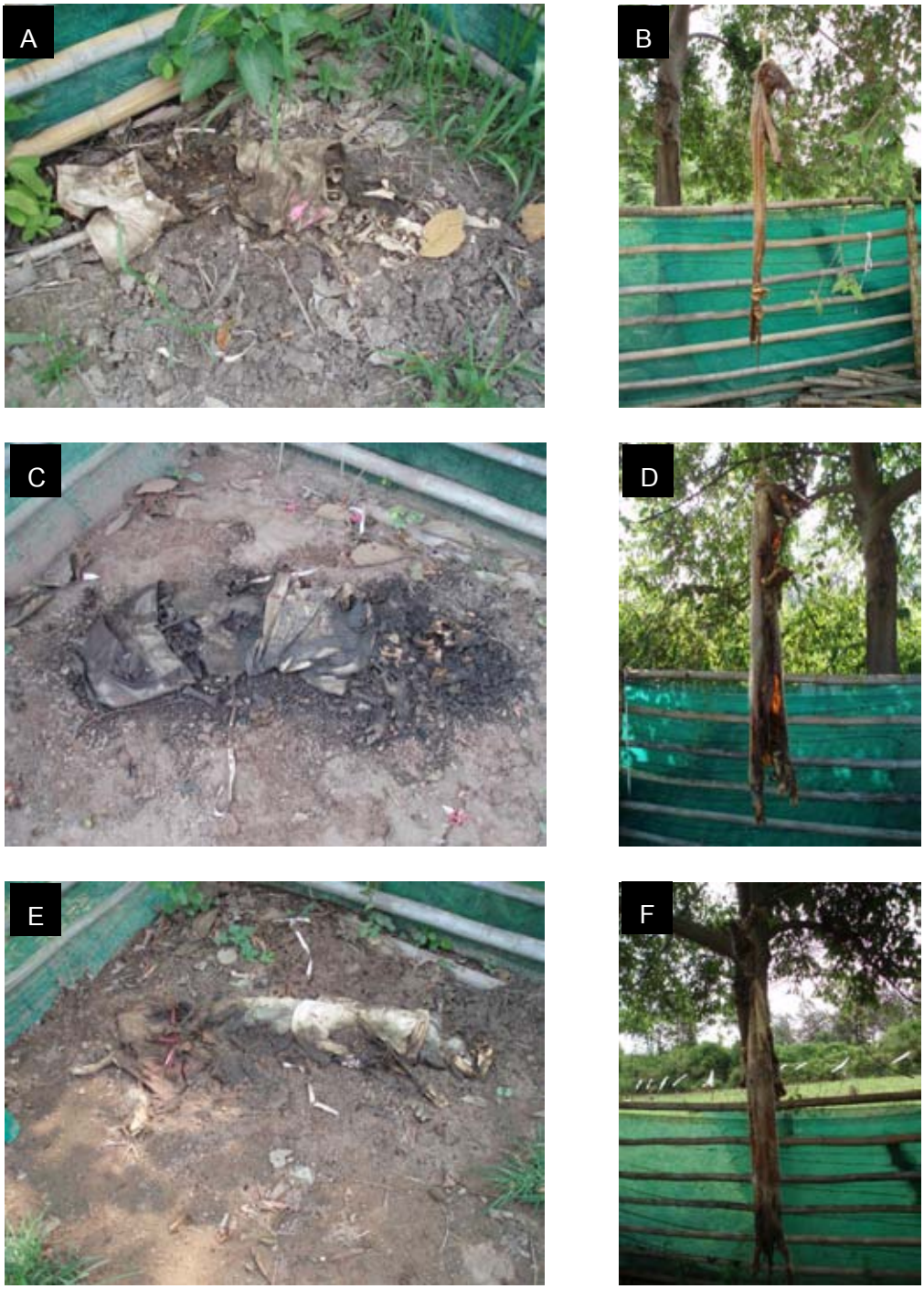


Figure 4.7 Photographic images of the pig carcasses in the post-decay stage of decomposition at site 2 at Muang Nan district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

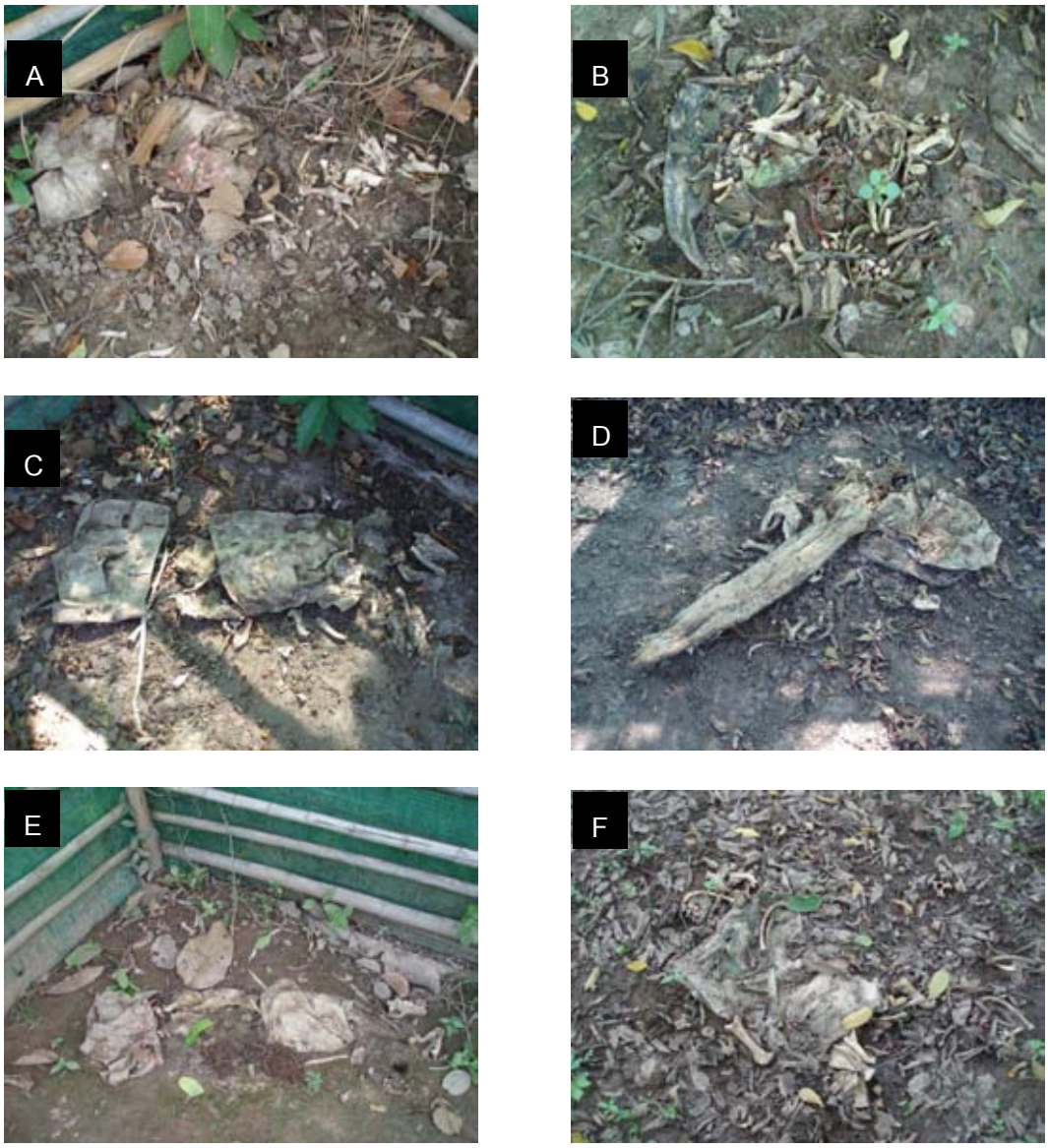


Figure 4.8 Photographic images of the pig carcasses in the skeletonized stage of decomposition at site 2 at Muang Nan district, Nan province. Images shown are pig carcasses laid on the ground (A, C, E); hung above the ground (B, D, F); monsoon (A, B); winter (C, D) and summer (E, F).

4.2 Meteorological data at the two sites during the study period

Meteorological data, including the ambient temperature (Figures 4.9A-4.9D), soil temperature (Figures 4.10A-4.10D), relative humidity (Figures 4.11A-4.11D), internal carcass temperature (Figures 4.12A-4.12D) and the maggot mass temperature (Figures 4.13A-4.13D). There were slightly different environmental factors between each site and, especially, season, such as the temperatures that were different in the last stages of decomposition (Figures 4.10A and 4.10B).

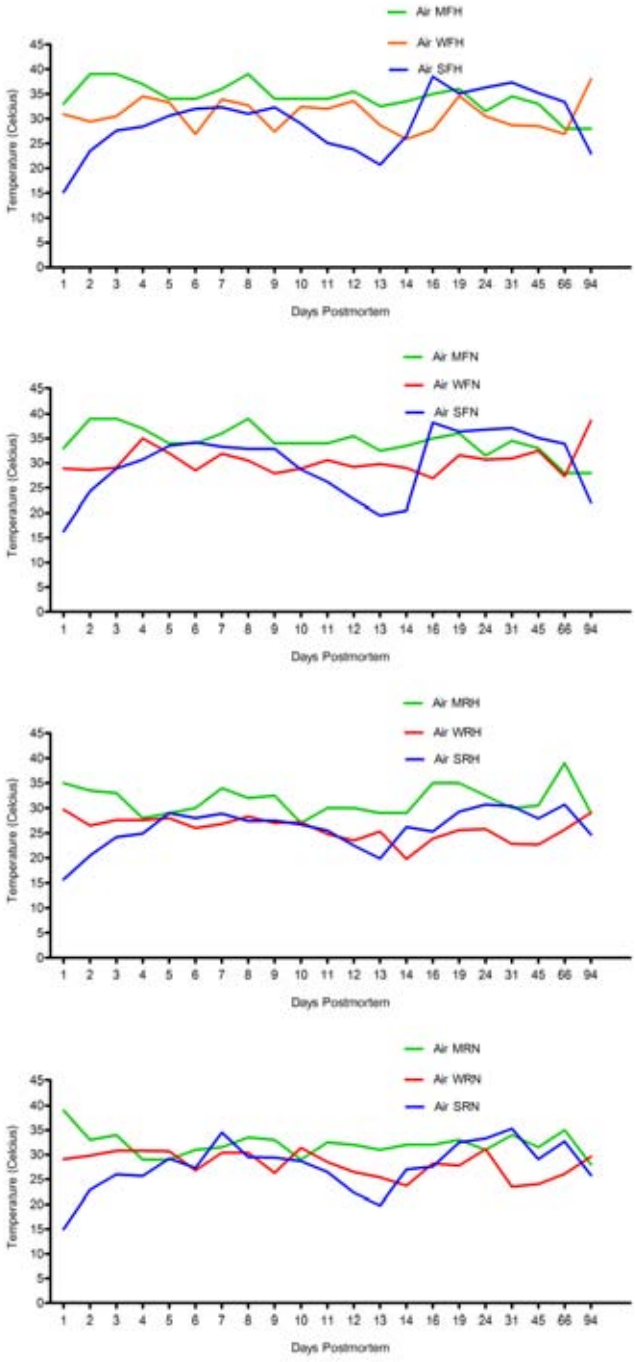


Figure 4.9 Ambient temperature of the arthropod succession, study sites at Wieng Sa district and Muang Nan district, Nan province, during May 2010 – August 2011 in the monsoon wet (M), winter (W) and summer (S) seasons at site 1, a mixed deciduous forest (F), or site 2, a sub urban (R), for carcasses that were either hung above (H) or laid on the ground (N).

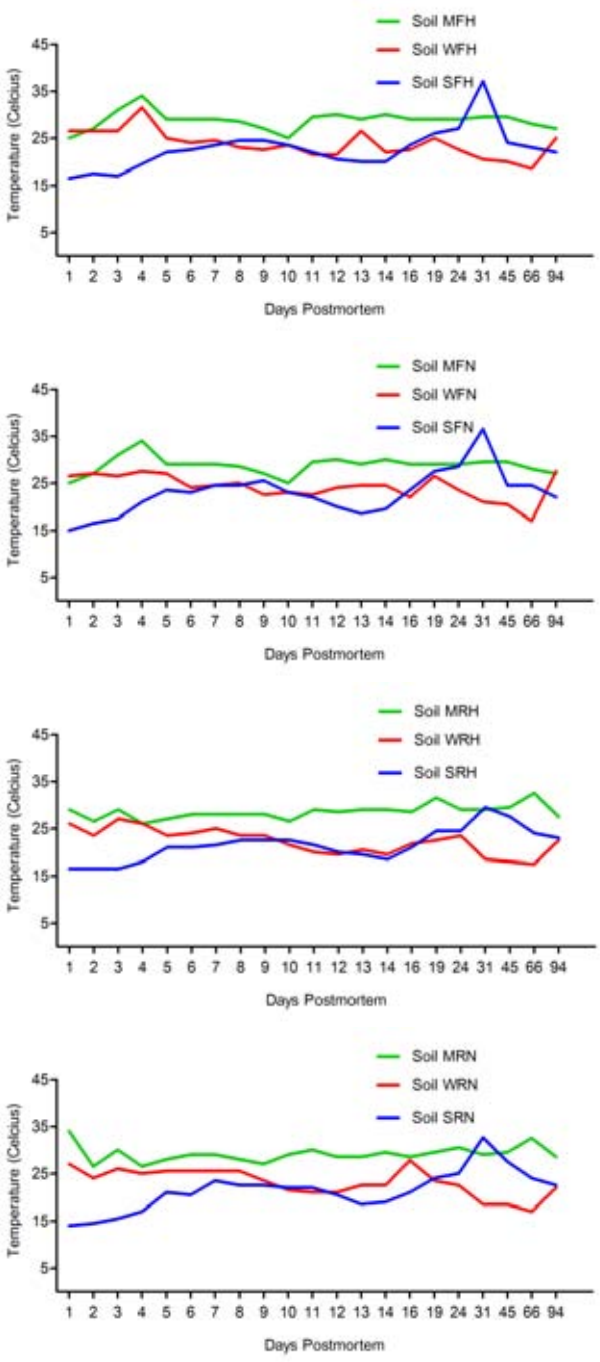


Figure 4.10 Soil temperature of the arthropod succession, study sites at Wieng Sa district and Muang Nan district, Nan province, during May 2010 – August 2011 in the monsoon wet (M), winter (W) and summer (S) seasons at site 1, a mixed deciduous forest (F), or site 2, a sub urban (R), for carcasses that were either hung above (H) or laid on the ground (N).

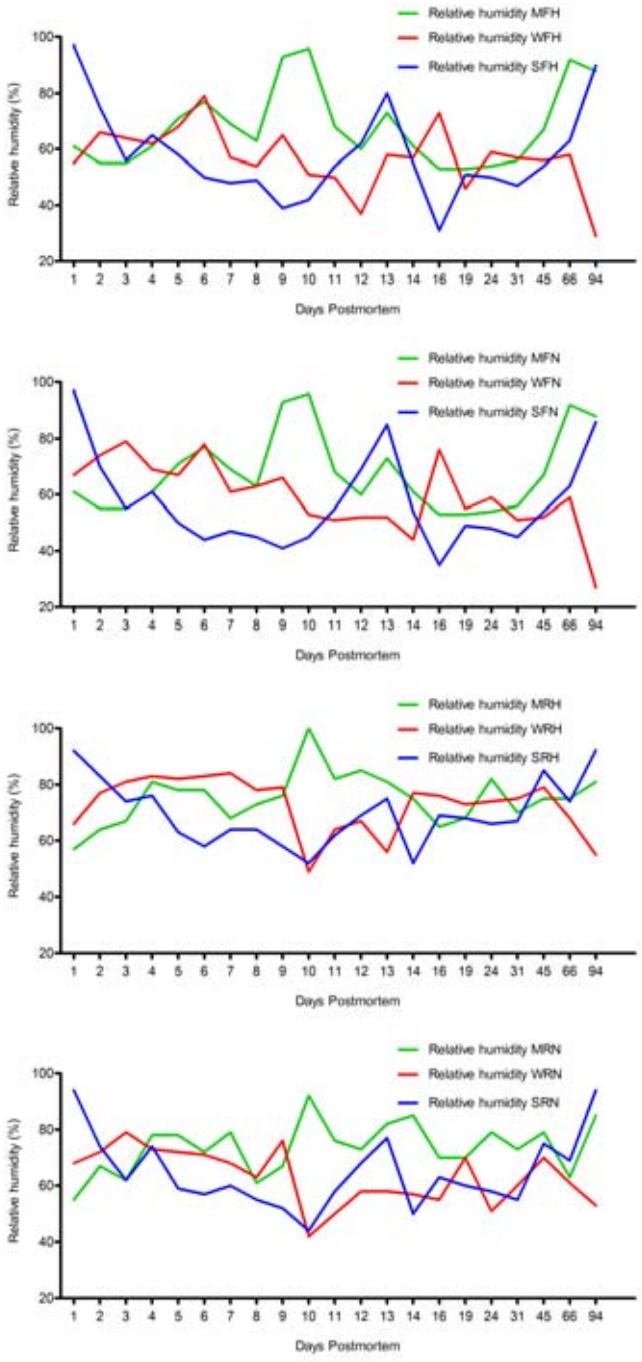


Figure 4.11 Relative humidity of the arthropod succession, study sites at Wieng Sa district and Muang Nan district, Nan province, during May 2010 – August 2011 in the monsoon wet (M), winter (W) and summer (S) seasons at site 1, a mixed deciduous forest (F), or site 2, a sub urban (R), for carcasses that were either hung above (H) or laid on the ground (N).

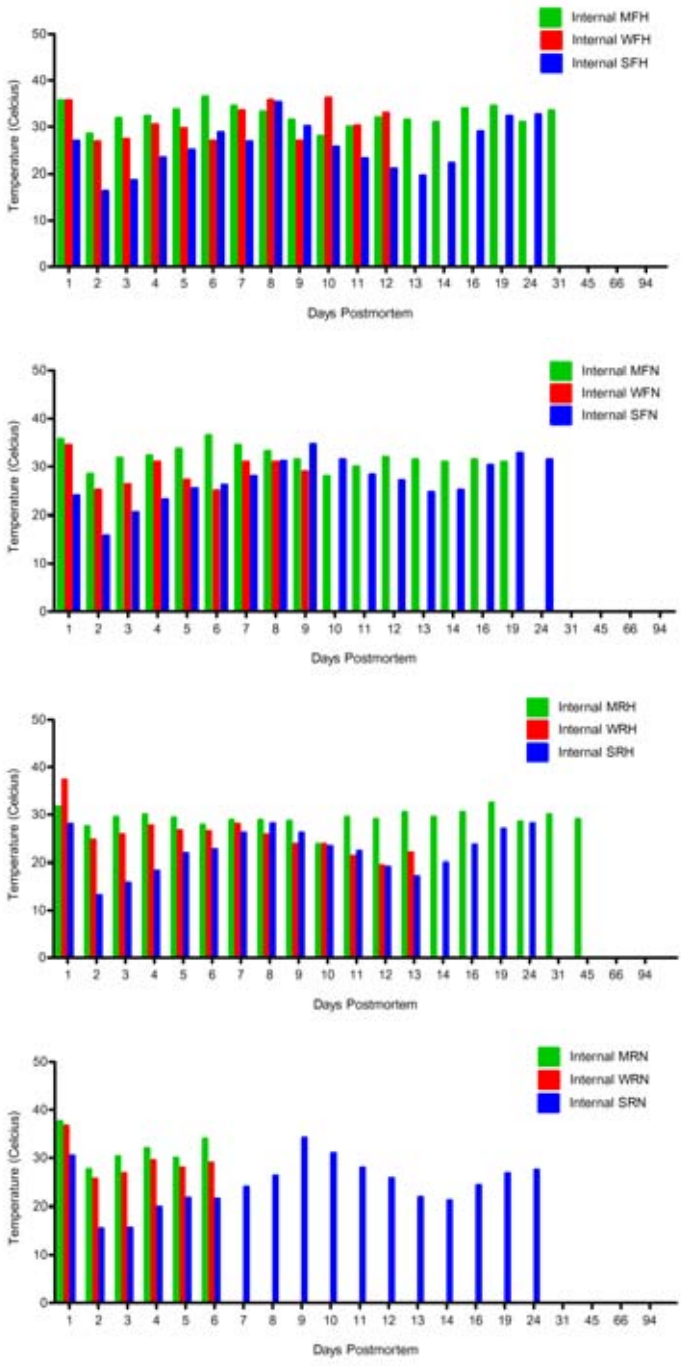


Figure 4.12 Internal carcass temperature of the arthropod succession, study sites at Wieng Sa district and Muang Nan district, Nan province, during May 2010 – August 2011 in the monsoon wet (M), winter (W) and summer (S) seasons at site 1, a mixed deciduous forest (F), or site 2, a sub urban (R), for carcasses that were either hung above (H) or laid on the ground (N).

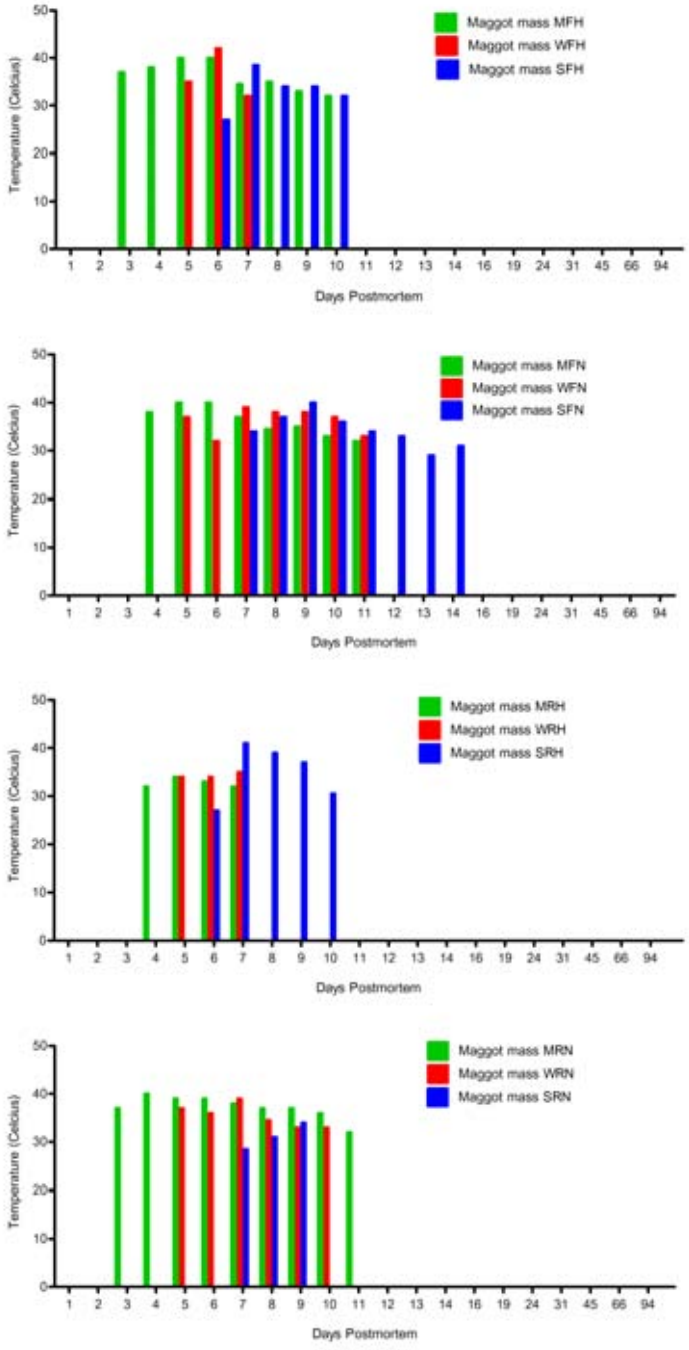


Figure 4.13 Maggot mass temperature of the arthropod succession, study sites at Wieng Sa district and Muang Nan district, Nan province, during May 2010 – August 2011 in the monsoon wet (M), winter (W) and summer (S) seasons at site 1, a mixed deciduous forest (F), or site 2, a sub urban (R), for carcasses that were either hung above (H) or laid on the ground (N).

4.3 INSECT SUCCESSION

4.3.1 Insect succession at site 1 (mixed deciduous forest of Wieng Sa district)

The succession patterns of representatives of the orders Diptera, Coleoptera and other arthropods onto the six pig carcasses (two orientations at each of three seasons) are presented in Table 4.3, whilst the succession pattern seen in this preliminary study is summarized for the monsoon wet (Table 4.4), winter (Table 4.5) and summer (Table 4.6) seasons and summarized for laid on the ground (Table 4.7) and hung on the tree (Table 4.8).

Fifty five species were collected and identified throughout the study and consisted of 25 species of Diptera and 14 species of Coleoptera as the main representatives in terms of number of species or individuals. Of the predominant Diptera: Calliphoridae consistently colonized all carcasses within the first species was rarely observed to frequent remains and did not oviposit on carcasses. *Musca domestica* (Muscidae) was observed regularly on carcasses throughout the decomposition process. Early colonizers arriving and ovipositing during the initial stage of decomposition included the two calliphorid (blow flies) species; *Chrysomya megachephala* and *Achoetandrus rufifacies* and the formicid (ant) species; *Oecophylla smaradina*.

Table 4.3 Summary of carrion arthropods found associating with both hung above and laid on ground pig carcasses of site 1 (Wieng Sa district, Nan province) during May 2010 – August 2011.

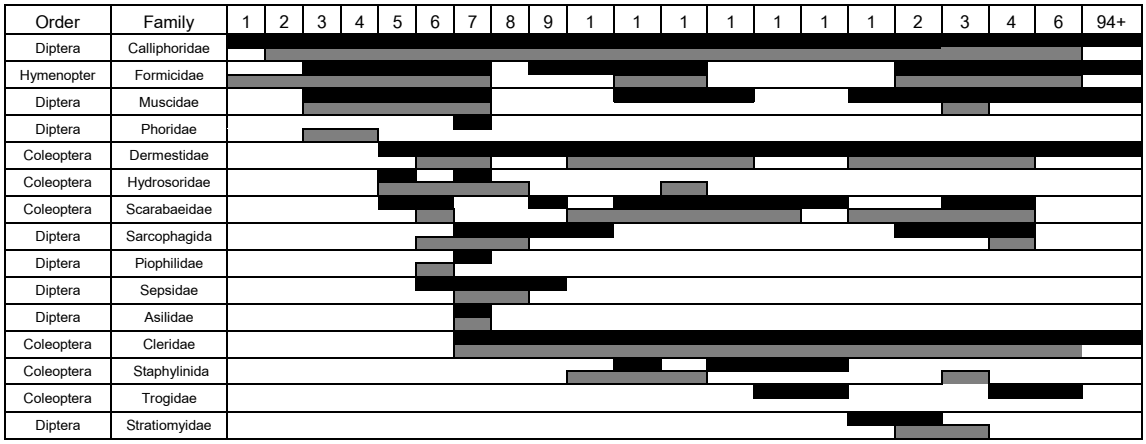
Order	Family / Likely role	Species	Collection
Diptera	Calliphoridae / Carrion feeders	*Chrysomya megacephala*	Eggs, Larvae, Pupae, Adults
		Chrysomya bezziana	Adults
		Chrysomya nigripes	Larvae, Pupae, Adults
		Chrysomya thanomthini	Adults
		Chrysomya pinguis	Adults
		Chrysomya chani	Adults
		Achoetandrus rufifacies	Eggs, Larvae, Pupae, Adults
		Achoetandrus villeneuvi	Adults
		Lucilia cuprina	Larvae, Pupae, Adults
		Hypopygiopsis infumata	Adults
		Hemipyrellia ligurriens	Larvae, Pupae, Adults
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	Larvae, Pupae, Adults
		Musca domestica	Adults
		Musca sorben	Adults
		Atherigona sp.	Larvae, Pupae, Adults
		Synthesiomyia nudiseta	Adults
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	Pupae, Adults
		Sarcophaga peregrine	Pupae, Adults
		Sarcophaga ruficornis	Pupae, Adults
	Drosophilidae	*Drosophila melanogaster*	Adults
	Phoridae / Carrion feeder	Unidentified	Adults
	Piophilidae / Scavenger	*Piophila casei*	Adults
	Sepsidae / Scavenger	Unidentified	Adults
	Stratiomyidae / Predatory	*Hermetia illucens*	Larvae, Pupae, Adults
	Asilidae / Predatory	Unidentified	Adults
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	Larvae, Adults
		Necrobia rufipes	Larvae, Adults
	Dermestidae / Scavenger	*Demestes maculatus*	Larvae, Pupae, Adults
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	Adults
	Scarabaeidae / Scavenger	*Coprophanaeus* sp.	Adults
		Onthophagus tricornis	Adults
	Trogidae / Scavenger	*Polynonchus* sp.	Adults
		Afrromorgus chinensis	Adults
	Staphylinidae / Predator	Unidentified sp. 1	Adults
		Unidentified sp. 2	Adults
		Unidentified sp. 3	Adults
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	Adults
	Cicindelidae / Predator	Unidentified	Adults
	Chrysomelidae / Accidental (leaf beetles)	Unidentified sp. 1	Adults

Table 4.3 (Cont.) Summary of carrion arthropods found associating with both hung above and laid on ground pig carcasses of site 1 (Wieng Sa district, Nan province) during May 2010 – August 2011.

Order	Family / Likely role	Species	Collection
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	Adults
		Pheidologeton diversus	Adults
		Crematogaster physocrema	Adults
		Camponotus rufoglaucus	Adults
		Monomorium destructor	Adults
	Braconidae / Parasitoid	Unidentified	Adults
	Apidae / Accidental-Saprophyte	*Melipona sp.*	Adults
	Acrididae/ Accidental	Unidentified	Adults
Orthoptera	Coreidae / Accidental	Unidentified	Adults
Hemiptera	Blattidae / Accidental	Unidentified	Adults
Blattodea	Unidentified / Accidental	Unidentified	Adults
Isoptera	Unidentified / Scavenger	Unidentified	Adults
Acari	Unidentified	Unidentified	Adults
Scorpiones	Unidentified	Unidentified	Adults
Araneae	Unidentified	Unidentified	Adults

Later dipteran colonisers included Sarcophagidae, Phoridae and Piophilidae. Representatives of the Piophilidae family, *P. casei* Linnaeus attended carcasses predominantly during the wet decay stages of decomposition (Table 4.4).

Table 4.4 Decomposition and insect succession patterns on pig carcasses at site 1 (mixed deciduous forest at Wieng Sa district, Nan province) in the monsoon wet season stages of decomposition of the pig carcasses exposed as hung on a tree (■) or laid on the ground (▭). lumerals indicate the time since death in days.



Coleoptera were present on carcasses in decay stage. Beetle abundance increased considerably during the post decay and dry remains stage in all carcasses and Coleoptera were the dominant taxa during the late dry remain stage. Dominant coleopteran species included Cleridae, Dermestidae, Scarabaeidae and Staphylinidae.

Table 4.5 Decomposition and insect succession patterns on pig carcasses at site 1 (mixed deciduous forest at Wieng Sa district, Nan province) in the winter season stages of decomposition of the pig carcasses exposed hung on a tree (■) or laid on the ground (▭). Numerals indicate the time since death in days.

Table 4.6 Decomposition and insect succession patterns on pig carcasses at site 1 (mixed deciduous forest at Wieng Sa district, Nan province) in the summer season stages of decomposition of the pig carcasses exposed as hung on a tree (■) or laid on the ground (■). Numerals indicate the time since death in days.

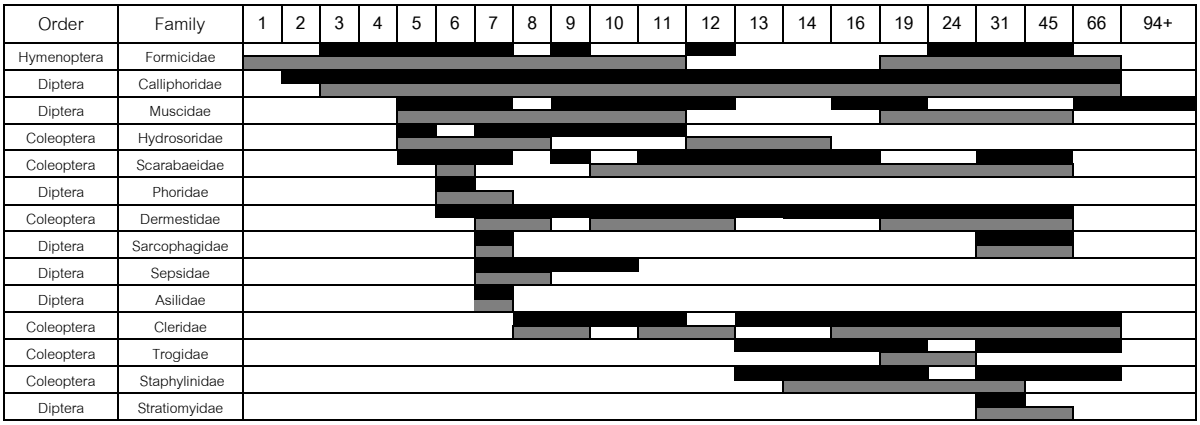


Table 4.7 Insect succession patterns on pig carcasses at site 1 (mixed deciduous forest), hung above the ground: monsoon wet (■), winter (■) and summer season (■). Numerals indicate the time since death in days.

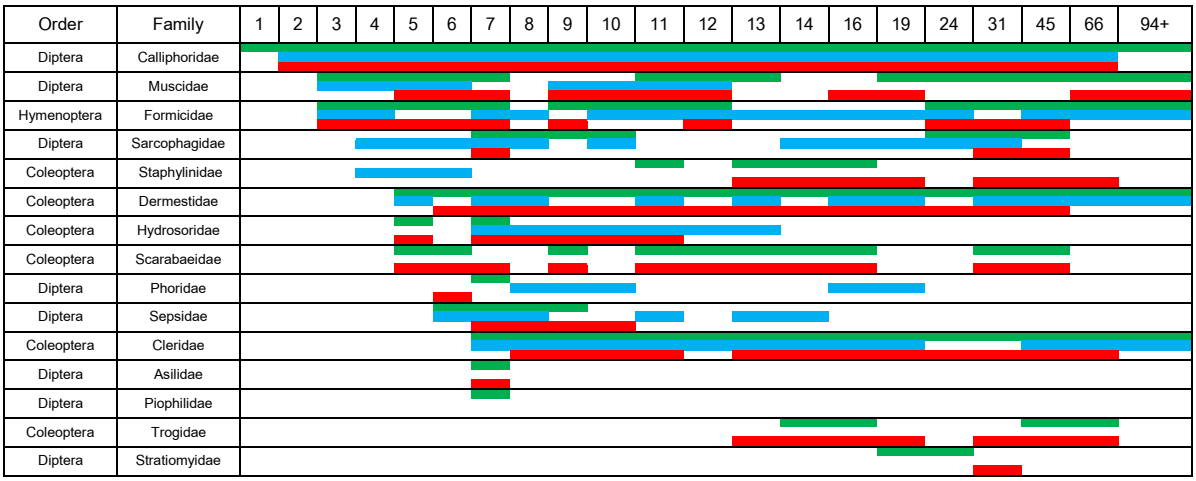


Table 4.8 Insect succession patterns on pig carcasses at site 1 (mixed deciduous forest), laid on the ground: monsoon wet (■), winter (■) and summer season (■). Numerals indicate the time since death in days.

Order	Family	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	19	24	31	45	66	94+
Hymenoptera	Formicidae																					
Diptera	Calliphoridae																					
Diptera	Muscidae																					
Coleoptera	Sarcophagidae																					
Diptera	Phoridae																					
Coleoptera	Dermestidae																					
Coleoptera	Hydrosoridae																					
Coleoptera	Staphylinidae																					
Coleoptera	Scarabaeidae																					
Diptera	Piophilidae																					
Diptera	Sepsidae																					
Coleoptera	Cleridae																					
Diptera	Asilidae																					
Coleoptera	Trogidae																					
Diptera	Stratiomyidae																					

4.3.2 Insect succession at site 2 (sub urban area at Muang Nan district)

In total, 46 arthropod species / morpho species, from 25 families of arthropods in eight orders (Table 4.9) were collected during this study from the six pigs at Site 2 (three seasons and two positions in each season). This is contrast with site 1, formicids (ants); *Oecophylla smaradina* were found only in site 1. The succession pattern seen in this preliminary study is summarized for the monsoon wet (Table 4.10), winter (Table 4.11) and summer (Table 4.12) seasons and summarized for laid on the ground (Table 4.13) and hung on the tree (Table 4.14).

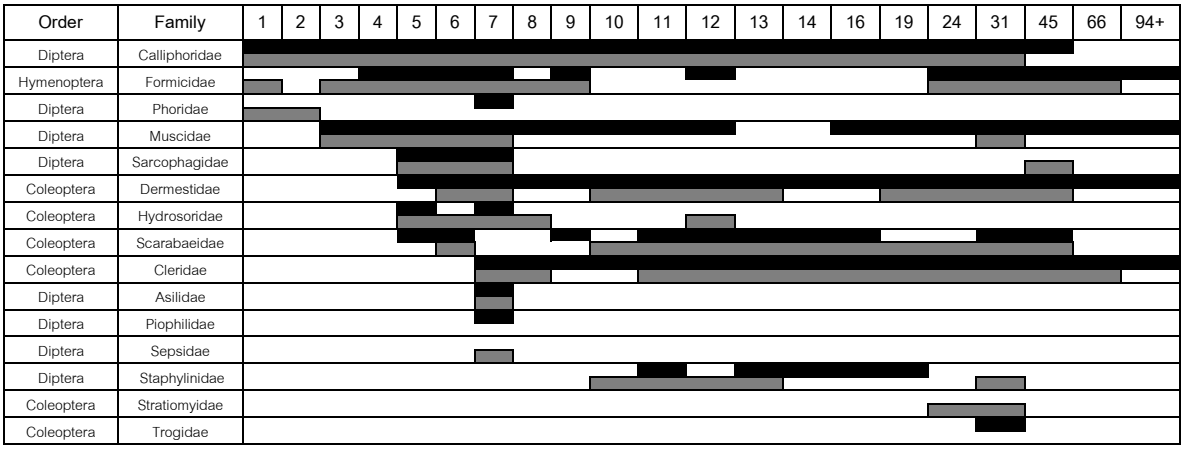
Members of the insect order Diptera (flies) were the primary initial colonizers, but with overall some 20 species of flies were found to attend the carcasses at some stage of the decomposition of all the carcasses, and with at least one species in attendance at every stage. Of all the arthropods that utilized the cadavers, the early colonizers arriving and ovipositing during the initial stage of decomposition included the calliphorids (blow flies); *C. megachephala* and *A. rufifacies.*

In the bloated stage, *C. megachephala* and *A. rufifacies* were the most numerous flies (as larvae) found in all the carcasses (all seasons and both carcass positions). Both these predominant species of Calliphoridae were similar to that reported for pig carcasses in an oil palm plantation in Malaysia (Chin 2010) and in a xerophytic habitat in Hawaii (Shalaby, 2000). Adult *M. domestica* regularly attended carcasses. When present, *M. domestica* larvae were generally not observed until the active decay stage of decomposition. The blow fly, *C. nigripes*, made their first appearance during the bloating stage, but were uncommon visitors.

Table 4.9 Summary of carrion arthropods found associating with both hung above and laid on ground pig carcasses of site 2 (Muang Nan district, Nan province) during May 2010 – August 2011.

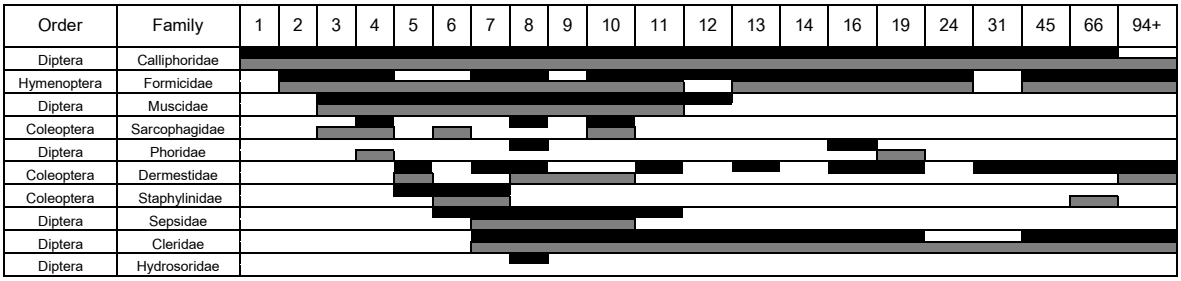
Order	Family / Likely role	Species	Collection
Diptera	Calliphoridae/ Carrion feeders	*Chrysomya megacephala*	Eggs, Larvae, Pupae, Adults
		Chrysomya bezziana	Adults
		Chrysomya nigripes	Larvae, Pupae, Adults
		Chrysomya thanomthini	Adults
		Achoetandrus rufifacies	Eggs, Larvae, Pupae, Adults
		Achoetandrus villeneuvi	Larvae, Adults
		Lucilia cuprina	Larvae, Pupae, Adults
		Hemipyrellia ligurriens	Larvae, Pupae, Adults
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	Larvae, Pupae, Adults
		Musca domestica	Adults
		Musca sorben	Adults
		Atherigona sp.1	Larvae, Pupae, Adults
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	Pupae, Adults
		Sarcophaga peregrina	Pupae, Adults
		Sarcophaga ruficornis	Pupae, Adults
	Phoridae / Carrion feeder	Unidentified	Adults
	Piophilidae / Scavenger	*Piophila casei*	Adults
	Sepsidae / Scavenger	Unidentified	Larvae, Pupae, Adults
	Stratiomyidae / Predatory	*Hermetia illucens*	Larvae, Pupae, Adults
	Asilidae / Predatory	Unidentified	Adults
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	Larvae, Adults
		Necrobia rufipes	Larvae, Adults
	Dermestidae / Scavenger	*Demestes maculatus*	Larvae, Pupae, Adults
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	Adults
	Scarabaeidae / Scavenger	*Coprophanaeus* sp.	Adults
		Onthophagus tricornis	Adults
	Trogidae / Scavenger	*Polynonchus* sp.	Adults
		Afrromorgus chinensis	Adults
	Staphylinidae / Predator	Unidentified 1	Adults
		Unidentified 2	Adults
		Unidentified 3	Adults
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	Adults
	Cicindelidae / Predator	Unidentified	Adults
	Chrysomelidae / Accidental (leaf beetles)	Unidentified 1	Adults
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	Adults
		Pheidologeton diversus	Adults
		Crematogaster physocrema	Adults
		Camponotus rufoglaucus	Adults
		Monomorium destructor	Adults
	Braconidae / Parasitoid	Unidentified	Adults
	Apidae / Accidental-Saprophyte	*Melipona* sp.	Adults
Orthoptera	Acrididae/ Accidental	Unidentified	Adults
Hemiptera	Coreidae / Accidental	Unidentified	Adults
Blattodea	Blattidae / Accidental	Unidentified	Adults
Isoptera	Unidentified / Accidental	Unidentified	Adults
Acari	Unidentified / Scavenger	Unidentified	Adults

Table 4.10 Decomposition and insect succession patterns on pig carcasses at site 2 (sub urban at Muang Nan district, Nan province) in the monsoon wet season stages of decomposition of the pig carcasses exposed as hung on a tree (■) or laid on the ground (■). Numerals indicate the time since death in days.



During the active decay stage, the heads of all carcasses were entirely infested with calliphorid larvae in varying stages of development. Larvae feeding on carcasses formed dense maggot feeding masses and larvae falling from the hanging carcasses were thereafter restricted to, and dependent upon, the fallen substrates for the remainder of their development. In addition the hung carcasses stretched towards the ground. The large maggot masses observed on the carcasses or fallen materials were principally comprised of the calliphorids, *C. megacephala, C. bezziana, C. nigripes, A. rufifacies* and *A. villeneuvi,* the muscids, *H. spinigera, M. domestica* and *Altherigona* sp.1, plus the sarcophagid *S. dux* in all carcasses, including the large maggot mass observed on the ground-laying carcasses.

Table 4.11 Decomposition and insect succession patterns on pig carcasses at site 2 (sub urban at Muang Nan district, Nan province) in the winter season stages of decomposition of the pig carcasses exposed as hung on a tree (■) or laid on the ground (■). Numerals indicate the time since death in days.



The carcasses slowly reached the active decay stage. Hanging carcasses began to fall apart during this stage and the parts that fell to the ground provided food for the few remaining Diptera larvae (Calliphoridae) in the area under the carcasses, and around carcasses for those lain on the ground. Parasitic wasps (Braconidae) of Diptera were commonly observed in hanging carcasses and were collected from the carcasses during the later post-decay stage. Coleoptera were observed on carcasses from the post-decay stage until skeletonization and included representative species of the Cleridae, Dermestidae, Hybosoridae, Scarabaeidae, Trogidae, Staphylinidae, Siliphidae, Cicindelidae and Chrysomelidae. Coleopteran larvae were observed in association with the carcasses in the late post-decay stage until skeletonization, although larvae of Cleridae (*N. ruficollis* and *N. rufipes*) and Dermestidae (*D. maculates*) were commonly found on the corpse during the dry phase.

Table 4.12 Decomposition and insect succession patterns on pig carcasses at site 2 (sub urban at Muang Nan district, Nan province) in the summer season stages of decomposition of the pig carcasses exposed as hung on a tree (■) or laid on the ground (■). Numerals indicate the time since death in days.

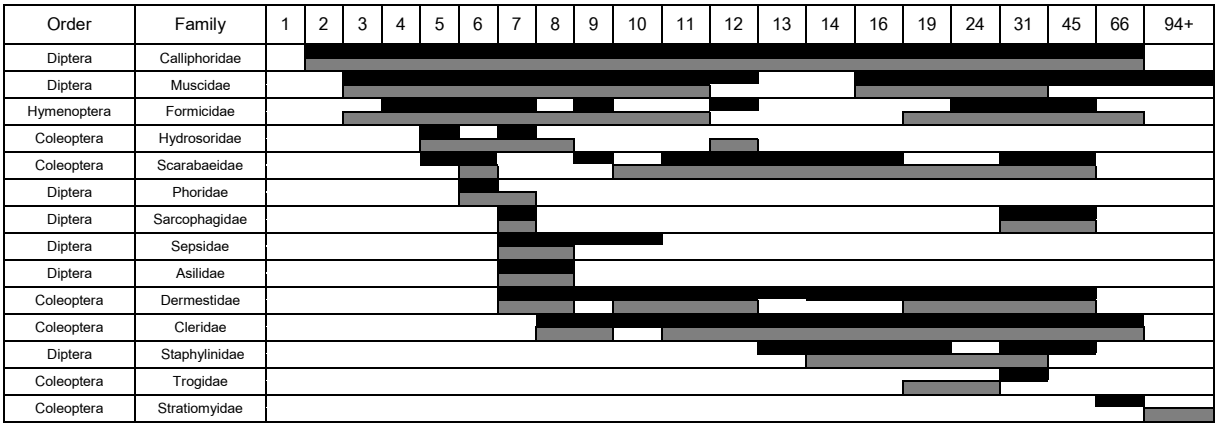


Table 4.13 Insect succession patterns on pig carcasses at site 2 (sub urban area), hung above the ground: monsoon wet (■), winter (■) and summer season (■). Numerals indicate the time since death in days.

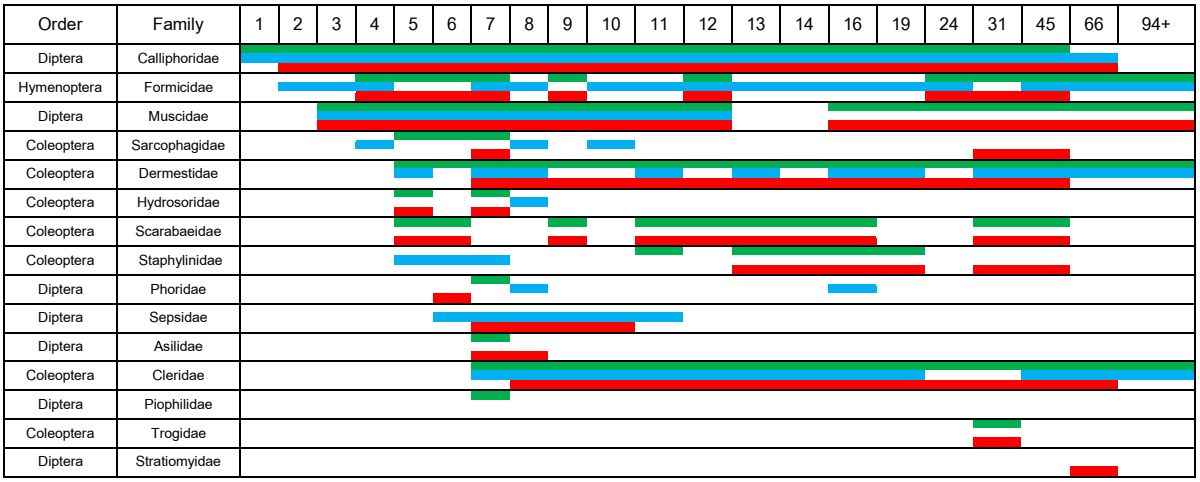
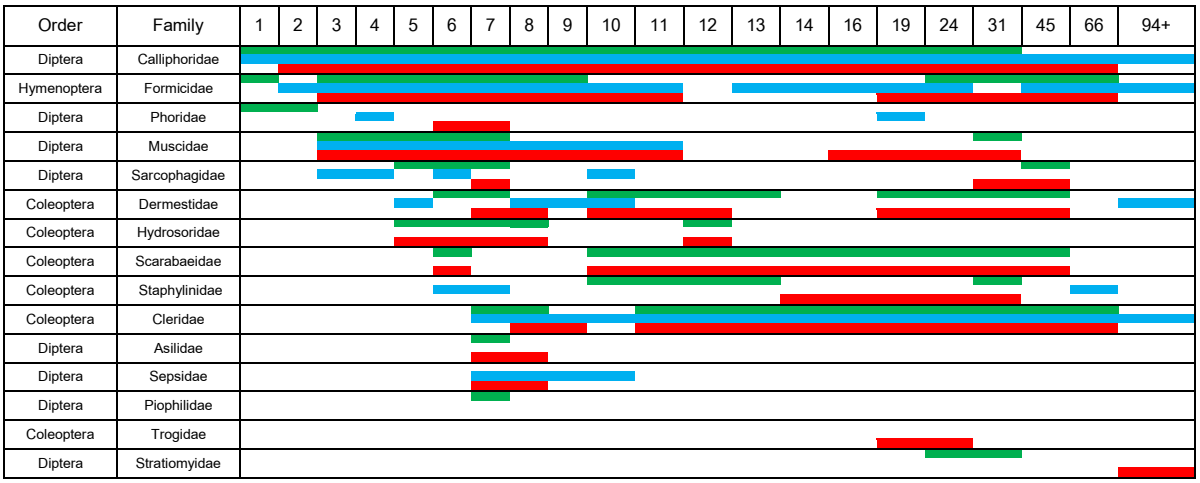


Table 4.14 Insect succession patterns on pig carcasses at site 2 (sub urban area), laid on the g monsoon wet (■), winter (■) and summer season (■). Numerals indicate the time since death in days.



Comparison between seasons (Table 4.7-4.8 and Table 4.13-41.4) of insect succession. In site 1, hung above the ground, the first insect to arrive at decomposing remains was Calliphoridae, following with Muscidae and Formicidae, respectively. Particularly, in monsoon wet season Calliphoridae was observed on the first day after death. While in winter and summer season, Calliphoridae was found on the second day after death. In site 1, laid on the ground, the first insect to arrive at decomposing remains was Formicidae, following with Calliphoridae and Muscidae, respectively. Particularly, in monsoon wet and summer season Formicidae was observed on the first day after death. While in winter season, Formicidae was found on the second day after death. Calliphoridae was found on 2-3 day after death. In site 2, insect succession in hung above the ground and laid on the ground were similar. Calliphoridae was observed on the first day after death, following with Formicidae and Muscidae in hung above the ground. This is contrast with laid on the ground, Phoridae were found follow in Formicidae.

4.4 Database of carrion arthropods in three seasons (Table 4.15 – 4.17).

Table 4.15 Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA001	14/5/2010		✓		✓	✓				
	CalA002	14/5/2010	✓		✓		✓				
	CalA003	15/5/2010		✓		✓	✓				
	CalA004	15/5/2010		✓	✓		✓				
	CalA005	15/5/2010	✓			✓	✓				
	CalA006	15/5/2010	✓		✓		✓				
	CalA007	16/5/2010		✓		✓	✓				
	CalA008	16/5/2010		✓	✓		✓				
	CalA009	16/5/2010	✓			✓	✓				
	CalA010	16/5/2010	✓		✓		✓				
	CalA011	17/5/2010		✓		✓	✓				
	CalA012	17/5/2010	✓			✓	✓				
	CalA013	17/5/2010	✓		✓		✓				
	CalA014	18/5/2010	✓		✓		✓				
	CalA015	21/5/2010		✓		✓					✓
	CalA016	21/5/2010	✓			✓					✓
	CalA017	22/5/2010		✓		✓					✓
	CalA018	22/5/2010		✓	✓			✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (C. megacephala)	CalA019	22/5/2010		✓	✓				✓		
	CalA020	22/5/2010	✓		✓			✓			
	CalA021	23/5/2010		✓		✓					✓
	CalA022	24/5/2010		✓		✓	✓				
	CalA023	24/5/2010		✓	✓					✓	
	CalA024	24/5/2010	✓		✓			✓			
	CalA025	24/5/2010	✓		✓					✓	
	CalA026	25/5/2010	✓			✓					✓
	CalA027	28/5/2010	✓		✓				✓		
	CalA028	5/6/2010		✓		✓					✓
Diptera: Caliphoridae (*C. bezziana*)	CalB001	15/5/2010		✓	✓		✓				
	CalB002	16/5/2010		✓		✓	✓				
	CalB003	17/5/2010	✓			✓	✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. nigripes*)	CalC001	15/5/2010		✓		✓	✓				
	CalC002	15/5/2010		✓	✓		✓				
	CalC003	15/5/2010	✓		✓		✓				
	CalC004	16/5/2010	✓			✓	✓				
	CalC005	17/5/2010		✓	✓		✓				
	CalC006	24/5/2010	✓			✓					✓
	CalC007	25/5/2010	✓			✓					✓
	CalC008	28/5/2010		✓		✓			✓		
	CalC009	28/5/2010	✓			✓					✓
Diptera: Caliphoridae (*C. thanomthini*)	CalD001	5/6/2010		✓		✓	✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE001	14/5/2010		✓	✓		✓				
	CalE002	14/5/2010	✓		✓		✓				
	CalE003	15/5/2010		✓		✓	✓				
	CalE004	15/5/2010		✓	✓		✓				
	CalE005	15/5/2010	✓		✓		✓				
	CalE006	16/5/2010		✓		✓	✓				
	CalE007	16/5/2010		✓	✓		✓				
	CalE008	16/5/2010	✓			✓	✓				
	CalE009	17/5/2010		✓		✓	✓				
	CalE010	17/5/2010	✓			✓	✓				
	CalE011	24/5/2010		✓		✓					✓
	CalE012	24/5/2010	✓		✓			✓			
	CalE013	25/5/2010	✓			✓					✓
	CalE014	26/5/2010		✓		✓					✓
	CalE015	26/5/2010	✓			✓		✓			
	CalE016	26/5/2010	✓			✓					✓
	CalE017	26/5/2010	✓		✓				✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. villeneuvi*)	CalF001	15/5/2010		✓	✓		✓				
	CalF002	12/6/2010	✓		✓		✓				
Diptera: Caliphoridae (*L. cuprina*)	CalG001	14/5/2010		✓	✓		✓				
Diptera: Caliphoridae (*H. infumata*)	CalH001	15/5/2010	✓		✓		✓				
	CalH002	16/5/2010	✓			✓	✓				
Diptera: Muscidae (*H. spinigera*)	MusA001	16/5/2010	✓			✓	✓				
	MusA002	17/5/2010		✓		✓	✓				
	MusA003	17/5/2010		✓	✓		✓				
	MusA004	17/5/2010	✓			✓	✓				
	MusA005	17/5/2010	✓		✓		✓				
	MusA006	18/5/2010	✓		✓		✓				
	MusA007	5/6/2010	✓		✓			✓			
	MusA008	12/6/2010		✓	✓		✓				
	MusA009	12/6/2010	✓			✓	✓				
	MusA010	12/6/2010	✓		✓		✓				
	MusA011	26/6/2010	✓			✓	✓				
	MusA012	17/7/2010	✓			✓	✓				
	MusA013	14/8/2010	✓			✓	✓				
	MusA014	14/8/2010	✓			✓			✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*M. domestica*)	MusB001	15/5/2010		✓		✓	✓				
	MusB002	15/5/2010		✓	✓		✓				
	MusB003	15/5/2010	✓			✓	✓				
	MusB004	15/5/2010	✓		✓		✓				
	MusB005	16/5/2010		✓		✓	✓				
	MusB006	16/5/2010		✓	✓		✓				
	MusB007	16/5/2010		✓	✓				✓		
	MusB008	16/5/2010	✓			✓	✓				
	MusB009	16/5/2010	✓		✓		✓				
	MusB010	17/5/2010		✓		✓	✓				
	MusB011	17/5/2010		✓	✓		✓				
	MusB012	17/5/2010	✓		✓		✓				
	MusB013	18/5/2010		✓		✓	✓				
	MusB014	18/5/2010	✓			✓	✓				
	MusB015	19/5/2010		✓		✓	✓				
	MusB016	19/5/2010		✓	✓		✓				
	MusB017	31/5/2010		✓		✓	✓				
	MusB018	5/6/2010	✓			✓	✓				
	MusB019	26/6/2010	✓			✓	✓				
	MusB020	17/7/2010	✓			✓	✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*M. sorben*)	MusC001	16/5/2010	✓		✓		✓				
	MusC002	17/5/2010		✓	✓		✓				
	MusC003	18/5/2010		✓		✓	✓				
	MusC004	18/5/2010		✓	✓		✓				
	MusC005	18/5/2010	✓		✓		✓				
	MusC006	12/6/2010	✓			✓	✓				
Diptera: Muscidae (*Atherigona* sp.1)	MusD001	17/5/2010		✓		✓	✓				
	MusD002	17/5/2010		✓	✓		✓				
	MusD003	17/5/2010	✓			✓	✓				
	MusD004	17/5/2010	✓		✓		✓				
	MusD005	18/5/2010		✓	✓		✓				
	MusD006	19/5/2010		✓	✓					✓	
	MusD007	5/6/2010	✓			✓	✓				
	MusD008	5/6/2010	✓		✓		✓				
	MusD009	12/6/2010	✓			✓	✓				
	MusD010	26/6/2010	✓			✓	✓				
Diptera: Muscidae (*S. nudiseta*)	MusE001	20/5/2010		✓	✓				✓		
	MusE002	25/5/2010	✓		✓				✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Musca* sp.1)	MusF001	19/5/2010		✓		✓	✓				
	MusF002	19/5/2010		✓	✓		✓				
	MusF003	19/5/2010	✓		✓		✓				
Diptera: Sarcophagidae (*S. dux*)	SarA001	18/5/2010		✓		✓	✓				
	SarA002	18/5/2010	✓			✓	✓				
	SarA003	19/5/2010		✓		✓	✓				
	SarA004	19/5/2010		✓	✓		✓				
	SarA005	19/5/2010	✓		✓		✓				
	SarA006	20/5/2010		✓		✓	✓				
	SarA007	5/6/2010	✓			✓	✓				
	SarA008	5/6/2010	✓		✓		✓				
	SarA009	12/6/2010		✓		✓	✓				
	SarA010	12/6/2010	✓			✓	✓				
	SarA011	12/6/2010	✓		✓		✓				
	SarA012	26/6/2010	✓			✓	✓				
	SarA013	17/7/2010		✓		✓	✓				
	SarA014	17/7/2010		✓	✓		✓				
	SarA015	17/7/2010	✓			✓	✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (S. peregrina)	SarB001	17/5/2010		✓		✓	✓				
	SarB002	17/5/2010		✓	✓		✓				
	SarB003	18/5/2010		✓	✓		✓				
	SarB004	19/5/2010		✓	✓		✓				
	SarB005	5/6/2010	✓			✓	✓				
	SarB006	5/6/2010	✓		✓		✓				
	SarB007	12/6/2010	✓			✓	✓				
	SarB008	12/6/2010	✓		✓		✓				
	SarB009	17/7/2010	✓			✓	✓				
	SarB010	14/8/2010	✓			✓	✓				

Table 4.15 (Cont.) database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (S. ruficornis)	SarC001	17/5/2010	✓		✓		✓				
	SarC002	18/5/2010		✓		✓	✓				
	SarC003	18/5/2010	✓		✓		✓				
	SarC004	19/5/2010		✓		✓	✓				
	SarC005	19/5/2010		✓	✓		✓				
	SarC006	19/5/2010	✓		✓		✓				
	SarC007	5/6/2010	✓			✓	✓				
	SarC008	5/6/2010	✓		✓		✓				
	SarC009	12/6/2010	✓			✓	✓				
	SarC010	26/6/2010		✓	✓		✓				
	SarC011	26/6/2010	✓			✓	✓				
	SarC012	17/5/2010	✓			✓	✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sepsidae (Unidentified)	SepA001	19/5/2010		✓	✓		✓				
	SepA002	26/6/2010	✓			✓	✓				
	SepA003	26/6/2010	✓		✓		✓				
Diptera: Drosophilidae (*D. melanogaster*)	DroA001	19/5/2010	✓			✓					✓
Diptera: Phoridae (Unidentified)	PhoA001	13/5/2010		✓	✓		✓				
	PhoA002	14/5/2010		✓	✓		✓				
	PhoA003	17/5/2010	✓		✓				✓		
	PhoA004	18/5/2010	✓		✓						✓
	PhoA005	19/5/2010		✓		✓	✓				
	PhoA006	19/5/2010	✓		✓			✓			
Diptera: Piophilidae (Unidentified)	PioA001	19/5/2010	✓			✓				✓	
Diptera: Asilidae (Unidentified)	AsiA001	19/5/2010		✓		✓	✓				
	AsiA002	19/5/2010		✓	✓		✓				

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA001	16/5/2010	✓			✓		✓			
	CleA002	18/5/2010	✓			✓		✓			
	CleA003	18/5/2010	✓			✓			✓		
	CleA004	18/5/2010	✓			✓					✓
	CleA005	19/5/2010		✓	✓			✓			
	CleA006	19/5/2010	✓			✓	✓				
	CleA007	19/5/2010	✓			✓		✓			
	CleA008	19/5/2010	✓			✓				✓	
	CleA009	19/5/2010	✓			✓					✓
	CleA010	19/5/2010	✓		✓					✓	
	CleA011	20/5/2010		✓		✓					✓
	CleA012	20/5/2010		✓	✓				✓		
	CleA013	20/5/2010	✓			✓					✓
	CleA014	20/5/2010	✓		✓					✓	
	CleA015	21/5/2010	✓			✓		✓			
	CleA016	21/5/2010	✓			✓				✓	
	CleA017	21/5/2010	✓			✓					✓
	CleA018	22/5/2010		✓		✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA019	23/5/2010		✓		✓		✓			
	CleA020	23/5/2010		✓		✓			✓		
	CleA021	23/5/2010		✓	✓					✓	
	CleA022	23/5/2010	✓			✓			✓		
	CleA023	24/5/2010		✓		✓		✓			
	CleA024	24/5/2010		✓		✓			✓		
	CleA025	24/5/2010		✓		✓				✓	
	CleA026	24/5/2010	✓			✓		✓			
	CleA027	24/5/2010	✓			✓				✓	
	CleA028	24/5/2010	✓		✓			✓			
	CleA029	24/5/2010	✓		✓				✓		
	CleA030	25/5/2010	✓			✓			✓		
	CleA031	25/5/2010	✓			✓				✓	
	CleA032	25/5/2010	✓		✓			✓			
	CleA033	25/5/2010	✓		✓				✓		
	CleA034	26/5/2010		✓		✓				✓	
	CleA035	26/5/2010		✓		✓					✓
	CleA036	26/5/2010	✓			✓		✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA037	26/5/2010	✓			✓				✓	
	CleA038	26/5/2010	✓			✓					✓
	CleA039	26/5/2010	✓		✓			✓			
	CleA040	26/5/2010	✓		✓				✓		
	CleA041	28/5/2010	✓		✓			✓			
	CleA042	31/5/2010		✓		✓					✓
	CleA043	31/5/2010		✓	✓				✓		
	CleA044	31/5/2010	✓			✓				✓	
	CleA045	31/5/2010	✓		✓			✓			
	CleA046	31/5/2010	✓		✓					✓	
Coleoptera: Cleridae (*N. refipes*)	CleB001	18/5/2010	✓			✓		✓			
	CleB002	18/5/2010	✓			✓			✓		
	CleB003	18/5/2010	✓			✓					✓
	CleB004	18/5/2010	✓		✓			✓			
	CleB005	19/5/2010		✓		✓			✓		
	CleB006	19/5/2010		✓		✓					✓
	CleB007	19/5/2010	✓			✓		✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB008	19/5/2010	✓			✓					✓
	CleB009	19/5/2010	✓		✓				✓		
	CleB010	19/5/2010	✓		✓					✓	
	CleB011	20/5/2010		✓		✓		✓			
	CleB012	20/5/2010		✓		✓			✓		
	CleB013	20/5/2010		✓		✓				✓	
	CleB014	20/5/2010		✓		✓					✓
	CleB015	20/5/2010		✓	✓				✓		
	CleB016	20/5/2010		✓	✓					✓	
	CleB017	20/5/2010	✓			✓					✓
	CleB018	20/5/2010	✓			✓		✓			
	CleB019	21/5/2010		✓		✓			✓		
	CleB020	21/5/2010		✓		✓					✓
	CleB021	21/5/2010	✓			✓				✓	
	CleB022	21/5/2010	✓		✓				✓		
	CleB023	22/5/2010		✓		✓		✓			
	CleB024	22/5/2010		✓		✓				✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (N. refipes)	CleB025	22/5/2010		✓		✓					✓
	CleB026	22/5/2010	✓		✓			✓			
	CleB027	23/5/2010		✓		✓		✓			
	CleB028	23/5/2010		✓		✓			✓		
	CleB029	23/5/2010		✓		✓					✓
	CleB030	23/5/2010		✓	✓			✓			
	CleB031	23/5/2010		✓	✓				✓		
	CleB032	23/5/2010		✓	✓					✓	
	CleB033	23/5/2010	✓			✓			✓		
	CleB034	23/5/2010	✓		✓				✓		
	CleB035	24/5/2010		✓		✓		✓			
	CleB036	24/5/2010		✓		✓			✓		
	CleB037	24/5/2010		✓		✓				✓	
	CleB038	24/5/2010		✓		✓					✓
	CleB039	24/5/2010		✓	✓			✓			
	CleB040	24/5/2010		✓	✓				✓		
	CleB041	24/5/2010		✓	✓					✓	
	CleB042	24/5/2010	✓			✓		✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB043	24/5/2010	✓			✓			✓		
	CleB044	24/5/2010	✓			✓				✓	
	CleB045	24/5/2010	✓		✓				✓		
	CleB046	25/5/2010		✓		✓		✓			
	CleB047	25/5/2010		✓		✓			✓		
	CleB048	25/5/2010		✓		✓				✓	
	CleB049	25/5/2010		✓		✓					✓
	CleB050	25/5/2010		✓	✓				✓		
	CleB051	25/5/2010		✓	✓					✓	
	CleB052	25/5/2010	✓			✓		✓			
	CleB053	25/5/2010	✓			✓			✓		
	CleB054	25/5/2010	✓			✓				✓	
	CleB055	25/5/2010	✓			✓					✓
	CleB056	25/5/2010	✓		✓			✓			
	CleB057	25/5/2010	✓		✓				✓		
	CleB058	26/5/2010		✓		✓		✓			
	CleB059	26/5/2010		✓		✓			✓		
	CleB060	26/5/2010		✓		✓				✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB061	26/5/2010		✓		✓					✓
	CleB062	26/5/2010		✓	✓			✓			
	CleB063	26/5/2010		✓	✓				✓		
	CleB064	26/5/2010		✓	✓					✓	
	CleB065	26/5/2010	✓			✓		✓			
	CleB066	26/5/2010	✓			✓					✓
	CleB067	26/5/2010	✓		✓			✓			
	CleB068	26/5/2010	✓		✓					✓	
	CleB069	28/5/2010		✓		✓		✓			
	CleB070	28/5/2010		✓		✓			✓		
	CleB071	28/5/2010		✓		✓				✓	
	CleB072	28/5/2010		✓		✓					✓
	CleB073	28/5/2010		✓	✓			✓			
	CleB074	28/5/2010		✓	✓				✓		
	CleB075	28/5/2010		✓	✓					✓	
	CleB076	28/5/2010	✓			✓		✓			
	CleB077	28/5/2010	✓			✓			✓		
	CleB078	28/5/2010	✓			✓				✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB079	28/5/2010	✓		✓			✓			
	CleB080	28/5/2010	✓		✓				✓		
	CleB081	28/5/2010	✓		✓					✓	
	CleB082	31/5/2010		✓		✓		✓			
	CleB083	31/5/2010		✓		✓				✓	
	CleB084	31/5/2010		✓		✓					✓
	CleB085	31/5/2010		✓	✓				✓		
	CleB086	31/5/2010		✓	✓					✓	
	CleB087	31/5/2010	✓			✓		✓			
	CleB088	5/6/2010		✓		✓		✓			
	CleB089	5/6/2010		✓		✓				✓	
	CleB090	5/6/2010		✓		✓					✓
	CleB091	5/6/2010		✓	✓				✓		
	CleB092	5/6/2010		✓	✓					✓	
	CleB093	5/6/2010	✓			✓		✓			
	CleB094	5/6/2010	✓			✓			✓		
	CleB095	5/6/2010	✓			✓					✓
	CleB096	5/6/2010	✓		✓			✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB097	12/6/2010		✓		✓		✓			
	CleB098	12/6/2010		✓		✓			✓		
	CleB099	12/6/2010		✓		✓				✓	
	CleB100	12/6/2010		✓		✓					✓
	CleB101	12/6/2010		✓	✓			✓			
	CleB102	12/6/2010		✓	✓				✓		
	CleB103	12/6/2010		✓	✓					✓	
	CleB104	12/6/2010	✓			✓		✓			
	CleB105	12/6/2010	✓			✓			✓		
	CleB106	12/6/2010	✓			✓				✓	
	CleB107	12/6/2010	✓			✓					✓
	CleB108	26/6/2010		✓		✓		✓			
	CleB109	26/6/2010		✓		✓			✓		
	CleB110	26/6/2010		✓		✓				✓	
	CleB111	26/6/2010		✓		✓					✓
	CleB112	26/6/2010		✓	✓			✓			
	CleB113	26/6/2010	✓			✓		✓			
	CleB114	26/6/2010	✓			✓			✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (N. refipes)	CleB115	26/6/2010	✓			✓				✓	
	CleB116	17/7/2010		✓		✓		✓			
	CleB117	17/7/2010		✓		✓			✓		
	CleB118	17/7/2010		✓		✓				✓	
	CleB119	17/7/2010		✓		✓					✓
	CleB120	17/7/2010		✓	✓			✓			
	CleB121	17/7/2010		✓	✓				✓		
	CleB122	17/7/2010	✓			✓		✓			
	CleB123	17/7/2010	✓			✓			✓		
	CleB124	17/7/2010	✓			✓				✓	
	CleB125	14/5/2010		✓		✓					✓
	CleB126	14/5/2010	✓			✓				✓	
	CleB127	14/5/2010	✓			✓					✓
Coleoptera: Dermestidae (*D. maculatus*)	DerA001	16/5/2010	✓			✓					✓
	DerA002	17/5/2010		✓		✓	✓				
	DerA003	17/5/2010		✓		✓					✓
	DerA004	17/5/2010	✓		✓					✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA005	18/5/2010		✓		✓			✓		
	DerA006	18/5/2010		✓		✓					✓
	DerA007	18/5/2010		✓	✓			✓			
	DerA008	18/5/2010	✓			✓		✓			
	DerA009	18/5/2010	✓			✓					✓
	DerA010	18/5/2010	✓		✓			✓			
	DerA011	18/5/2010	✓		✓					✓	
	DerA012	19/5/2010		✓		✓		✓			
	DerA013	19/5/2010		✓		✓					✓
	DerA014	19/5/2010		✓	✓			✓			
	DerA015	19/5/2010	✓			✓				✓	
	DerA016	19/5/2010	✓			✓					✓
	DerA017	19/5/2010	✓		✓				✓		
	DerA018	19/5/2010	✓		✓					✓	
	DerA019	20/5/2010		✓		✓		✓			
	DerA020	20/5/2010		✓		✓					✓
	DerA021	20/5/2010	✓			✓		✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA022	20/5/2010	✓			✓			✓		
	DerA023	20/5/2010	✓			✓				✓	
	DerA024	20/5/2010	✓		✓			✓			
	DerA025	21/5/2010		✓		✓			✓		
	DerA026	21/5/2010		✓		✓					✓
	DerA027	21/5/2010	✓			✓		✓			
	DerA028	21/5/2010	✓			✓				✓	
	DerA029	21/5/2010	✓			✓					✓
	DerA030	22/5/2010		✓		✓		✓			
	DerA031	22/5/2010		✓		✓					✓
	DerA032	22/5/2010		✓	✓					✓	
	DerA033	22/5/2010	✓			✓		✓			
	DerA034	23/5/2010		✓		✓		✓			
	DerA035	23/5/2010		✓		✓			✓		
	DerA036	23/5/2010		✓	✓				✓		
	DerA037	23/5/2010	✓			✓			✓		
	DerA038	23/5/2010	✓			✓				✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA039	23/5/2010	✓		✓				✓		
	DerA040	24/5/2010		✓		✓	✓				
	DerA041	24/5/2010		✓		✓		✓			
	DerA042	24/5/2010		✓		✓			✓		
	DerA043	24/5/2010		✓		✓				✓	
	DerA044	24/5/2010		✓		✓					✓
	DerA045	24/5/2010		✓	✓					✓	
	DerA046	24/5/2010	✓			✓		✓			
	DerA047	24/5/2010	✓			✓			✓		
	DerA048	24/5/2010	✓			✓					✓
	DerA049	25/5/2010		✓		✓		✓			
	DerA050	25/5/2010		✓		✓					✓
	DerA051	25/5/2010		✓	✓				✓		
	DerA052	25/5/2010		✓	✓					✓	
	DerA053	25/5/2010	✓			✓		✓			
	DerA054	25/5/2010	✓			✓			✓		
	DerA055	25/5/2010	✓			✓				✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA056	25/5/2010	✓			✓					✓
	DerA057	26/5/2010		✓		✓		✓			
	DerA058	26/5/2010		✓		✓			✓		
	DerA059	26/5/2010		✓		✓					✓
	DerA060	26/5/2010	✓			✓		✓			
	DerA061	26/5/2010	✓			✓			✓		
	DerA062	26/5/2010	✓			✓				✓	
	DerA063	26/5/2010	✓			✓					✓
	DerA064	28/5/2010		✓		✓		✓			
	DerA065	28/5/2010		✓		✓			✓		
	DerA066	28/5/2010		✓		✓					✓
	DerA067	28/5/2010	✓			✓		✓			
	DerA068	28/5/2010	✓			✓			✓		
	DerA069	28/5/2010	✓			✓				✓	
	DerA070	28/5/2010	✓			✓					✓
	DerA071	28/5/2010	✓		✓			✓			
	DerA072	28/5/2010	✓		✓				✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA073	28/5/2010	✓		✓					✓	
	DerA074	31/5/2010		✓		✓		✓			
	DerA075	31/5/2010		✓		✓					✓
	DerA076	31/5/2010		✓	✓				✓		
	DerA077	31/5/2010	✓			✓		✓			
	DerA078	31/5/2010	✓			✓			✓		
	DerA079	31/5/2010	✓		✓					✓	
	DerA080	5/6/2010		✓		✓		✓			
	DerA081	5/6/2010		✓		✓			✓		
	DerA082	5/6/2010	✓			✓	✓				
	DerA083	5/6/2010	✓			✓		✓			
	DerA084	5/6/2010	✓			✓			✓		
	DerA085	5/6/2010	✓			✓				✓	
	DerA086	5/6/2010	✓			✓					✓
	DerA087	5/6/2010	✓		✓			✓			
	DerA088	12/6/2010		✓		✓		✓			
	DerA089	12/6/2010		✓		✓			✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (D. maculatus)	DerA090	12/6/2010	✓			✓		✓			
	DerA091	12/6/2010	✓			✓			✓		
	DerA092	12/6/2010	✓			✓				✓	
	DerA093	12/6/2010	✓			✓					✓
	DerA094	26/6/2010		✓		✓		✓			
	DerA095	26/6/2010		✓		✓			✓		
	DerA096	26/6/2010		✓		✓				✓	
	DerA097	26/6/2010		✓	✓				✓		
	DerA098	26/6/2010	✓			✓		✓			
	DerA099	17/7/2010		✓		✓		✓			
	DerA100	17/7/2010		✓		✓			✓		
	DerA101	17/7/2010		✓		✓					✓
	DerA102	14/8/2010		✓		✓					✓
	DerA103	14/8/2010	✓			✓					✓
Coleoptera: Scarabaeidae (*Coprophanaeus* sp.)	ScaA001	20/5/2010	✓		✓				✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*O. tricornis*)	ScaB001	17/5/2010		✓	✓			✓			
	ScaB002	17/5/2010	✓			✓					✓
	ScaB003	18/5/2010		✓		✓					✓
	ScaB004	18/5/2010		✓	✓					✓	
	ScaB005	19/5/2010	✓		✓				✓		
	ScaB006	20/5/2010	✓			✓					✓
	ScaB007	21/5/2010		✓		✓		✓			
	ScaB008	21/5/2010		✓		✓			✓		
	ScaB009	21/5/2010	✓		✓			✓			
	ScaB010	22/5/2010	✓		✓			✓			
	ScaB011	23/5/2010		✓		✓					✓
	ScaB012	23/5/2010		✓	✓			✓			
	ScaB013	23/5/2010		✓	✓					✓	
	ScaB014	23/5/2010	✓			✓					✓
	ScaB015	23/5/2010	✓		✓				✓		
	ScaB016	24/5/2010		✓		✓					✓
	ScaB017	24/5/2010		✓	✓				✓		

Table 4.15 (Cont.) database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (O. tricornis)	ScaB018	24/5/2010	✓		✓			✓			
	ScaB019	25/5/2010		✓		✓					✓
	ScaB020	25/5/2010	✓		✓			✓			
	ScaB021	26/5/2010		✓	✓					✓	
	ScaB022	28/5/2010	✓		✓					✓	
	ScaB023	5/6/2010	✓			✓					✓
	ScaB024	5/6/2010	✓		✓			✓			
	ScaB025	12/6/2010		✓	✓				✓		
	ScaB026	26/6/2010		✓		✓					✓
	ScaB027	26/6/2010		✓	✓				✓		
	ScaB028	26/6/2010	✓			✓			✓		
	ScaB029	26/6/2010	✓			✓				✓	
	ScaB030	26/6/2010	✓		✓				✓		
	ScaB031	17/7/2010	✓			✓		✓			
	ScaB032	17/7/2010	✓			✓			✓		

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*Onthophagus* sp.)	ScaC001	16/5/2010	✓			✓					✓
	ScaC002	16/5/2010	✓		✓			✓			
	ScaC003	17/5/2010	✓		✓					✓	
	ScaC004	19/5/2010	✓		✓				✓		
	ScaC005	20/5/2010	✓			✓					✓
	ScaC006	20/5/2010	✓		✓				✓		
	ScaC007	21/5/2010	✓			✓					✓
	ScaC008	21/5/2010	✓		✓			✓			
	ScaC009	21/5/2010	✓		✓					✓	
	ScaC010	22/5/2010		✓	✓			✓			
	ScaC011	22/5/2010		✓	✓				✓		
	ScaC012	22/5/2010	✓			✓					✓
	ScaC013	22/5/2010	✓		✓			✓			
	ScaC014	23/5/2010		✓		✓					✓
	ScaC015	23/5/2010		✓	✓				✓		
	ScaC016	23/5/2010		✓	✓					✓	
	ScaC017	23/5/2010	✓			✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*Onthophagus* sp.)	ScaC018	23/5/2010	✓		✓			✓			
	ScaC019	23/5/2010	✓		✓					✓	
	ScaC020	24/5/2010		✓	✓			✓			
	ScaC021	24/5/2010		✓	✓				✓		
	ScaC022	24/5/2010		✓	✓					✓	
	ScaC023	24/5/2010	✓			✓					✓
	ScaC024	24/5/2010	✓		✓				✓		
	ScaC025	25/5/2010		✓		✓					✓
	ScaC026	25/5/2010		✓	✓			✓			
	ScaC027	25/5/2010		✓	✓				✓		
	ScaC028	25/5/2010		✓	✓					✓	
	ScaC029	25/5/2010	✓			✓					✓
	ScaC030	26/5/2010		✓		✓					✓
	ScaC031	26/5/2010		✓	✓				✓		
	ScaC032	26/5/2010		✓	✓					✓	
	ScaC033	28/5/2010		✓		✓					✓
	ScaC034	28/5/2010		✓	✓			✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*Onthophagus* sp.)	ScaC035	28/5/2010		✓	✓				✓		
	ScaC036	31/5/2010		✓	✓					✓	
	ScaC037	5/6/2010		✓	✓				✓		
	ScaC038	5/6/2010		✓	✓					✓	
	ScaC039	5/6/2010	✓			✓					✓
	ScaC040	12/6/2010		✓		✓					✓
	ScaC041	26/6/2010		✓		✓					✓
	ScaC042	26/6/2010		✓	✓			✓			
	ScaC043	26/6/2010		✓	✓				✓		
	ScaC044	26/6/2010		✓	✓					✓	
	ScaC045	26/6/2010	✓			✓			✓		
	ScaC046	26/6/2010	✓			✓				✓	
	ScaC047	26/6/2010	✓		✓				✓		
	ScaC048	17/7/2010	✓			✓		✓			
	ScaC049	17/7/2010	✓			✓			✓	✓	
	ScaC050	17/7/2010	✓			✓					
	ScaC051	17/7/2010	✓		✓				✓		
	ScaC052	14/8/2010	✓			✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Trogidae (*Polynonchus* sp.)	TroA001	17/5/2010		✓	✓					✓	
	TroA002	20/5/2010	✓			✓					✓
	TroA003	12/6/2010		✓		✓					✓
	TroA004	12/6/2010	✓		✓					✓	
	TroA005	26/6/2010	✓		✓				✓		
	TroA006	17/7/2010	✓		✓					✓	
	TroA007	14/8/2010	✓		✓				✓		
Coleoptera: Trogidae (*A. chinensis*)	TroB001	20/5/2010	✓			✓					✓
	TroB002	5/6/2010	✓			✓					✓
	TroB003	5/6/2010	✓		✓				✓		
	TroB004	12/6/2010	✓			✓					✓
	TroB005	12/6/2010	✓		✓					✓	
	TroB006	26/6/2010	✓			✓			✓		
	TroB007	17/7/2010	✓		✓				✓		
Coleoptera: Staphylinidae (Unidentified 1)	StaA001	28/5/2010	✓			✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Staphylinidae (Unidentified 3)	StaC001	21/5/2010	✓			✓					✓
	StaC002	22/5/2010		✓	✓			✓			
	StaC003	22/5/2010		✓	✓				✓		
	StaC004	22/5/2010	✓		✓			✓			
	StaC005	23/5/2010		✓		✓					✓
	StaC006	23/5/2010		✓	✓					✓	
	StaC007	23/5/2010	✓			✓					✓
	StaC008	24/5/2010		✓	✓					✓	
	StaC009	24/5/2010	✓		✓			✓			
	StaC010	25/5/2010		✓		✓				✓	
	StaC011	25/5/2010		✓		✓					✓
	StaC012	25/5/2010		✓	✓					✓	
	StaC013	25/5/2010	✓			✓					✓
	StaC014	25/5/2010	✓		✓			✓			
	StaC015	25/5/2010	✓		✓				✓		
	StaC016	26/5/2010		✓		✓					✓
	StaC017	26/5/2010	✓		✓			✓			
	StaC018	28/5/2010		✓		✓					✓
	StaC019	31/5/2010		✓	✓					✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA001	16/5/2010	✓			✓	✓				
	HisA002	16/5/2010	✓			✓					✓
	HisA003	16/5/2010	✓		✓			✓			
	HisA004	16/5/2010	✓		✓					✓	
	HisA005	17/5/2010		✓		✓			✓		
	HisA006	17/5/2010		✓		✓					✓
	HisA007	17/5/2010		✓	✓			✓			
	HisA008	17/5/2010		✓	✓					✓	
	HisA009	17/5/2010	✓			✓					✓
	HisA010	17/5/2010	✓		✓					✓	
	HisA011	18/5/2010		✓		✓					✓
	HisA012	18/5/2010		✓	✓					✓	
	HisA013	18/5/2010	✓			✓	✓				
	HisA014	18/5/2010	✓			✓					✓
	HisA015	18/5/2010	✓		✓			✓			
	HisA016	18/5/2010	✓		✓					✓	
	HisA017	19/5/2010		✓		✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA018	19/5/2010		✓	✓			✓			
	HisA019	19/5/2010		✓	✓				✓		
	HisA020	19/5/2010	✓			✓					✓
	HisA021	19/5/2010	✓		✓				✓		
	HisA022	20/5/2010		✓		✓					✓
	HisA023	20/5/2010	✓		✓			✓			
	HisA024	20/5/2010	✓		✓					✓	
	HisA025	21/5/2010	✓			✓					✓
	HisA026	22/5/2010		✓	✓			✓			
	HisA027	22/5/2010	✓			✓		✓			
	HisA028	22/5/2010	✓			✓					✓
	HisA029	22/5/2010	✓		✓				✓		
	HisA030	23/5/2010	✓			✓				✓	
	HisA031	23/5/2010	✓			✓					✓
	HisA032	23/5/2010	✓		✓			✓			
	HisA033	23/5/2010	✓		✓				✓		
	HisA034	23/5/2010	✓		✓					✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (Pachylister sp.)	HisA035	24/5/2010	✓			✓					✓
	HisA036	24/5/2010	✓		✓			✓			
	HisA037	24/5/2010	✓		✓				✓		
	HisA038	25/5/2010	✓			✓					✓
	HisA039	26/5/2010	✓		✓			✓			
	HisA040	26/5/2010	✓		✓				✓		
	HisA041	26/5/2010	✓		✓					✓	
	HisA042	27/5/2010	✓			✓					✓
	HisA043	5/6/2010	✓		✓				✓		
	HisA044	12/6/2010	✓		✓				✓		
	HisA045	26/6/2010	✓			✓		✓			
	HisA046	26/6/2010	✓			✓				✓	
	HisA047	14/8/2010		✓		✓					✓
Coleoptera: (Hybosoridae (*P. emarginatus*)	HybA001	16/5/2010	✓			✓					✓
	HybA002	16/5/2010	✓		✓					✓	
	HybA003	17/5/2010		✓		✓					✓
	HybA004	17/5/2010		✓	✓			✓			

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: (Hybosoridae (*P. emarginatus*)	HybA005	17/5/2010	✓		✓				✓		
	HybA006	18/5/2010		✓	✓			✓			
	HybA007	18/5/2010		✓	✓				✓		
	HybA008	18/5/2010		✓	✓					✓	
	HybA009	18/5/2010	✓			✓					✓
	HybA010	18/5/2010	✓		✓			✓			
	HybA011	18/5/2010	✓		✓					✓	
	HybA012	19/5/2010		✓		✓					✓
	HybA013	19/5/2010		✓	✓			✓			
	HybA014	19/5/2010		✓	✓				✓		
	HybA015	19/5/2010		✓	✓					✓	
	HybA016	19/5/2010	✓			✓					✓
	HybA017	19/5/2010	✓		✓				✓		
	HybA018	19/5/2010	✓		✓					✓	
	HybA019	20/5/2010		✓	✓			✓			
	HybA020	20/5/2010		✓	✓					✓	
	HybA021	20/5/2010	✓			✓					✓

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: (Hybosoridae (*P. emarginatus*)	HybA022	20/5/2010	✓		✓			✓			
	HybA023	20/5/2010	✓		✓				✓		
	HybA024	20/5/2010	✓		✓					✓	
	HybA025	21/5/2010	✓			✓					✓
	HybA026	21/5/2010	✓		✓			✓			
	HybA027	21/5/2010	✓		✓				✓		
	HybA028	21/5/2010	✓		✓					✓	
	HybA029	22/5/2010	✓			✓					✓
	HybA030	22/5/2010	✓		✓				✓		
	HybA031	22/5/2010	✓		✓					✓	
	HybA032	23/5/2010	✓			✓				✓	
	HybA033	23/5/2010	✓		✓			✓			
	HybA034	23/5/2010	✓		✓				✓		
	HybA035	23/5/2010	✓		✓					✓	
	HybA036	24/5/2010		✓	✓					✓	
	HybA037	24/5/2010	✓			✓					✓
	HybA038	24/5/2010	✓		✓					✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: (Hybosoridae (*P. emarginatus*)	HybA039	25/5/2010	✓			✓					✓
	HybA040	25/5/2010	✓		✓			✓			
	HybA041	25/5/2010	✓		✓				✓		
	HybA042	25/5/2010	✓		✓					✓	
	HybA043	26/5/2010	✓			✓		✓			
	HybA044	26/5/2010	✓			✓					✓
	HybA045	26/5/2010	✓		✓			✓			
	HybA046	26/5/2010	✓		✓				✓		
	HybA047	26/5/2010	✓		✓					✓	
	HybA048	28/5/2010	✓			✓					✓
	HybA049	28/5/2010	✓		✓			✓			
	HybA050	28/5/2010	✓		✓				✓		
	HybA051	28/5/2010	✓		✓					✓	
	HybA052	31/5/2010	✓			✓					✓
	HybA053	5/6/2010	✓		✓			✓			
	HybA054	5/6/2010	✓		✓				✓		
	HybA055	5/6/2010	✓		✓					✓	

Table 4.15 (Cont.) Database of carrion arthropods in monsoon wet season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Silphidae (*N. luciae*)	SilA001	17/5/2010	✓			✓	✓				
Coleoptera: Cicindelidae (Unidentified 1)	CicA001	21/5/2010		✓		✓	✓				
Coleoptera: Chrysomelidae (Unidentified 1)	ChrA001	23/5/2010		✓		✓	✓				
Coleoptera: Chrysomelidae (*Danacia* sp.)	ChrB001	20/5/2010	✓		✓					✓	
Coleoptera: Chrysomelidae (*P. pereginus*)	ChrD001	17/5/2010	✓		✓		✓				

Table 4.16 Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA029	21/10/2010	✓			✓	✓				
	CalA030	22/10/2010		✓		✓	✓				
	CalA031	22/10/2010		✓	✓		✓				
	CalA032	22/10/2010	✓			✓	✓				
	CalA033	23/10/2010	✓			✓	✓				
	CalA034	23/10/2010	✓		✓		✓				
	CalA035	24/10/2010		✓		✓	✓				
	CalA036	24/10/2010		✓	✓		✓				
	CalA037	24/10/2010	✓			✓	✓				
	CalA038	24/10/2010	✓		✓		✓				
	CalA039	25/10/2010		✓		✓	✓				
	CalA040	25/10/2010		✓	✓		✓				
	CalA041	25/10/2010	✓			✓	✓				
	CalA042	25/10/2010	✓		✓		✓				
	CalA043	26/10/2010		✓		✓	✓				
	CalA044	26/10/2010		✓	✓		✓				
	CalA045	26/10/2010	✓			✓	✓				
	CalA046	26/10/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA047	27/10/2010		✓		✓	✓				
	CalA048	27/10/2010	✓			✓	✓				
	CalA049	27/10/2010	✓		✓		✓				
	CalA050	28/10/2010	✓		✓		✓				
	CalA051	29/10/2010	✓			✓	✓				
	CalA052	30/10/2010		✓		✓	✓				
	CalA053	30/10/2010		✓	✓		✓				
	CalA054	1/11/2010		✓		✓	✓				
	CalA055	1/11/2010		✓	✓			✓			
	CalA056	1/11/2010		✓	✓				✓		
	CalA057	1/11/2010		✓	✓					✓	
	CalA058	1/11/2010	✓			✓	✓				
	CalA059	1/11/2010	✓			✓					✓
	CalA060	2/11/2010		✓		✓	✓				
	CalA061	2/11/2010		✓	✓		✓				
	CalA062	2/11/2010		✓	✓			✓			
	CalA063	2/11/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA064	2/11/2010	✓		✓			✓			
	CalA065	2/11/2010	✓		✓				✓		
	CalA066	2/11/2010	✓		✓					✓	
	CalA067	3/11/2010		✓		✓	✓				
	CalA068	3/11/2010		✓		✓					✓
	CalA069	3/11/2010		✓	✓		✓				
	CalA070	3/11/2010	✓			✓	✓				
	CalA071	3/11/2010	✓			✓					✓
	CalA072	3/11/2010	✓		✓		✓				
	CalA073	3/11/2010	✓		✓					✓	
	CalA074	4/11/2010		✓		✓					✓
	CalA075	4/11/2010		✓	✓			✓			
	CalA076	4/11/2010		✓	✓				✓		
	CalA077	4/11/2010		✓	✓					✓	
	CalA078	4/11/2010	✓			✓			✓		
	CalA079	4/11/2010	✓			✓					✓
	CalA080	4/11/2010	✓		✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (C. megacephala)	CalA081	6/11/2010		✓		✓				✓	
	CalA082	6/11/2010		✓		✓					✓
	CalA083	6/11/2010	✓		✓			✓			
	CalA084	6/11/2010	✓		✓				✓		
	CalA085	13/11/2010	✓			✓	✓				
Diptera: Caliphoridae (*C. bezziana*)	CalB004	23/10/2010	✓			✓	✓				
	CalB005	23/10/2010	✓		✓		✓				
	CalB006	24/10/2010		✓		✓	✓				
	CalB007	25/10/2010		✓		✓	✓				
	CalB008	26/10/2010	✓			✓	✓				
	CalB009	1/11/2010	✓			✓	✓				
	CalB010	1/11/2010	✓		✓		✓				
	CalB011	2/11/2010		✓	✓		✓				
	CalB012	2/11/2010	✓			✓	✓				
	CalB013	2/11/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. nigripes*)	CalC010	23/10/2010	✓			✓	✓				
	CalC011	23/10/2010	✓		✓		✓				
	CalC012	24/10/2010		✓		✓	✓				
	CalC013	24/10/2010		✓	✓		✓				
	CalC014	25/10/2010		✓		✓	✓				
	CalC015	25/10/2010	✓			✓	✓				
	CalC016	25/10/2010	✓		✓		✓				
	CalC017	26/10/2010		✓		✓	✓				
	CalC018	26/10/2010	✓			✓	✓				
	CalC019	26/10/2010	✓		✓		✓				
	CalC020	27/10/2010	✓			✓	✓				
	CalC021	27/10/2010	✓		✓		✓				
	CalC022	29/10/2010	✓		✓		✓				
	CalC023	2/11/2010	✓			✓	✓				
	CalC024	2/11/2010	✓			✓					✓
	CalC025	3/11/2010	✓			✓	✓				
	CalC026	6/11/2010		✓		✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. nigripes*)	CalC010	23/10/2010	✓			✓	✓				
	CalC011	23/10/2010	✓		✓		✓				
	CalC012	24/10/2010		✓		✓	✓				
	CalC013	24/10/2010		✓	✓		✓				
	CalC014	25/10/2010		✓		✓	✓				
	CalC015	25/10/2010	✓			✓	✓				
	CalC016	25/10/2010	✓		✓		✓				
	CalC017	26/10/2010		✓		✓	✓				
	CalC018	26/10/2010	✓			✓	✓				
	CalC019	26/10/2010	✓		✓		✓				
	CalC020	27/10/2010	✓			✓	✓				
	CalC021	27/10/2010	✓		✓		✓				
	CalC022	29/10/2010	✓		✓		✓				
	CalC023	2/11/2010	✓			✓	✓				
	CalC024	2/11/2010	✓			✓					✓
	CalC025	3/11/2010	✓			✓	✓				
	CalC026	6/11/2010		✓		✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. thanomthini*)	CalD002	1/11/2010	✓			✓	✓				
Diptera: Caliphoridae (*A. rufifacies*)	CalE018	21/10/2010	✓			✓	✓				
	CalE019	23/10/2010		✓		✓	✓				
	CalE020	23/10/2010	✓			✓	✓				
	CalE021	24/10/2010		✓		✓	✓				
	CalE022	24/10/2010		✓	✓		✓				
	CalE023	24/10/2010	✓			✓	✓				
	CalE024	24/10/2010	✓		✓		✓				
	CalE025	25/10/2010		✓		✓	✓				
	CalE026	25/10/2010		✓	✓		✓				
	CalE027	25/10/2010	✓			✓	✓				
	CalE028	25/10/2010	✓		✓		✓				
	CalE029	25/10/2010	✓		✓				✓		
	CalE030	26/10/2010		✓		✓	✓				
	CalE031	26/10/2010	✓			✓	✓				
	CalE032	27/10/2010		✓		✓	✓				
	CalE033	27/10/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE034	27/10/2010	✓		✓		✓				
	CalE035	28/10/2010	✓		✓		✓				
	CalE036	29/10/2010		✓		✓	✓				
	CalE037	30/10/2010		✓	✓		✓				
	CalE038	30/10/2010		✓	✓				✓		
	CalE039	1/11/2010		✓	✓					✓	
	CalE040	1/11/2010		✓		✓	✓				
	CalE041	1/11/2010	✓			✓	✓				
	CalE042	2/11/2010		✓		✓	✓				
	CalE043	2/11/2010		✓		✓					✓
	CalE044	2/11/2010		✓	✓		✓				
	CalE045	2/11/2010	✓			✓	✓				
	CalE046	2/11/2010	✓			✓					✓
	CalE047	3/11/2010		✓		✓	✓				
	CalE048	3/11/2010		✓		✓					✓
	CalE049	3/11/2010		✓	✓		✓				
	CalE050	3/11/2010		✓	✓			✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE051	3/11/2010		✓	✓				✓		
	CalE052	3/11/2010		✓	✓					✓	
	CalE053	3/11/2010	✓			✓	✓				
	CalE054	3/11/2010	✓			✓				✓	
	CalE055	3/11/2010	✓		✓		✓				
	CalE056	4/11/2010		✓		✓	✓				
	CalE057	4/11/2010		✓		✓		✓			
	CalE058	4/11/2010		✓		✓				✓	
	CalE059	4/11/2010		✓		✓					✓
	CalE060	4/11/2010		✓	✓		✓				
	CalE061	4/11/2010		✓	✓			✓			
	CalE062	4/11/2010		✓	✓				✓		
	CalE063	4/11/2010		✓	✓					✓	
	CalE064	4/11/2010	✓			✓	✓				
	CalE065	4/11/2010	✓			✓		✓			
	CalE066	4/11/2010	✓			✓			✓		
	CalE067	4/11/2010	✓			✓				✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE068	6/11/2010		✓		✓	✓				
	CalE069	6/11/2010		✓		✓		✓			
	CalE070	6/11/2010		✓		✓			✓		
	CalE071	6/11/2010		✓		✓				✓	
	CalE072	6/11/2010		✓		✓					✓
	CalE073	6/11/2010		✓	✓		✓				
	CalE074	6/11/2010		✓	✓			✓			
	CalE075	6/11/2010		✓	✓			✓			
	CalE076	6/11/2010		✓	✓						✓
	CalE077	6/11/2010	✓			✓	✓				
	CalE078	6/11/2010	✓			✓					✓
	CalE079	6/11/2010	✓		✓		✓				
	CalE080	6/11/2010	✓		✓			✓			
	CalE081	6/11/2010	✓		✓				✓		
	CalE082	6/11/2010	✓		✓					✓	
	CalE083	13/11/2010		✓		✓					✓
	CalE084	13/11/2010		✓	✓				✓		
	CalE085	13/11/2010	✓		✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. villeneuvi*)	CalF003	3/11/2010	✓		✓		✓				
	CalF004	4/11/2010		✓		✓	✓				
	CalF005	4/11/2010	✓		✓		✓				
	CalF006	4/11/2010	✓			✓	✓				
	CalF007	6/11/2010	✓			✓	✓				
	CalF008	13/11/2010	✓		✓		✓				
Diptera: Caliphoridae (*L. cuprina*)	CalG002	22/10/2010	✓			✓	✓				
	CalG003	23/10/2010		✓		✓	✓				
	CalG004	23/10/2010	✓			✓	✓				
	CalG005	24/10/2010	✓			✓	✓				
	CalG006	25/10/2010	✓		✓		✓				
Diptera: Caliphoridae (*H. infumata*)	CalH003	23/10/2010	✓		✓		✓				
	CalH004	24/10/2010		✓		✓	✓				
	CalH005	24/10/2010	✓		✓		✓				
Diptera: Caliphoridae (*C. pinguis*)	CalI001	27/10/2010	✓			✓	✓				
	CalI002	3/11/2010	✓			✓	✓				
	CalI003	3/11/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. Chani*)	CalJ001	22/10/2010	✓			✓	✓				
	CalJ002	22/10/2010	✓		✓		✓				
	CalJ003	29/10/2010	✓			✓	✓				
	CalJ004	2/11/2010	✓			✓	✓				
	CalJ005	3/11/2010	✓		✓		✓				
Diptera: Muscidae (*H. spinigera*)	MusA0015	22/10/2010		✓		✓	✓				
	MusA0016	22/10/2010	✓			✓	✓				
	MusA0017	22/10/2010	✓		✓		✓				
	MusA0018	23/10/2010		✓	✓		✓				
	MusA0019	23/10/2010	✓			✓	✓				
	MusA0020	24/10/2010		✓	✓		✓				
	MusA0021	24/10/2010		✓		✓	✓				
	MusA0022	24/10/2010	✓		✓		✓				
	MusA0023	24/10/2010	✓			✓	✓				
	MusA0024	25/10/2010		✓	✓		✓				
	MusA0025	25/10/2010		✓		✓	✓				
	MusA0026	25/10/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*H. spinigera*)	MusA0027	25/10/2010	✓			✓	✓				
	MusA0028	26/10/2010		✓	✓		✓				
	MusA0029	26/10/2010		✓		✓	✓				
	MusA0030	26/10/2010	✓		✓		✓				
	MusA0031	26/10/2010	✓			✓	✓				
	MusA0032	27/10/2010		✓	✓		✓				
	MusA0033	27/10/2010		✓		✓	✓				
	MusA0034	27/10/2010	✓		✓		✓				
	MusA0035	27/10/2010	✓			✓	✓				
	MusA0036	28/10/2010		✓	✓		✓				
	MusA0037	28/10/2010		✓		✓	✓				
	MusA0038	28/10/2010	✓			✓	✓				
	MusA0039	29/10/2010		✓		✓	✓				
	MusA0040	29/10/2010	✓			✓	✓				
	MusA0041	29/10/2010	✓		✓		✓				
	MusA0042	30/10/2010		✓		✓	✓				
	MusA0043	30/10/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*H. spinigera*)	MusA0044	1/11/2010	✓			✓	✓				
	MusA0045	2/11/2010	✓		✓		✓				
	MusA0046	3/11/2010	✓			✓	✓				
	MusA0047	3/11/2010	✓		✓		✓				
	MusA0048	4/11/2010		✓		✓	✓				
	MusA0049	4/11/2010	✓		✓		✓				
	MusA0050	4/11/2010	✓			✓	✓				
	MusA0051	6/11/2010	✓			✓	✓				
	MusA0052	13/11/2010	✓			✓	✓				
	MusA0053	13/11/2010	✓		✓		✓				
	MusA0054	4/12/2010		✓		✓	✓				
	MusA0055	4/12/2010		✓	✓		✓				
	MusA0056	14/1/2011	✓			✓					✓
Diptera: Muscidae (M. domestica)	MusB021	24/10/2010	✓			✓	✓				
	MusB022	25/10/2010	✓			✓	✓				
	MusB023	26/10/2010		✓	✓		✓				
	MusB024	27/10/2010		✓	✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*M. domestica*)	MusB025	28/10/2010		✓		✓	✓				
	MusB026	6/11/2010		✓	✓		✓				
	MusB027	6/11/2010	✓		✓		✓				
	MusB028	14/1/2011	✓			✓					✓
	MusB029	14/1/2011	✓		✓		✓				
Diptera: Muscidae (*Atherigona* sp.1)	MusD011	21/10/2010	✓			✓	✓				
	MusD012	21/10/2010	✓		✓		✓				
	MusD013	22/10/2010	✓			✓	✓				
	MusD014	22/10/2010	✓		✓		✓				
	MusD015	22/10/2010		✓		✓	✓				
	MusD016	23/10/2010	✓		✓		✓				
	MusD017	23/10/2010	✓			✓	✓				
	MusD018	23/10/2010		✓	✓		✓				
	MusD019	23/10/2010		✓		✓	✓				
	MusD020	24/10/2010		✓		✓	✓				
	MusD021	24/10/2010		✓	✓		✓				
	MusD022	24/10/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Atherigona* sp.1)	MusD023	25/10/2010	✓		✓		✓				
	MusD024	25/10/2010	✓			✓	✓				
	MusD025	25/10/2010		✓	✓		✓				
	MusD026	25/10/2010		✓		✓	✓				
	MusD027	26/10/2010	✓		✓		✓				
	MusD028	26/10/2010	✓			✓	✓				
	MusD029	26/10/2010		✓	✓		✓				
	MusD030	26/10/2010		✓		✓	✓				
	MusD031	27/10/2010	✓		✓		✓				
	MusD032	27/10/2010	✓			✓	✓				
	MusD033	27/10/2010		✓	✓		✓				
	MusD034	27/10/2010		✓		✓	✓				
	MusD035	28/10/2010	✓		✓		✓				
	MusD036	28/10/2010	✓			✓	✓				
	MusD037	28/10/2010		✓	✓		✓				
	MusD038	28/10/2010		✓		✓	✓				
	MusD039	29/10/2010	✓		✓		✓				
	MusD040	29/10/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Atherigona* sp.1)	MusD041	29/10/2010		✓	✓		✓				
	MusD042	29/10/2010		✓		✓	✓				
	MusD043	30/10/2010		✓	✓		✓				
	MusD044	30/10/2010		✓		✓	✓				
	MusD045	30/10/2010	✓		✓		✓				
	MusD046	30/10/2010	✓			✓	✓				
	MusD047	1/11/2010		✓	✓		✓				
	MusD048	1/11/2010		✓		✓	✓				
	MusD049	1/11/2010	✓		✓		✓				
	MusD050	1/11/2010	✓			✓	✓				
	MusD051	2/11/2010		✓	✓		✓				
	MusD052	2/11/2010		✓		✓	✓				
	MusD053	2/11/2010	✓		✓		✓				
	MusD054	2/11/2010	✓			✓	✓				
	MusD055	25/12/2010	✓			✓	✓				
Diptera: Muscidae (*S. nudiseta*)	MusE003	29/10/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (Musca sp.1)	MusF004	25/10/2010	✓			✓	✓				
	MusF005	26/10/2010		✓		✓	✓				
	MusF006	26/10/2010	✓			✓	✓				
	MusF007	27/10/2010		✓	✓		✓				
	MusF008	27/10/2010		✓		✓	✓				
	MusF009	27/10/2010	✓		✓		✓				
	MusF010	27/10/2010	✓			✓	✓				
	MusF011	28/10/2010	✓		✓		✓				
	MusF012	28/10/2010	✓			✓	✓				
	MusF013	28/10/2010		✓	✓		✓				
	MusF014	28/10/2010		✓		✓	✓				
	MusF015	29/10/2010		✓	✓		✓				
	MusF016	29/10/2010		✓		✓	✓				
	MusF017	30/10/2010	✓		✓		✓				
	MusF018	30/10/2010	✓			✓	✓				
	MusF019	1/11/2010	✓			✓	✓				
	MusF020	2/11/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Musca* sp.1)	MusF021	2/11/2010	✓			✓	✓				
	MusF022	3/11/2010	✓			✓	✓				
	MusF023	3/11/2010	✓			✓					✓
	MusF024	6/11/2010	✓		✓		✓				
	MusF025	6/11/2010	✓			✓	✓				
	MusF026	25/12/2010	✓			✓	✓				
Diptera: Sarcophagidae (*S. dux*)	SarA0016	23/10/2010		✓	✓		✓				
	SarA0017	25/10/2010	✓		✓		✓				
	SarA0018	26/10/2010	✓			✓	✓				
	SarA0019	27/10/2010	✓		✓		✓				
	SarA0020	27/10/2010	✓			✓	✓				
	SarA0021	28/10/2010		✓		✓	✓				
	SarA0022	28/10/2010	✓			✓	✓				
	SarA0023	29/10/2010	✓		✓		✓				
	SarA0024	29/10/2010	✓			✓	✓				
	SarA0025	30/10/2010	✓			✓	✓				
	SarA0026	30/10/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. dux*)	SarA0027	1/11/2010	✓		✓		✓				
	SarA0028	2/11/2010	✓			✓	✓				
	SarA0029	2/11/2010	✓		✓		✓				
	SarA0030	3/11/2010	✓			✓	✓				
	SarA0031	25/12/2010	✓		✓		✓				
	SarA0032	25/12/2010	✓			✓	✓				
	SarA0033	14/1/2011	✓		✓		✓				
	SarA0034	14/1/2011	✓			✓	✓				
Diptera: Sarcophagidae (*S. peregrina*)	SarB011	21/10/2010	✓			✓	✓				
	SarB012	21/10/2010	✓		✓		✓				
	SarB013	22/10/2010	✓			✓	✓				
	SarB014	23/10/2010	✓			✓	✓				
	SarB015	24/10/2010		✓		✓	✓				
	SarB016	24/10/2010		✓	✓		✓				
	SarB017	25/10/2010	✓			✓	✓				
	SarB018	26/10/2010	✓			✓	✓				
	SarB019	27/10/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. peregrina*)	SarB020	27/10/2010	✓		✓		✓				
	SarB021	29/10/2010	✓			✓	✓				
	SarB022	30/10/2010	✓			✓	✓				
	SarB023	1/11/2010	✓			✓	✓				
	SarB024	1/11/2010	✓		✓		✓				
	SarB025	2/11/2010	✓			✓	✓				
	SarB026	2/11/2010	✓		✓		✓				
	SarB027	4/11/2010	✓			✓	✓				
	SarB028	4/11/2010	✓		✓		✓				
	SarB029	13/11/2010	✓		✓		✓				
	SarB030	4/12/2010	✓			✓	✓				
	SarB031	25/12/2010	✓			✓	✓				
	SarB032	14/1/2011	✓			✓	✓				
Diptera: Sarcophagidae (*S. ruficornis*)	SarC013	22/10/2010	✓			✓	✓				
	SarC014	23/10/2010	✓			✓	✓				
	SarC015	24/10/2010	✓			✓	✓				
	SarC016	25/10/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. ruficornis*)	SarC017	26/10/2010	✓			✓	✓				
	SarC018	27/10/2010	✓			✓	✓				
	SarC019	28/10/2010	✓		✓		✓				
	SarC020	29/10/2010	✓			✓	✓				
	SarC021	29/10/2010	✓		✓		✓				
	SarC022	30/10/2010	✓			✓	✓				
	SarC023	30/10/2010	✓		✓		✓				
	SarC024	1/11/2010	✓			✓	✓				
	SarC025	2/11/2010	✓			✓	✓				
	SarC026	2/11/2010	✓		✓		✓				
	SarC027	3/11/2010	✓			✓	✓				
	SarC028	3/11/2010	✓		✓		✓				
	SarC029	4/11/2010	✓			✓	✓				
	SarC030	4/11/2010	✓		✓		✓				
	SarC031	13/11/2010	✓			✓	✓				
	SarC032	13/11/2010	✓		✓		✓				
	SarC033	4/12/2010	✓		✓		✓				
	SarC034	25/12/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sepsidae (Unidentified)	SepA004	21/10/2010	✓		✓		✓				
	SepA005	21/10/2010	✓			✓	✓				
	SepA006	22/10/2010	✓		✓		✓				
	SepA007	22/10/2010	✓			✓	✓				
	SepA008	23/10/2010	✓			✓	✓				
	SepA009	25/10/2010	✓			✓			✓		
	SepA010	25/10/2010	✓		✓		✓				
	SepA011	26/10/2010		✓	✓		✓				
	SepA012	26/10/2010		✓		✓	✓				
	SepA013	26/10/2010	✓		✓		✓				
	SepA014	26/10/2010	✓			✓	✓				
	SepA015	27/10/2010		✓	✓		✓				
	SepA016	27/10/2010		✓		✓	✓				
	SepA017	27/10/2010	✓		✓		✓				
	SepA018	27/10/2010	✓			✓	✓				
	SepA019	28/10/2010		✓	✓		✓				
	SepA020	28/10/2010		✓		✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sepsidae (Unidentified)	SepA021	28/10/2010	✓			✓	✓				
	SepA022	29/10/2010		✓	✓		✓				
	SepA023	29/10/2010		✓		✓	✓				
	SepA024	29/10/2010	✓		✓		✓				
	SepA025	29/10/2010	✓			✓	✓				
	SepA026	30/10/2010		✓	✓		✓				
	SepA027	30/10/2010		✓		✓	✓				
	SepA028	30/10/2010	✓		✓		✓				
	SepA029	30/10/2010	✓			✓	✓				
	SepA030	1/11/2010		✓	✓		✓				
	SepA031	1/11/2010	✓		✓		✓				
	SepA032	1/11/2010	✓			✓	✓				
	SepA033	2/11/2010	✓		✓		✓				
	SepA034	2/11/2010	✓			✓	✓				
	SepA035	25/12/2010	✓			✓	✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Drosophilidae (*D. melanogaster*)	DroA002	26/10/2010	✓		✓		✓				
	DroA003	29/10/2010	✓		✓		✓				
	DroA004	29/10/2010	✓			✓	✓				
	DroA005	30/10/2010		✓	✓		✓				
	DroA006	30/10/2010	✓		✓		✓				
	DroA007	1/11/2010	✓			✓	✓				
	DroA008	2/11/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Phoridae (Unidentified)	PhoA007	24/10/2010		✓	✓		✓				
	PhoA008	25/10/2010	✓		✓		✓				
	PhoA009	26/10/2010	✓			✓	✓				
	PhoA010	26/10/2010	✓		✓		✓				
	PhoA011	27/10/2010	✓		✓		✓				
	PhoA012	28/10/2010		✓		✓		✓			
	PhoA013	29/10/2010	✓			✓	✓				
	PhoA014	29/10/2010	✓			✓				✓	
	PhoA015	30/10/2010		✓	✓		✓				
	PhoA016	30/10/2010	✓		✓		✓				
	PhoA017	3/11/2010	✓			✓	✓				
	PhoA018	3/11/2010	✓		✓		✓				
	PhoA019	3/11/2010	✓		✓			✓			
	PhoA020	6/11/2010		✓		✓	✓				
	PhoA021	6/11/2010	✓			✓	✓				
	PhoA022	6/11/2010	✓		✓		✓				
	PhoA023	13/11/2010		✓	✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA047	21/10/2010	✓			✓		✓			
	CleA048	21/10/2010	✓			✓		✓			
	CleA049	21/10/2010	✓			✓			✓		
	CleA050	21/10/2010	✓			✓				✓	
	CleA051	22/10/2010		✓		✓		✓			
	CleA052	22/10/2010	✓			✓	✓				
	CleA053	23/10/2010	✓			✓		✓			
	CleA054	23/10/2010	✓			✓			✓		
	CleA055	23/10/2010	✓			✓				✓	
	CleA056	23/10/2010	✓			✓					✓
	CleA057	23/10/2010		✓		✓					✓
	CleA058	23/10/2010		✓	✓				✓		
	CleA059	24/10/2010	✓			✓		✓			
	CleA060	24/10/2010	✓			✓			✓		
	CleA061	24/10/2010	✓			✓				✓	
	CleA062	24/10/2010	✓			✓					✓
	CleA063	24/10/2010	✓		✓				✓		
	CleA064	25/10/2010		✓		✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA065	25/10/2010		✓		✓		✓			
	CleA066	25/10/2010		✓		✓			✓		
	CleA067	25/10/2010	✓		✓			✓			
	CleA068	25/10/2010	✓			✓			✓		
	CleA069	26/10/2010		✓		✓		✓			
	CleA070	26/10/2010		✓		✓			✓		
	CleA071	26/10/2010		✓		✓					✓
	CleA072	26/10/2010	✓			✓		✓			
	CleA073	26/10/2010	✓			✓			✓		
	CleA074	26/10/2010	✓		✓			✓			
	CleA075	26/10/2010	✓		✓				✓		
	CleA076	27/10/2010	✓			✓		✓			
	CleA077	27/10/2010	✓			✓					✓
	CleA078	27/10/2010	✓		✓			✓			
	CleA079	27/10/2010	✓		✓				✓		
	CleA080	27/10/2010		✓		✓		✓			
	CleA081	27/10/2010		✓		✓			✓		
	CleA082	28/10/2010	✓			✓		✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA083	28/10/2010	✓			✓			✓		
	CleA084	28/10/2010	✓			✓				✓	
	CleA085	28/10/2010	✓		✓			✓			
	CleA086	28/10/2010	✓		✓				✓		
	CleA087	28/10/2010	✓		✓					✓	
	CleA088	29/10/2010		✓		✓					✓
	CleA089	29/10/2010		✓		✓				✓	
	CleA090	29/10/2010		✓	✓				✓		
	CleA091	29/10/2010	✓		✓			✓			
	CleA092	29/10/2010	✓		✓					✓	
	CleA093	29/10/2010	✓			✓		✓			
	CleA094	29/10/2010	✓			✓			✓		
	CleA095	29/10/2010	✓			✓				✓	
	CleA096	29/10/2010	✓			✓					✓
	CleA097	30/10/2010		✓		✓		✓			
	CleA098	30/10/2010		✓		✓					✓
	CleA099	30/10/2010	✓			✓		✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA100	30/10/2010	✓			✓					✓
	CleA101	30/10/2010	✓		✓			✓			
	CleA102	30/10/2010	✓		✓				✓		
	CleA103	1/11/2010		✓		✓		✓			
	CleA104	1/11/2010		✓		✓			✓		
	CleA105	1/11/2010		✓		✓				✓	
	CleA106	1/11/2010		✓		✓					✓
	CleA107	1/11/2010		✓	✓			✓			
	CleA108	1/11/2010		✓	✓				✓		
	CleA109	1/11/2010	✓			✓					✓
	CleA110	1/11/2010	✓			✓		✓			
	CleA111	2/11/2010		✓		✓			✓		
	CleA112	2/11/2010		✓		✓				✓	
	CleA113	2/11/2010		✓		✓					✓
	CleA114	2/11/2010		✓	✓				✓		
	CleA115	2/11/2010	✓			✓		✓			
	CleA116	2/11/2010	✓			✓				✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA117	2/11/2010	✓			✓					✓
	CleA118	2/11/2010	✓		✓				✓		
	CleA119	3/11/2010		✓		✓		✓			
	CleA120	3/11/2010		✓		✓			✓		
	CleA121	3/11/2010		✓		✓					✓
	CleA122	3/11/2010		✓	✓			✓			
	CleA123	3/11/2010		✓	✓				✓		
	CleA124	3/11/2010	✓			✓			✓		
	CleA125	3/11/2010	✓			✓					✓
	CleA126	3/11/2010	✓		✓				✓		
	CleA127	4/11/2010		✓		✓		✓			
	CleA128	4/11/2010		✓		✓			✓		
	CleA129	4/11/2010		✓		✓				✓	
	CleA130	4/11/2010		✓		✓					✓
	CleA131	4/11/2010		✓	✓			✓			
	CleA132	4/11/2010		✓	✓				✓		
	CleA133	4/11/2010		✓	✓					✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA134	13/11/2010		✓		✓					✓
	CleA135	13/11/2010		✓	✓				✓		
	CleA136	13/11/2010		✓	✓					✓	
	CleA137	13/11/2010	✓			✓					✓
	CleA138	13/11/2010	✓		✓			✓			
	CleA139	20/11/2010		✓		✓					✓
	CleA140	20/11/2010		✓	✓			✓			
	CleA141	20/11/2010		✓	✓				✓		
	CleA142	20/11/2010	✓			✓					✓
	CleA143	20/11/2010	✓		✓				✓		
	CleA144	4/12/2010		✓		✓					✓
	CleA145	4/12/2010		✓	✓			✓			
	CleA146	4/12/2010		✓	✓				✓		
	CleA147	4/12/2010	✓		✓					✓	
	CleA148	25/12/2010		✓		✓					✓
	CleA149	25/12/2010		✓	✓				✓		
	CleA150	25/12/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA151	14/1/2011		✓	✓			✓			
	CleA152	14/1/2011		✓	✓				✓		
	CleA153	14/1/2011		✓		✓					✓
	CleA154	14/1/2011	✓			✓					✓
	CleA155	18/12/2011		✓		✓					✓
	CleA156	18/12/2011		✓	✓			✓			
	CleA157	18/12/2011		✓	✓				✓		
	CleA158	18/12/2011	✓			✓					✓
	CleA159	18/12/2011	✓		✓			✓			
	CleA160	18/12/2011	✓		✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB128	21/10/2010	✓			✓			✓		
	CleB129	21/10/2010	✓		✓			✓			
	CleB130	21/10/2010	✓		✓				✓		
	CleB131	21/10/2010		✓		✓		✓			
	CleB132	22/10/2010		✓		✓			✓		
	CleB133	22/10/2010	✓			✓				✓	
	CleB134	23/10/2010		✓		✓					✓
	CleB135	23/10/2010		✓	✓			✓			
	CleB136	23/10/2010		✓	✓				✓		
	CleB137	23/10/2010	✓			✓					✓
	CleB138	23/10/2010	✓			✓				✓	
	CleB139	23/10/2010	✓		✓				✓		
	CleB140	24/10/2010		✓		✓				✓	
	CleB141	24/10/2010		✓		✓					✓
	CleB142	24/10/2010		✓	✓				✓		
	CleB143	24/10/2010	✓			✓		✓			
	CleB144	24/10/2010	✓			✓			✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (N. refipes)	CleB145	25/10/2010	✓			✓					✓
	CleB146	25/10/2010	✓		✓			✓			
	CleB147	25/10/2010		✓		✓		✓			
	CleB148	25/10/2010		✓		✓			✓		
	CleB149	26/10/2010		✓		✓					✓
	CleB150	26/10/2010		✓	✓			✓			
	CleB151	26/10/2010		✓	✓				✓		
	CleB152	26/10/2010		✓	✓					✓	
	CleB153	26/10/2010	✓			✓			✓		
	CleB154	26/10/2010	✓			✓				✓	
	CleB155	26/10/2010	✓		✓			✓			
	CleB156	27/10/2010		✓		✓		✓			
	CleB157	27/10/2010		✓		✓				✓	
	CleB158	27/10/2010		✓		✓					✓
	CleB159	27/10/2010		✓	✓			✓			
	CleB160	27/10/2010		✓	✓				✓		
	CleB161	27/10/2010		✓	✓					✓	
	CleB162	28/10/2010	✓			✓		✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB163	28/10/2010	✓			✓			✓		
	CleB164	28/10/2010	✓		✓			✓			
	CleB165	28/10/2010	✓		✓				✓		
	CleB166	28/10/2010		✓		✓		✓			
	CleB167	28/10/2010		✓		✓			✓		
	CleB168	29/10/2010		✓		✓		✓			
	CleB169	29/10/2010		✓		✓				✓	
	CleB170	29/10/2010		✓	✓				✓		
	CleB171	29/10/2010		✓	✓					✓	
	CleB172	29/10/2010	✓			✓		✓			
	CleB173	29/10/2010	✓			✓			✓		
	CleB174	29/10/2010	✓			✓				✓	
	CleB175	29/10/2010	✓			✓					✓
	CleB176	29/10/2010	✓		✓			✓			
	CleB177	29/10/2010	✓		✓				✓		
	CleB178	30/10/2010		✓		✓		✓			
	CleB179	30/10/2010		✓		✓			✓		
	CleB180	30/10/2010		✓		✓				✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB181	30/10/2010		✓		✓					✓
	CleB182	30/10/2010		✓	✓			✓			
	CleB183	30/10/2010		✓	✓				✓		
	CleB184	30/10/2010		✓	✓					✓	
	CleB185	1/11/2010	✓			✓		✓			
	CleB186	1/11/2010	✓			✓			✓		
	CleB187	1/11/2010	✓		✓			✓			
	CleB188	1/11/2010	✓		✓					✓	
	CleB189	1/11/2010		✓		✓		✓			
	CleB190	1/11/2010		✓		✓			✓		
	CleB191	1/11/2010		✓		✓				✓	
	CleB192	2/11/2010		✓		✓					✓
	CleB193	2/11/2010		✓	✓			✓			
	CleB194	2/11/2010		✓	✓				✓		
	CleB195	2/11/2010		✓	✓					✓	
	CleB196	2/11/2010	✓			✓		✓			
	CleB197	2/11/2010	✓			✓			✓		
	CleB198	2/11/2010	✓			✓				✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB199	2/11/2010	✓		✓			✓			
	CleB200	2/11/2010	✓		✓				✓		
	CleB201	2/11/2010	✓		✓					✓	
	CleB202	3/11/2010		✓		✓		✓			
	CleB203	3/11/2010		✓		✓				✓	
	CleB204	3/11/2010		✓		✓					✓
	CleB205	3/11/2010		✓	✓				✓		
	CleB206	3/11/2010		✓	✓					✓	
	CleB207	3/11/2010	✓			✓		✓			
	CleB208	3/11/2010	✓			✓					✓
	CleB209	4/11/2010		✓		✓			✓		
	CleB210	4/11/2010		✓		✓					✓
	CleB211	4/11/2010		✓	✓				✓		
	CleB212	4/11/2010		✓	✓					✓	
	CleB213	4/11/2010	✓			✓		✓			
	CleB214	4/11/2010	✓			✓			✓		
	CleB215	4/11/2010	✓			✓					✓
	CleB216	4/11/2010	✓		✓			✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB217	13/11/2010		✓		✓		✓			
	CleB218	13/11/2010		✓		✓			✓		
	CleB219	13/11/2010		✓		✓				✓	
	CleB220	13/11/2010		✓		✓					✓
	CleB221	13/11/2010		✓	✓			✓			
	CleB222	13/11/2010		✓	✓				✓		
	CleB223	13/11/2010		✓	✓					✓	
	CleB224	13/11/2010	✓			✓		✓			
	CleB225	13/11/2010	✓			✓			✓		
	CleB226	13/11/2010	✓			✓				✓	
	CleB227	13/11/2010	✓			✓					✓
	CleB228	20/11/2010		✓		✓					✓
	CleB229	20/11/2010		✓	✓			✓			
	CleB230	20/11/2010		✓	✓				✓		
	CleB231	20/11/2010	✓			✓					✓
	CleB232	20/11/2010	✓		✓			✓			
	CleB233	20/11/2010	✓		✓				✓		
	CleB234	20/11/2010	✓		✓					✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB235	4/12/2010		✓		✓					✓
	CleB236	4/12/2010		✓	✓			✓			
	CleB237	4/12/2010	✓		✓				✓		
	CleB238	4/12/2010	✓		✓					✓	
	CleB239	25/12/2010		✓		✓					✓
	CleB240	25/12/2010		✓	✓			✓			
	CleB241	25/12/2010	✓		✓			✓			
	CleB242	14/1/2011	✓			✓					✓
	CleB243	14/1/2011	✓		✓				✓		
	CleB244	14/1/2011	✓		✓					✓	
	CleB245	14/1/2011		✓		✓					✓
	CleB246	18/12/2011	✓		✓					✓	
	CleB247	18/12/2011	✓			✓					✓
	CleB248	18/12/2011		✓		✓					✓
	CleB249	18/12/2011		✓	✓		✓				
	CleB250	18/12/2011		✓	✓				✓		
	CleB251	18/12/2011		✓	✓					✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA104	21/10/2010		✓		✓				✓	
	DerA105	22/10/2010		✓		✓				✓	
	DerA106	22/10/2010	✓			✓		✓			
	DerA107	23/10/2010	✓			✓		✓			
	DerA108	23/10/2010	✓			✓			✓		
	DerA109	23/10/2010		✓	✓			✓			
	DerA110	23/10/2010		✓	✓					✓	
	DerA111	24/10/2010		✓		✓		✓			
	DerA112	24/10/2010		✓		✓					✓
	DerA113	24/10/2010		✓	✓			✓			
	DerA114	24/10/2010	✓			✓				✓	
	DerA115	24/10/2010	✓			✓					✓
	DerA116	24/10/2010	✓		✓				✓		
	DerA117	24/10/2010	✓		✓					✓	
	DerA118	25/10/2010		✓		✓		✓			
	DerA119	25/10/2010		✓		✓					✓
	DerA120	25/10/2010	✓			✓		✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA121	25/10/2010	✓			✓			✓		
	DerA122	25/10/2010	✓		✓			✓			
	DerA123	25/10/2010	✓		✓				✓		
	DerA124	26/10/2010		✓		✓				✓	
	DerA125	26/10/2010		✓		✓					✓
	DerA126	26/10/2010	✓			✓		✓			
	DerA127	26/10/2010	✓			✓					✓
	DerA128	26/10/2010	✓		✓			✓			
	DerA129	27/10/2010		✓		✓		✓			
	DerA130	27/10/2010		✓		✓					✓
	DerA131	27/10/2010		✓	✓					✓	
	DerA132	27/10/2010	✓			✓		✓			
	DerA133	27/10/2010	✓			✓					✓
	DerA134	28/10/2010		✓		✓			✓		
	DerA135	28/10/2010		✓	✓				✓		
	DerA136	28/10/2010	✓			✓			✓		
	DerA137	28/10/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA138	28/10/2010	✓		✓				✓		
	DerA139	29/10/2010		✓		✓		✓			
	DerA140	29/10/2010		✓		✓			✓		
	DerA141	29/10/2010		✓		✓				✓	
	DerA142	29/10/2010		✓		✓					✓
	DerA143	29/10/2010		✓	✓				✓		
	DerA144	29/10/2010		✓	✓					✓	
	DerA145	29/10/2010	✓			✓		✓			
	DerA146	29/10/2010	✓			✓			✓		
	DerA147	29/10/2010	✓			✓					✓
	DerA148	30/10/2010		✓		✓		✓			
	DerA149	30/10/2010		✓		✓			✓		
	DerA150	30/10/2010		✓		✓					✓
	DerA151	30/10/2010		✓	✓					✓	
	DerA152	30/10/2010	✓			✓		✓			
	DerA153	30/10/2010	✓			✓			✓		
	DerA154	30/10/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA155	30/10/2010	✓		✓				✓		
	DerA156	1/11/2010		✓		✓		✓			
	DerA157	1/11/2010		✓		✓			✓		
	DerA158	1/11/2010		✓		✓					✓
	DerA159	1/11/2010	✓			✓		✓			
	DerA160	1/11/2010	✓			✓			✓		
	DerA161	1/11/2010	✓			✓				✓	
	DerA162	1/11/2010	✓			✓					✓
	DerA163	2/11/2010		✓		✓		✓			
	DerA164	2/11/2010		✓		✓			✓		
	DerA165	2/11/2010		✓		✓				✓	
	DerA166	2/11/2010		✓		✓					✓
	DerA167	2/11/2010	✓			✓			✓		
	DerA168	2/11/2010	✓			✓				✓	
	DerA169	2/11/2010	✓			✓					✓
	DerA170	2/11/2010	✓		✓			✓			
	DerA171	2/11/2010	✓		✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA172	2/11/2010	✓		✓					✓	
	DerA173	3/11/2010		✓		✓		✓			
	DerA174	3/11/2010		✓		✓					✓
	DerA175	3/11/2010		✓	✓					✓	
	DerA176	3/11/2010	✓			✓		✓			
	DerA177	3/11/2010	✓			✓			✓		
	DerA178	3/11/2010	✓		✓					✓	
	DerA179	4/11/2010		✓		✓		✓			
	DerA180	4/11/2010		✓		✓			✓		
	DerA181	4/11/2010	✓			✓	✓				
	DerA182	4/11/2010	✓			✓		✓			
	DerA183	4/11/2010	✓			✓			✓		
	DerA184	4/11/2010	✓			✓				✓	
	DerA185	4/11/2010	✓			✓					✓
	DerA186	4/11/2010	✓		✓			✓			
	DerA187	6/11/2010		✓		✓		✓			
	DerA188	6/11/2010		✓		✓			✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (D. maculatus)	DerA189	6/11/2010	✓			✓		✓			
	DerA190	6/11/2010	✓			✓			✓		
	DerA191	6/11/2010	✓			✓				✓	
	DerA192	6/11/2010	✓			✓					✓
	DerA193	13/11/2010		✓		✓					✓
	DerA194	13/11/2010		✓	✓			✓			
	DerA195	13/11/2010	✓			✓					✓
	DerA196	13/11/2010	✓		✓			✓			
	DerA197	20/11/2010		✓		✓					✓
	DerA198	20/11/2010		✓	✓				✓		
	DerA199	20/11/2010	✓			✓					✓
	DerA200	20/11/2010	✓		✓					✓	
	DerA201	4/12/2010		✓		✓					✓
	DerA202	4/12/2010	✓			✓					✓
	DerA203	25/12/2010		✓		✓					✓
	DerA204	25/12/2010	✓			✓					✓
	DerA205	14/1/2011	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*O. tricornis*)	ScaB033	27/10/2010		✓	✓			✓			
	ScaB034	27/10/2010		✓	✓				✓		
	ScaB035	27/10/2010	✓			✓				✓	
	ScaB036	27/10/2010	✓		✓				✓		
	ScaB037	28/10/2010		✓		✓					✓
	ScaB038	28/10/2010	✓		✓				✓		
	ScaB039	29/10/2010		✓	✓				✓		
	ScaB040	29/10/2010		✓	✓					✓	
	ScaB041	29/10/2010	✓			✓					✓
	ScaB042	30/10/2010		✓	✓			✓			
	ScaB043	3/11/2010		✓	✓				✓		
	ScaB044	3/11/2010		✓	✓					✓	
	ScaB045	3/11/2010	✓		✓				✓		
	ScaB046	4/11/2010	✓		✓				✓		
	ScaB047	6/11/2010		✓	✓				✓		
	ScaB048	6/11/2010	✓			✓	✓				
	ScaB049	13/11/2010	✓		✓				✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*Onthophagus* sp.)	ScaC053	24/10/2010		✓		✓					✓
	ScaC054	27/10/2010	✓		✓				✓		
	ScaC055	28/10/2010		✓	✓					✓	
	ScaC056	28/10/2010	✓			✓		✓			
	ScaC057	28/10/2010	✓		✓				✓		
	ScaC058	29/10/2010		✓	✓				✓		
	ScaC059	29/10/2010		✓	✓					✓	
	ScaC060	29/10/2010	✓			✓					✓
	ScaC061	30/10/2010		✓	✓			✓			
	ScaC062	1/11/2010	✓			✓		✓			
	ScaC063	2/11/2010		✓	✓				✓		
	ScaC064	2/11/2010	✓		✓				✓		
	ScaC065	4/11/2010	✓		✓				✓		
Coleoptera: Trogidae (*Polynonchus* sp.)	TroA008	27/10/2010	✓			✓					✓

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Staphylinidae (Unidentified 1)	StaA002	25/10/2010		✓		✓		✓			
	StaA003	25/10/2010		✓		✓			✓		
	StaA004	25/10/2010	✓			✓			✓		
	StaA005	26/10/2010	✓			✓		✓			
	StaA006	26/10/2010	✓			✓			✓		
	StaA007	26/10/2010	✓			✓				✓	
	StaA008	27/10/2010		✓		✓			✓		
	StaA009	27/10/2010		✓		✓					✓
	StaA010	27/10/2010		✓		✓		✓			
	StaA011	27/10/2010		✓		✓			✓		
	StaA012	27/10/2010		✓		✓				✓	
	StaA013	27/10/2010	✓			✓					✓
	StaA014	27/10/2010	✓		✓		✓				
	StaA015	27/10/2010	✓		✓			✓			
	StaA016	27/10/2010	✓		✓					✓	
	StaA017	28/10/2010	✓			✓					✓
	StaA018	1/11/2010	✓		✓		✓				

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Staphylinidae (Unidentified 1)	StaA019	25/12/2010	✓		✓				✓		
	StaA020	14/1/2011		✓	✓				✓		
	StaA021	14/1/2011	✓			✓					✓
Coleoptera: Staphylinidae (Unidentified 2)	StaB001	21/10/2010	✓		✓			✓			
	StaB002	24/10/2010		✓		✓		✓			
	StaB003	25/10/2010	✓		✓				✓		
	StaB004	26/10/2010		✓		✓		✓			
	StaB005	26/10/2010		✓	✓					✓	
	StaB006	26/10/2010	✓			✓				✓	
	StaB007	26/10/2010	✓			✓					✓
	StaB008	26/10/2010	✓		✓				✓		
	StaB009	26/10/2010	✓		✓					✓	
	StaB010	27/10/2010	✓			✓					✓
	StaB011	27/10/2010	✓		✓			✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA048	24/10/2010	✓			✓	✓				
	HisA049	24/10/2010	✓			✓		✓			
	HisA050	24/10/2010	✓		✓			✓			
	HisA051	24/10/2010	✓		✓				✓		
	HisA052	25/10/2010	✓		✓				✓		
	HisA053	26/10/2010		✓		✓		✓			
	HisA054	26/10/2010		✓	✓			✓			
	HisA055	26/10/2010		✓	✓					✓	
	HisA056	26/10/2010	✓			✓					✓
	HisA057	26/10/2010	✓		✓					✓	
	HisA058	27/10/2010		✓		✓					✓
	HisA059	27/10/2010		✓	✓		✓				
	HisA060	27/10/2010		✓	✓					✓	
	HisA061	27/10/2010	✓			✓		✓			
	HisA062	27/10/2010	✓			✓				✓	
	HisA063	27/10/2010	✓			✓					✓
	HisA064	27/10/2010	✓		✓			✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA065	27/10/2010	✓		✓				✓		
	HisA066	28/10/2010		✓		✓					✓
	HisA067	28/10/2010		✓	✓			✓			
	HisA068	28/10/2010		✓	✓				✓		
	HisA069	28/10/2010	✓			✓					✓
	HisA070	28/10/2010	✓		✓			✓			
	HisA071	28/10/2010	✓		✓					✓	
	HisA072	29/10/2010		✓		✓					✓
	HisA073	29/10/2010		✓	✓			✓			
	HisA074	29/10/2010	✓			✓		✓			
	HisA075	29/10/2010	✓			✓					✓
	HisA076	29/10/2010	✓		✓					✓	
	HisA077	30/10/2010		✓		✓			✓		
	HisA078	30/10/2010	✓			✓					✓
	HisA079	30/10/2010	✓		✓			✓			
	HisA080	1/11/2010	✓		✓				✓		
	HisA081	2/11/2010	✓			✓			✓		

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister sp.*)	HisA082	2/11/2010	✓			✓					✓
	HisA083	2/11/2010	✓		✓			✓			
	HisA084	2/11/2010	✓		✓				✓		
	HisA085	2/11/2010	✓		✓						✓
	HisA086	3/11/2010		✓		✓					✓
	HisA087	3/11/2010		✓	✓			✓			
	HisA088	3/11/2010	✓		✓					✓	
	HisA089	3/11/2010	✓			✓					✓
	HisA090	3/11/2010	✓		✓			✓			
	HisA091	3/11/2010	✓		✓					✓	
	HisA092	4/11/2010		✓		✓					✓
	HisA093	4/11/2010	✓		✓					✓	
	HisA094	4/11/2010	✓			✓					✓
	HisA095	6/11/2010		✓		✓					✓
	HisA096	6/11/2010	✓		✓			✓			
	HisA097	6/11/2010	✓		✓				✓		
	HisA098	6/11/2010	✓		✓					✓	

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (Pachylister sp.)	HisA099	6/11/2010	✓			✓					✓
	HisA100	13/11/2010		✓	✓					✓	
	HisA101	13/11/2010		✓		✓					✓
	HisA102	13/11/2010	✓		✓			✓			
	HisA103	13/11/2010	✓			✓					✓
Coleoptera: Hybosoridae (*P. emarginatus*)	HybA056	28/10/2010		✓		✓					✓
Coleoptera: Silphidae (*D. osculans*)	SilB001	1/11/2010		✓		✓					✓
	SilB002	3/11/2010	✓		✓			✓			
Coleoptera: Anthicidae (*F. elongatissimus*)	AntA001	20/11/2010		✓		✓					✓
Coleoptera: Bruchidae (*Conicobruchus* sp.)	BruA001	6/11/2010	✓			✓		✓			

Table 4.16 (Cont.) Database of carrion arthropods in winter season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Meloidae (*M. cichhorii*)	MelA001	29/10/2010	✓			✓	✓				
Coleoptera: Scutellidae (*S. chinense*)	ScuA001	28/10/2010	✓			✓		✓			
Coleoptera: Chrysomelidae (*Monolepta* sp.)	ChrC001	6/11/2010	✓			✓	✓				
Coleoptera: Tenebrionidae (*unidentified 2*)	TenB001	3/11/2010		✓		✓					✓

Table 4.17 Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA086	18/3/2011	✓			✓	✓				
	CalA087	19/3/2011	✓			✓	✓				
	CalA088	20/3/2011	✓			✓	✓				
	CalA089	20/3/2011		✓		✓	✓				
	CalA090	21/3/2011	✓			✓	✓				
	CalA091	21/3/2011	✓		✓		✓				
	CalA092	21/3/2011		✓		✓	✓				
	CalA093	21/3/2011		✓	✓		✓				
	CalA094	22/3/2011	✓			✓	✓				
	CalA095	22/3/2011	✓		✓		✓				
	CalA096	22/3/2011		✓		✓	✓				
	CalA097	22/3/2011		✓	✓		✓				
	CalA098	23/3/2011	✓			✓	✓				
	CalA099	23/3/2011	✓		✓		✓				
	CalA100	23/3/2011		✓		✓	✓				
	CalA101	23/3/2011		✓	✓		✓				
	CalA102	24/3/2011	✓			✓	✓				
	CalA103	24/3/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA104	24/3/2011		✓		✓	✓				
	CalA105	24/3/2011		✓	✓		✓				
	CalA106	25/3/2011	✓			✓	✓				
	CalA107	25/3/2011	✓		✓		✓				
	CalA108	25/3/2011		✓		✓	✓				
	CalA109	25/3/2011		✓	✓		✓				
	CalA110	26/3/2011	✓			✓	✓				
	CalA111	26/3/2011	✓		✓		✓				
	CalA112	26/3/2011		✓	✓			✓			
	CalA113	26/3/2011		✓	✓				✓		
	CalA114	27/3/2011	✓			✓	✓				
	CalA115	27/3/2011	✓			✓					✓
	CalA116	27/3/2011		✓		✓	✓				
	CalA117	27/3/2011		✓		✓					✓
	CalA118	28/3/2011	✓			✓	✓				
	CalA119	28/3/2011	✓		✓			✓			
	CalA120	28/3/2011		✓		✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA121	28/3/2011		✓	✓		✓				
	CalA122	29/3/2011	✓		✓				✓		
	CalA123	29/3/2011	✓		✓					✓	
	CalA124	29/3/2011		✓		✓	✓				
	CalA125	29/3/2011		✓		✓					✓
	CalA126	30/3/2011	✓		✓		✓				
	CalA127	30/3/2011	✓			✓	✓				
	CalA128	30/3/2011		✓		✓					✓
	CalA129	30/3/2011		✓	✓		✓				
	CalA130	30/3/2011		✓	✓					✓	
	CalA131	1/4/2011	✓			✓					✓
	CalA132	1/4/2011	✓		✓			✓			
	CalA133	1/4/2011	✓		✓				✓		
	CalA134	1/4/2011		✓	✓					✓	
	CalA135	1/4/2011		✓		✓			✓		
	CalA136	4/4/2011	✓			✓					✓
	CalA137	4/4/2011	✓		✓				✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. megacephala*)	CalA138	4/4/2011		✓		✓	✓				
	CalA139	4/4/2011		✓	✓				✓		
	CalA140	8/4/2011	✓		✓					✓	
	CalA141	8/4/2011		✓		✓	✓				
	CalA142	8/4/2011		✓		✓					✓
	CalA143	15/4/2011	✓		✓		✓				
	CalA144	15/4/2011		✓		✓	✓				
	CalA145	15/4/2011		✓		✓					✓
	CalA146	15/4/2011		✓	✓		✓				
	CalA147	29/4/2011	✓		✓					✓	
	CalA148	29/4/2011	✓			✓					✓
	CalA149	29/4/2011		✓	✓			✓			
	CalA150	29/4/2011		✓	✓					✓	
	CalA151	29/4/2011		✓		✓					✓
	CalA152	21/5/2011	✓			✓	✓				
	CalA153	21/5/2011	✓			✓					✓
	CalA154	25/6/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*C. nigripes*)	CalC027	22/3/2011	✓			✓	✓				
	CalC028	22/3/2011	✓		✓		✓				
	CalC029	23/3/2011		✓		✓	✓				
	CalC030	23/3/2011		✓	✓		✓				
	CalC031	24/3/2011	✓			✓	✓				
	CalC032	24/3/2011		✓		✓	✓				
	CalC033	25/3/2011	✓		✓		✓				
	CalC034	25/3/2011		✓		✓	✓				
	CalC035	26/3/2011	✓			✓	✓				
	CalC036	27/3/2011		✓	✓		✓				
	CalC037	28/3/2011		✓		✓	✓				
	CalC038	28/3/2011		✓	✓		✓				
	CalC039	29/3/2011		✓		✓	✓				
	CalC040	29/3/2011		✓	✓		✓				
	CalC041	29/3/2011	✓			✓	✓				
	CalC042	4/4/2011	✓			✓	✓				
	CalC043	29/4/2011		✓		✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE086	18/3/2011	✓			✓	✓				
	CalE087	18/3/2011	✓		✓		✓				
	CalE088	18/3/2011		✓		✓	✓				
	CalE089	18/3/2011		✓	✓		✓				
	CalE090	19/3/2011	✓			✓	✓				
	CalE091	19/3/2011	✓		✓		✓				
	CalE092	19/3/2011		✓		✓	✓				
	CalE093	19/3/2011		✓	✓		✓				
	CalE094	20/3/2011	✓			✓	✓				
	CalE095	20/3/2011	✓		✓		✓				
	CalE096	20/3/2011		✓		✓	✓				
	CalE097	20/3/2011		✓	✓		✓				
	CalE098	21/3/2011	✓			✓	✓				
	CalE099	21/3/2011	✓		✓		✓				
	CalE100	21/3/2011		✓		✓	✓				
	CalE101	21/3/2011		✓	✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE102	22/3/2011	✓			✓	✓				
	CalE103	22/3/2011	✓		✓		✓				
	CalE104	22/3/2011		✓		✓	✓				
	CalE105	22/3/2011		✓	✓		✓				
	CalE106	22/3/2011		✓	✓				✓		
	CalE107	23/3/2011	✓		✓		✓				
	CalE108	23/3/2011		✓		✓	✓				
	CalE109	23/3/2011		✓	✓			✓			
	CalE110	24/3/2011	✓			✓	✓				
	CalE111	24/3/2011	✓		✓					✓	
	CalE112	24/3/2011		✓		✓	✓				
	CalE113	24/3/2011		✓	✓		✓				
	CalE114	25/3/2011	✓			✓					✓
	CalE115	25/3/2011	✓			✓	✓				
	CalE116	25/3/2011		✓		✓					✓
	CalE117	25/3/2011		✓	✓		✓				
	CalE118	25/3/2011		✓	✓			✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE119	26/3/2011	✓			✓	✓				
	CalE120	26/3/2011	✓			✓				✓	
	CalE121	26/3/2011		✓	✓				✓		
	CalE122	26/3/2011		✓	✓					✓	
	CalE123	27/3/2011	✓			✓	✓				
	CalE124	27/3/2011	✓		✓		✓				
	CalE125	27/3/2011		✓		✓		✓			
	CalE126	27/3/2011		✓		✓					✓
	CalE127	28/3/2011	✓			✓					✓
	CalE128	28/3/2011	✓		✓		✓				
	CalE129	28/3/2011		✓		✓	✓				
	CalE130	28/3/2011		✓	✓			✓			
	CalE131	28/3/2011		✓	✓					✓	
	CalE132	29/3/2011	✓			✓	✓				
	CalE133	29/3/2011	✓			✓		✓			
	CalE134	29/3/2011		✓		✓	✓				
	CalE135	29/3/2011		✓		✓			✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*A. rufifacies*)	CalE136	30/3/2011	✓			✓	✓				
	CalE137	30/3/2011	✓			✓		✓			
	CalE138	30/3/2011	✓			✓					✓
	CalE139	30/3/2011		✓		✓	✓				
	CalE140	30/3/2011		✓		✓			✓		
	CalE141	1/4/2011	✓			✓	✓				
	CalE142	1/4/2011	✓		✓			✓			
	CalE143	1/4/2011		✓	✓			✓			
	CalE144	4/4/2011	✓		✓		✓				
	CalE145	4/4/2011		✓		✓	✓				
	CalE146	8/4/2011	✓			✓					✓
	CalE147	8/4/2011		✓	✓		✓				
	CalE148	15/4/2011	✓			✓					✓
	CalE149	15/4/2011		✓	✓		✓				
	CalE150	29/4/2011		✓	✓				✓		
	CalE151	21/5/2011	✓			✓					✓
	CalE152	21/5/2011		✓	✓		✓				
	CalE153	25/6/2011		✓	✓				✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Caliphoridae (*L. cuprina*)	CalG007	22/3/2011	✓			✓	✓				
	CalG008	24/3/2011		✓		✓	✓				
	CalG009	25/4/2011		✓		✓	✓				
Diptera: Caliphoridae (*H. infumata*)	CalH006	22/3/2011	✓			✓	✓				
	CalH007	24/3/2011		✓		✓	✓				
	CalH008	24/3/2011	✓		✓		✓				
Diptera: Caliphoridae (*C. pinguis*)	CalI004	23/3/2011	✓			✓	✓				
	CalI005	25/3/2011		✓		✓	✓				
Diptera: Caliphoridae (*C. Chani*)	CalJ006	22/3/2011	✓			✓	✓				
	CalJ007	22/3/2011	✓		✓		✓				
	CalJ008	23/4/2011	✓			✓	✓				
	CalJ009	24/4/2011	✓			✓	✓				
	CalJ010	30/4/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*H. spinigera*)	MusA057	18/3/2011		✓		✓	✓				
	MusA058	18/3/2011		✓	✓		✓				
	MusA059	18/3/2011	✓			✓	✓				
	MusA060	19/3/2011		✓	✓		✓				
	MusA061	19/3/2011	✓			✓	✓				
	MusA062	20/3/2011		✓		✓	✓				
	MusA063	20/3/2011		✓	✓		✓				
	MusA064	20/3/2011	✓			✓	✓				
	MusA065	20/3/2011	✓		✓		✓				
	MusA066	21/3/2011		✓		✓	✓				
	MusA067	21/3/2011		✓	✓		✓				
	MusA068	21/3/2011	✓			✓	✓				
	MusA069	21/3/2011	✓		✓		✓				
	MusA070	22/3/2011		✓		✓	✓				
	MusA071	22/3/2011	✓			✓	✓				
	MusA072	23/3/2011		✓		✓	✓				
	MusA073	23/3/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*H. spinigera*)	MusA074	24/3/2011		✓		✓	✓				
	MusA075	24/3/2011	✓			✓	✓				
	MusA076	25/3/2011	✓			✓	✓				
	MusA077	26/3/2011		✓		✓	✓				
	MusA078	27/3/2011	✓			✓	✓				
	MusA079	28/3/2011		✓		✓	✓				
	MusA080	29/3/2011		✓		✓	✓				
	MusA081	29/3/2011	✓			✓	✓				
	MusA082	1/4/2011	✓			✓	✓				
	MusA083	1/4/2011	✓		✓		✓				
	MusA084	4/4/2011		✓		✓	✓				
	MusA085	4/4/2011	✓			✓	✓				
	MusA086	8/4/2011		✓		✓	✓				
	MusA087	15/4/2011		✓	✓		✓				
	MusA088	15/4/2011	✓			✓	✓				
	MusA089	29/4/2011	✓		✓		✓				
	MusA090	21/5/2011		✓		✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*M. domestica*)	MusB030	19/3/2011		✓		✓	✓				
	MusB031	19/3/2011		✓	✓		✓				
	MusB032	19/3/2011	✓			✓	✓				
	MusB033	20/3/2011		✓		✓	✓				
	MusB034	20/3/2011		✓	✓		✓				
	MusB035	21/3/2011		✓		✓	✓				
	MusB036	21/3/2011	✓		✓		✓				
	MusB037	22/3/2011		✓		✓	✓				
	MusB038	22/3/2011		✓	✓		✓				
	MusB039	24/3/2011	✓			✓	✓				
	MusB040	24/3/2011		✓	✓		✓				
	MusB041	25/3/2011		✓	✓		✓				
	MusB042	25/3/2011		✓		✓	✓				
	MusB043	26/3/2011		✓	✓		✓				
	MusB044	27/3/2011		✓	✓		✓				
	MusB045	27/3/2011	✓			✓	✓				
	MusB046	1/4/2004	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*M. domestica*)	MusB047	4/4/2011		✓		✓	✓				
	MusB048	4/4/2011		✓	✓		✓				
	MusB049	8/4/2011		✓	✓		✓				
	MusB050	15/4/2011	✓			✓	✓				
	MusB051	21/5/2011		✓	✓		✓				
Diptera: Muscidae (*Atherigona* sp.1)	MusD056	18/3/2011	✓			✓	✓				
	MusD057	18/3/2011	✓		✓		✓				
	MusD058	19/3/2011	✓			✓	✓				
	MusD059	19/3/2011	✓		✓		✓				
	MusD060	19/3/2011		✓	✓		✓				
	MusD061	20/3/2011	✓		✓		✓				
	MusD062	20/3/2011	✓			✓	✓				
	MusD063	20/3/2011		✓	✓		✓				
	MusD064	20/3/2011		✓		✓	✓				
	MusD065	21/3/2011	✓			✓	✓				
	MusD066	21/3/2011	✓		✓		✓				
	MusD067	21/3/2011		✓		✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Atherigona* sp.1)	MusD068	22/3/2011	✓		✓		✓				
	MusD069	22/3/2011	✓			✓	✓				
	MusD070	22/3/2011		✓	✓		✓				
	MusD071	22/3/2011		✓		✓	✓				
	MusD072	23/3/2011	✓		✓		✓				
	MusD073	23/3/2011	✓			✓	✓				
	MusD074	23/3/2011		✓	✓		✓				
	MusD075	23/3/2011		✓		✓	✓				
	MusD076	24/3/2011	✓		✓		✓				
	MusD077	24/3/2011	✓			✓	✓				
	MusD078	24/3/2011		✓	✓		✓				
	MusD079	25/3/2011		✓		✓	✓				
	MusD080	25/3/2011	✓		✓		✓				
	MusD081	25/3/2011	✓			✓	✓				
	MusD082	26/3/2011		✓	✓		✓				
	MusD083	26/3/2011		✓		✓	✓				
	MusD084	26/3/2011	✓		✓		✓				
	MusD085	26/3/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Atherigona* sp.1)	MusD086	27/3/2011		✓		✓	✓				
	MusD087	27/3/2011	✓			✓	✓				
	MusD088	28/3/2011		✓		✓	✓				
	MusD089	29/3/2011	✓			✓	✓				
	MusD090	30/3/2011	✓		✓		✓				
	MusD091	4/4/2011	✓			✓	✓				
	MusD092	8/4/2011		✓		✓	✓				
	MusD093	8/4/2011	✓		✓		✓				
	MusD094	15/4/2011	✓		✓		✓				
	MusD095	15/4/2011	✓			✓	✓				
	MusD096	29/4/2011		✓		✓	✓				
	MusD097	29/4/2011	✓		✓		✓				
	MusD098	21/5/2011	✓		✓		✓				
	MusD099	21/5/2011	✓			✓	✓				
	MusD100	25/6/2011	✓			✓	✓				
Diptera: Muscidae (*S. nudiseta*)	MusE004	24/3/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Muscidae (*Musca* sp.1)	MusF027	22/3/2011	✓			✓	✓				
	MusF028	23/3/2011	✓			✓	✓				
	MusF029	24/3/2011	✓			✓	✓				
	MusF030	25/3/2011	✓			✓	✓				
	MusF031	26/3/2011	✓			✓	✓				
	MusF032	27/3/2011	✓			✓	✓				
	MusF033	28/3/2011	✓			✓	✓				
	MusF034	29/3/2011	✓			✓	✓				
	MusF035	30/3/2011	✓			✓	✓				
	MusF036	1/4/2011	✓			✓	✓				
	MusF037	4/4/2011	✓			✓	✓				
	MusF038	8/4/2011	✓			✓	✓				
	MusF039	29/4/2011	✓			✓	✓				
Diptera: Sarcophagidae (*S. dux*)	SarA035	21/3/2011	✓		✓		✓				
	SarA036	22/3/2011	✓		✓		✓				
	SarA037	22/3/2011	✓			✓	✓				
	SarA038	23/3/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. dux*)	SarA039	23/3/2011	✓			✓	✓				
	SarA040	24/3/2011	✓		✓		✓				
	SarA041	24/3/2011	✓			✓	✓				
	SarA042	25/3/2011	✓		✓		✓				
	SarA043	25/3/2011	✓			✓	✓				
	SarA044	26/3/2011	✓			✓	✓				
	SarA045	27/3/2011	✓		✓		✓				
	SarA046	27/3/2011	✓			✓	✓				
	SarA047	28/3/2011	✓			✓	✓				
	SarA048	29/3/2011	✓		✓		✓				
	SarA049	29/3/2011	✓			✓	✓				
	SarA050	1/4/2011	✓		✓		✓				
	SarA051	1/4/2011	✓			✓	✓				
	SarA052	15/4/2011	✓		✓		✓				
	SarA053	15/4/2011	✓			✓	✓				
	SarA054	21/5/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. peregrina*)	SarB033	23/3/2011	✓			✓	✓				
	SarB034	24/3/2011	✓		✓		✓				
	SarB035	24/3/2011	✓			✓	✓				
	SarB036	25/3/2011		✓		✓	✓				
	SarB037	25/3/2011	✓			✓	✓				
	SarB038	26/3/2011		✓	✓		✓				
	SarB039	27/3/2011	✓		✓		✓				
	SarB040	27/3/2011	✓			✓	✓				
	SarB041	28/3/2011	✓			✓	✓				
	SarB042	29/3/2011		✓	✓		✓				
	SarB043	29/3/2011	✓			✓	✓				
	SarB044	1/4/2011		✓		✓	✓				
	SarB045	1/4/2011	✓		✓		✓				
	SarB046	1/4/2011	✓			✓	✓				
	SarB047	4/4/2011		✓	✓		✓				
	SarB048	4/4/2011	✓		✓		✓				
	SarB049	4/4/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. peregrina*)	SarB050	8/4/2011		✓	✓		✓				
	SarB051	15/4/2011	✓		✓		✓				
	SarB052	15/4/2011	✓			✓	✓				
	SarB053	21/5/2011	✓			✓	✓				
	SarB054	25/6/2011	✓			✓	✓				
Diptera: Sarcophagidae (*S. ruficornis*)	SarC035	23/3/2011	✓			✓	✓				
	SarC036	24/3/2011	✓		✓		✓				
	SarC037	24/3/2011	✓			✓	✓				
	SarC038	25/3/2011		✓		✓	✓				
	SarC039	25/3/2011	✓			✓	✓				
	SarC040	26/3/2011	✓			✓	✓				
	SarC041	27/3/2011	✓		✓		✓				
	SarC042	27/3/2011	✓			✓	✓				
	SarC043	28/3/2011	✓		✓		✓				
	SarC044	28/3/2011	✓			✓	✓				
	SarC045	29/3/2011	✓		✓		✓				
	SarC046	29/3/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sarcophagidae (*S. ruficornis*)	SarC047	1/4/2011		✓	✓		✓				
	SarC048	1/4/2011	✓		✓		✓				
	SarC049	1/4/2011	✓			✓	✓				
	SarC050	4/4/2011	✓		✓		✓				
	SarC051	4/4/2011	✓			✓	✓				
	SarC052	8/4/2011	✓			✓	✓				
	SarC053	15/4/2011		✓	✓		✓				
	SarC054	15/4/2011	✓			✓	✓				
	SarC055	21/5/2011	✓			✓	✓				
	SarC056	25/6/2011	✓			✓	✓				
Diptera: Sepsidae (Unidentified)	SepA036	23/3/2011		✓	✓		✓				
	SepA037	24/3/2011		✓	✓		✓				
	SepA038	24/3/2011		✓		✓	✓				
	SepA039	25/3/2011		✓		✓	✓				
	SepA040	25/3/2011	✓			✓	✓				
	SepA041	26/3/2011	✓			✓			✓		
	SepA042	27/3/2011		✓	✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Sepsidae (Unidentified)	SepA037	28/3/2011		✓	✓		✓				
	SepA038	29/3/2011		✓		✓	✓				
	SepA039	29/3/2011	✓			✓	✓				
	SepA040	30/3/2011		✓	✓		✓				
	SepA041	30/3/2011		✓		✓	✓				
	SepA042	30/3/2011	✓		✓				✓		
	SepA043	30/3/2011	✓			✓	✓				
	SepA044	1/4/2011		✓	✓		✓				
	SepA045	1/4/2011		✓		✓	✓				
	SepA046	1/4/2011	✓		✓		✓				
	SepA047	8/4/2011	✓			✓	✓				
	SepA048	8/4/2011		✓	✓		✓				
	SepA049	15/4/2011		✓		✓	✓				
	SepA050	15/4/2011	✓		✓		✓				
	SepA051	15/4/2011	✓			✓	✓				
	SepA052	29/4/2011		✓	✓		✓				
	SepA053	29/4/2011		✓		✓	✓				
	SepA054	21/5/2011		✓		✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Diptera: Phoridae (Unidentified)	PhoA024	23/3/2011		✓	✓		✓				
	PhoA025	24/3/2011	✓		✓		✓				
	PhoA026	24/3/2011	✓			✓	✓				
	PhoA027	25/3/2011	✓		✓		✓				
	PhoA028	26/3/2011	✓			✓	✓				
	PhoA029	27/3/2011		✓		✓	✓				
	PhoA030	27/3/2011	✓			✓	✓				
	PhoA031	28/3/2011	✓			✓	✓				
	PhoA032	29/3/2011		✓	✓		✓				
	PhoA033	29/3/2011	✓			✓	✓				
	PhoA034	1/4/2011	✓			✓	✓				
	PhoA035	4/4/2011		✓	✓		✓				
	PhoA036	15/4/2011		✓		✓	✓				
	PhoA037	29/4/2011		✓		✓	✓				
	PhoA038	29/4/2011	✓			✓	✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA161	23/3/2011		✓		✓		✓			
	CleA162	23/3/2011		✓		✓			✓		
	CleA163	23/3/2011	✓			✓		✓			
	CleA164	23/3/2011	✓			✓				✓	
	CleA165	24/3/2011		✓		✓	✓				
	CleA166	24/3/2011		✓		✓		✓			
	CleA167	24/3/2011	✓			✓		✓			
	CleA168	24/3/2011	✓			✓			✓		
	CleA169	25/3/2011		✓		✓		✓			
	CleA170	25/3/2011		✓		✓					✓
	CleA171	25/3/2011	✓			✓					✓
	CleA172	25/3/2011	✓		✓				✓		
	CleA173	26/3/2011		✓		✓		✓			
	CleA174	26/3/2011		✓		✓			✓		
	CleA175	26/3/2011		✓		✓					✓
	CleA176	26/3/2011	✓			✓					✓
	CleA177	26/3/2011	✓		✓			✓			
	CleA178	27/3/2011		✓		✓					✓

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA179	27/3/2011		✓		✓		✓			
	CleA180	27/3/2011		✓		✓				✓	
	CleA181	27/3/2011	✓		✓			✓			
	CleA182	27/3/2011	✓			✓					✓
	CleA183	28/3/2011		✓	✓			✓			
	CleA184	28/3/2011		✓		✓			✓		
	CleA185	28/3/2011		✓		✓					✓
	CleA186	28/3/2011	✓			✓		✓			
	CleA187	28/3/2011	✓			✓					✓
	CleA188	28/3/2011	✓		✓			✓			
	CleA189	28/3/2011	✓		✓				✓		
	CleA190	29/3/2011		✓		✓		✓			
	CleA191	29/3/2011		✓		✓					✓
	CleA192	29/3/2011		✓	✓					✓	
	CleA193	29/3/2011	✓		✓			✓			
	CleA194	29/3/2011	✓			✓		✓			
	CleA195	29/3/2011	✓			✓			✓		
	CleA196	29/3/2011	✓			✓				✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA197	30/3/2011		✓		✓		✓			
	CleA198	30/3/2011		✓		✓				✓	
	CleA199	30/3/2011		✓	✓			✓			
	CleA200	30/3/2011	✓		✓				✓		
	CleA201	30/3/2011	✓		✓					✓	
	CleA202	1/4/2011		✓		✓					✓
	CleA203	1/4/2011		✓		✓				✓	
	CleA204	1/4/2011		✓	✓			✓			
	CleA205	1/4/2011		✓	✓				✓		
	CleA206	1/4/2011		✓	✓					✓	
	CleA207	1/4/2011	✓			✓		✓			
	CleA208	1/4/2011	✓			✓			✓		
	CleA209	1/4/2011	✓			✓				✓	
	CleA210	1/4/2011	✓			✓					✓
	CleA211	4/4/2011		✓		✓		✓			
	CleA212	4/4/2011		✓		✓			✓		
	CleA213	4/4/2011		✓		✓					✓

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA214	4/4/2011	✓			✓					✓
	CleA215	4/4/2011	✓		✓				✓		
	CleA216	4/4/2011	✓		✓					✓	
	CleA217	8/4/2011		✓		✓		✓			
	CleA218	8/4/2011		✓		✓			✓		
	CleA219	8/4/2011		✓		✓				✓	
	CleA220	8/4/2011		✓		✓					✓
	CleA221	8/4/2011		✓	✓				✓		
	CleA222	8/4/2011	✓		✓				✓		
	CleA223	8/4/2011	✓			✓		✓			
	CleA224	8/4/2011	✓			✓					✓
	CleA225	15/4/2011		✓		✓			✓		
	CleA226	15/4/2011		✓		✓				✓	
	CleA227	15/4/2011		✓		✓					✓
	CleA228	15/4/2011		✓	✓				✓		
	CleA229	15/4/2011	✓			✓		✓			
	CleA230	15/4/2011	✓			✓				✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA231	15/4/2011	✓			✓					✓
	CleA232	15/4/2011	✓		✓				✓		
	CleA233	29/4/2011		✓		✓		✓			
	CleA234	29/4/2011		✓		✓			✓		
	CleA235	29/4/2011		✓		✓					✓
	CleA236	29/4/2011		✓	✓				✓		
	CleA237	29/4/2011		✓	✓					✓	
	CleA238	29/4/2011	✓			✓		✓			
	CleA239	29/4/2011	✓			✓					✓
	CleA240	29/4/2011	✓		✓					✓	
	CleA241	21/5/2011		✓		✓		✓			
	CleA242	21/5/2011		✓		✓			✓		
	CleA243	21/5/2011		✓		✓				✓	
	CleA244	21/5/2011		✓		✓					✓
	CleA245	21/5/2011		✓	✓				✓		
	CleA246	21/5/2011	✓			✓					✓
	CleA247	21/5/2011	✓		✓					✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. reficollis*)	CleA248	25/6/2011		✓		✓					✓
	CleA249	25/6/2011		✓		✓			✓		
	CleA250	25/6/2011		✓	✓				✓		
	CleA251	25/6/2011		✓	✓					✓	
	CleA252	25/6/2011	✓			✓		✓			
	CleA253	25/6/2011	✓			✓					✓
	CleA254	25/6/2011	✓		✓				✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB252	23/3/2011		✓		✓		✓			
	CleB253	23/3/2011		✓	✓			✓			
	CleB254	23/3/2011	✓			✓		✓			
	CleB255	23/3/2011	✓		✓			✓			
	CleB256	24/3/2011		✓		✓		✓			
	CleB257	24/3/2011		✓		✓			✓		
	CleB258	24/3/2011	✓			✓			✓		
	CleB259	24/3/2011	✓		✓			✓			
	CleB260	25/3/2011		✓		✓		✓			
	CleB261	25/3/2011		✓		✓			✓		
	CleB262	25/3/2011		✓		✓					✓
	CleB263	25/3/2011	✓		✓				✓		
	CleB264	26/3/2011		✓		✓		✓			
	CleB265	26/3/2011		✓		✓					✓
	CleB266	26/3/2011		✓	✓			✓			
	CleB267	26/3/2011	✓			✓		✓			
	CleB268	26/3/2011	✓			✓				✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB269	27/3/2011		✓		✓		✓			
	CleB270	27/3/2011		✓	✓			✓			
	CleB271	27/3/2011	✓			✓		✓			
	CleB272	27/3/2011	✓			✓				✓	
	CleB273	28/3/2011		✓		✓		✓			
	CleB274	28/3/2011		✓		✓					✓
	CleB275	28/3/2011		✓	✓				✓		
	CleB276	28/3/2011		✓	✓					✓	
	CleB277	28/3/2011	✓			✓		✓			
	CleB278	28/3/2011	✓			✓			✓		
	CleB279	28/3/2011	✓		✓			✓			
	CleB280	29/3/2011		✓		✓		✓			
	CleB281	29/3/2011		✓		✓			✓		
	CleB282	29/3/2011		✓		✓					✓
	CleB283	29/3/2011	✓		✓			✓			
	CleB284	29/3/2011	✓		✓				✓		
	CleB285	29/3/2011	✓		✓					✓	
	CleB286	29/3/2011	✓			✓		✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB287	30/3/2011		✓		✓		✓			
	CleB288	30/3/2011		✓	✓			✓			
	CleB289	30/3/2011		✓	✓					✓	
	CleB290	30/3/2011	✓			✓		✓			
	CleB291	30/3/2011	✓			✓			✓		
	CleB292	1/4/2011		✓		✓		✓			
	CleB293	1/4/2011		✓		✓			✓		
	CleB294	1/4/2011		✓		✓				✓	
	CleB295	1/4/2011		✓	✓			✓			
	CleB296	1/4/2011		✓	✓				✓		
	CleB297	1/4/2011	✓			✓		✓			
	CleB298	1/4/2011	✓			✓				✓	
	CleB299	1/4/2011	✓			✓					✓
	CleB300	1/4/2011	✓		✓			✓			
	CleB301	4/4/2011		✓		✓		✓			
	CleB302	4/4/2011		✓		✓			✓		
	CleB303	4/4/2011		✓		✓				✓	
	CleB304	4/4/2011		✓		✓					✓

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB305	4/4/2011		✓	✓				✓		
	CleB306	4/4/2011	✓			✓		✓			
	CleB307	8/4/2011		✓		✓		✓			
	CleB308	8/4/2011		✓		✓				✓	
	CleB309	8/4/2011		✓	✓			✓			
	CleB310	8/4/2011	✓		✓			✓			
	CleB311	8/4/2011	✓		✓				✓		
	CleB312	8/4/2011	✓		✓					✓	
	CleB313	8/4/2011	✓			✓		✓			
	CleB314	8/4/2011	✓			✓					✓
	CleB315	15/4/2011		✓		✓		✓			
	CleB316	15/4/2011		✓		✓					✓
	CleB317	15/4/2011		✓	✓			✓			
	CleB318	15/4/2011		✓	✓					✓	
	CleB319	15/4/2011		✓	✓						✓
	CleB320	15/4/2011	✓			✓		✓			
	CleB321	15/4/2011	✓			✓			✓		
	CleB322	15/4/2011	✓			✓					✓

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Cleridae (*N. refipes*)	CleB323	29/4/2011		✓	✓			✓			
	CleB324	29/4/2011		✓	✓				✓		
	CleB325	29/4/2011		✓	✓					✓	
	CleB326	29/4/2011	✓			✓		✓			
	CleB327	29/4/2011	✓			✓			✓		
	CleB328	29/4/2011	✓			✓				✓	
	CleB329	29/4/2011	✓		✓			✓			
	CleB330	29/4/2011	✓		✓					✓	
	CleB331	21/5/2011		✓		✓		✓			
	CleB332	21/5/2011		✓		✓			✓		
	CleB333	21/5/2011		✓		✓				✓	
	CleB334	21/5/2011		✓	✓			✓			
	CleB335	21/5/2011		✓	✓				✓		
	CleB336	21/5/2011	✓		✓			✓			
	CleB337	21/5/2011	✓			✓		✓			
	CleB338	25/6/2011	✓			✓			✓		
	CleB339	25/6/2011	✓			✓				✓	
	CleB340	25/6/2011	✓		✓			✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA104	23/3/2011		✓		✓			✓		
	DerA105	23/3/2011		✓		✓				✓	
	DerA106	23/3/2011	✓			✓		✓			
	DerA107	23/3/2011	✓			✓			✓		
	DerA108	24/3/2011		✓		✓		✓			
	DerA109	24/3/2011		✓	✓			✓			
	DerA110	24/3/2011	✓			✓		✓			
	DerA111	24/3/2011	✓		✓			✓			
	DerA112	25/3/2011		✓		✓		✓			
	DerA113	25/3/2011		✓	✓						✓
	DerA114	25/3/2011	✓			✓				✓	
	DerA115	25/3/2011	✓		✓						✓
	DerA116	26/3/2011		✓		✓			✓		
	DerA117	26/3/2011		✓		✓					✓
	DerA118	26/3/2011		✓	✓			✓			
	DerA119	26/3/2011	✓			✓					✓
	DerA120	26/3/2011	✓			✓		✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA121	27/3/2011		✓		✓		✓			
	DerA122	27/3/2011		✓	✓			✓			
	DerA123	27/3/2011	✓			✓					✓
	DerA124	27/3/2011	✓		✓					✓	
	DerA125	28/3/2011		✓		✓		✓			
	DerA126	28/3/2011		✓		✓			✓		
	DerA127	28/3/2011		✓		✓					✓
	DerA128	28/3/2011		✓	✓			✓			
	DerA129	28/3/2011	✓			✓		✓			
	DerA130	28/3/2011	✓			✓					✓
	DerA131	28/3/2011	✓		✓					✓	
	DerA132	29/3/2011		✓		✓		✓			
	DerA133	29/3/2011		✓		✓			✓		
	DerA134	29/3/2011		✓		✓					✓
	DerA135	29/3/2011	✓			✓			✓		
	DerA136	29/3/2011	✓			✓					✓
	DerA137	29/3/2011	✓		✓			✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA138	30/3/2011		✓		✓		✓			
	DerA139	30/3/2011		✓		✓				✓	
	DerA140	30/3/2011		✓	✓				✓		
	DerA141	30/3/2011	✓			✓			✓		
	DerA142	30/3/2011	✓			✓				✓	
	DerA143	1/4/2011		✓		✓		✓			
	DerA144	1/4/2011		✓		✓			✓		
	DerA145	1/4/2011		✓		✓				✓	
	DerA146	1/4/2011		✓	✓			✓			
	DerA147	1/4/2011		✓	✓					✓	
	DerA148	1/4/2011	✓			✓		✓			
	DerA149	1/4/2011	✓			✓			✓		
	DerA150	1/4/2011	✓			✓				✓	
	DerA151	1/4/2011	✓		✓			✓			
	DerA152	4/4/2011		✓		✓		✓			
	DerA153	4/4/2011		✓		✓			✓		
	DerA154	4/4/2011		✓		✓				✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA155	4/4/2011	✓			✓		✓			
	DerA156	4/4/2011	✓		✓			✓			
	DerA157	8/4/2011		✓		✓		✓			
	DerA158	8/4/2011		✓		✓			✓		
	DerA159	8/4/2011		✓		✓				✓	
	DerA160	8/4/2011		✓	✓			✓			
	DerA161	8/4/2011		✓	✓					✓	
	DerA162	8/4/2011	✓			✓		✓			
	DerA163	8/4/2011	✓			✓			✓		
	DerA164	8/4/2011	✓		✓					✓	
	DerA165	15/4/2011		✓		✓		✓			
	DerA166	15/4/2011		✓		✓			✓		
	DerA167	15/4/2011		✓		✓				✓	
	DerA168	15/4/2011		✓	✓			✓			
	DerA169	15/4/2011	✓			✓		✓			
	DerA170	15/4/2011	✓			✓			✓		
	DerA171	15/4/2011	✓			✓				✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Dermestidae (*D. maculatus*)	DerA172	29/4/2011		✓		✓					✓
	DerA173	29/4/2011		✓	✓			✓			
	DerA174	29/4/2011		✓	✓				✓		
	DerA175	29/4/2011		✓	✓					✓	
	DerA176	29/4/2011	✓			✓					✓
	DerA177	29/4/2011	✓		✓			✓			
	DerA178	29/4/2011	✓		✓				✓		
	DerA179	29/4/2011	✓		✓					✓	
	DerA180	21/5/2011		✓		✓					✓
	DerA181	21/5/2011		✓	✓			✓			
	DerA182	21/5/2011		✓	✓					✓	
	DerA183	21/5/2011	✓			✓					✓
	DerA184	21/5/2011	✓		✓			✓			
	DerA185	25/6/2011		✓		✓					✓
	DerA186	25/6/2011	✓			✓					✓

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*O. tricornis*)	ScaB050	24/3/2011		✓		✓					✓
	ScaB051	24/3/2011		✓	✓			✓			
	ScaB052	24/3/2011	✓			✓					✓
	ScaB053	25/3/2011	✓		✓				✓		
	ScaB054	27/3/2011		✓		✓					✓
	ScaB055	29/3/2011	✓		✓			✓			
	ScaB056	30/3/2011		✓	✓				✓		
	ScaB057	1/4/2011		✓	✓					✓	
	ScaB058	4/4/2011		✓		✓					✓
	ScaB059	4/4/2011		✓	✓			✓			
	ScaB060	4/4/2011	✓		✓					✓	
	ScaB061	8/4/2011		✓	✓					✓	
	ScaB062	8/4/2011	✓		✓				✓		
	ScaB063	15/4/2011	✓		✓				✓		
	ScaB064	29/4/2011		✓	✓				✓		
	ScaB065	21/5/2011	✓			✓					✓
	ScaB066	25/6/2011	✓		✓				✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Scarabaeidae (*Onthophagus* sp.)	ScaC066	24/3/2011		✓		✓					✓
	ScaC067	24/3/2011		✓	✓				✓		
	ScaC068	24/3/2011	✓		✓				✓		
	ScaC069	25/3/2011		✓	✓			✓			
	ScaC070	27/3/2011		✓	✓				✓		
	ScaC071	29/3/2011		✓	✓				✓		
	ScaC072	30/3/2011		✓	✓					✓	
	ScaC073	1/4/2011	✓			✓					✓
	ScaC074	4/4/2011		✓	✓				✓		
	ScaC075	4/4/2011	✓			✓		✓			
	ScaC076	8/4/2011		✓	✓				✓		
	ScaC077	8/4/2011	✓		✓				✓		
	ScaC078	15/4/2011	✓		✓				✓		
	ScaC079	29/4/2011	✓		✓				✓		
	ScaC080	21/5/2011	✓		✓			✓			
Coleoptera: Trogidae (*Polynonchus* sp.)	TroA009	27/3/2011	✓		✓				✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Staphylinidae (Unidentified 1)	StaA022	23/3/2011		✓	✓				✓		
	StaA023	24/3/2011		✓		✓					✓
	StaA024	24/3/2011	✓			✓					✓
	StaA025	25/3/2011	✓		✓			✓			
	StaA026	27/3/2011	✓		✓				✓		
	StaA027	29/3/2011	✓		✓				✓		
	StaA028	30/3/2011		✓	✓				✓		
	StaA029	1/4/2011		✓	✓					✓	
	StaA030	4/4/2011		✓	✓			✓			
	StaA031	4/4/2011	✓		✓					✓	
	StaA032	8/4/2011		✓	✓			✓			
	StaA033	8/4/2011	✓		✓				✓		
	StaA034	15/4/2011	✓		✓		✓				
	StaA035	29/4/2011	✓		✓			✓			
	StaA036	21/5/2011	✓		✓					✓	
	StaA037	25/6/2011	✓			✓			✓		
	StaA038	25/6/2011	✓		✓		✓				

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Staphylinidae (Unidentified 2)	StaB012	22/3/2011	✓		✓			✓			
	StaB013	23/3/2011	✓			✓					✓
	StaB014	24/3/2011		✓	✓					✓	
	StaB015	25/3/2011	✓		✓			✓			
	StaB016	27/3/2011		✓	✓				✓		
	StaB017	29/3/2011	✓		✓				✓		
	StaB018	30/3/2011	✓		✓			✓			
	StaB019	1/4/2011	✓		✓				✓		
	StaB020	4/4/2011	✓		✓					✓	
	StaB021	8/4/2011	✓			✓					✓
	StaB022	29/4/2011	✓		✓			✓			
Coleoptera: Staphylinidae (Unidentified 3)	StaC020	30/3/2011	✓		✓				✓		
	StaC021	1/4/2011		✓	✓				✓		
	StaC022	4/4/2011	✓			✓					✓
	StaC023	8/4/2011	✓		✓			✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA104	23/3/2011		✓		✓					✓
	HisA105	23/3/2011		✓	✓			✓			
	HisA106	23/3/2011		✓	✓				✓		
	HisA107	23/3/2011	✓		✓				✓		
	HisA108	24/3/2011		✓	✓			✓			
	HisA109	24/3/2011		✓	✓				✓		
	HisA110	24/3/2011	✓		✓			✓			
	HisA111	24/3/2011	✓		✓					✓	
	HisA112	25/3/2011		✓	✓			✓			
	HisA113	25/3/2011		✓	✓				✓		
	HisA114	25/3/2011	✓		✓			✓			
	HisA115	25/3/2011	✓		✓				✓		
	HisA116	26/3/2011		✓	✓			✓			
	HisA117	26/3/2011		✓	✓				✓		
	HisA118	26/3/2011	✓		✓			✓			
	HisA119	27/3/2011	✓		✓			✓			
	HisA120	27/3/2011	✓		✓					✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister* sp.)	HisA121	27/3/2011	✓		✓				✓		
	HisA122	28/3/2011		✓		✓					✓
	HisA123	28/3/2011		✓	✓			✓			
	HisA124	28/3/2011		✓	✓				✓		
	HisA125	28/3/2011	✓		✓			✓			
	HisA126	28/3/2011	✓		✓				✓		
	HisA127	29/3/2011	✓		✓					✓	
	HisA128	29/3/2011		✓		✓	✓				
	HisA129	29/3/2011		✓	✓			✓			
	HisA130	29/3/2011	✓			✓		✓			
	HisA131	30/3/2011		✓	✓				✓		
	HisA132	30/3/2011		✓	✓					✓	
	HisA133	30/3/2011	✓		✓				✓		
	HisA134	30/3/2011	✓		✓					✓	
	HisA135	1/4/2011		✓	✓			✓			
	HisA136	1/4/2011	✓		✓				✓		
	HisA137	1/4/2011	✓			✓			✓		

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Histeridae (*Pachylister sp.*)	HisA138	4/4/2011		✓		✓					✓
	HisA139	4/4/2011	✓		✓				✓		
	HisA140	8/4/2011		✓		✓					✓
	HisA141	8/4/2011		✓	✓				✓		
	HisA142	8/4/2011	✓		✓					✓	
	HisA143	15/4/2011		✓	✓			✓			
	HisA144	15/4/2011	✓		✓					✓	
	HisA145	29/4/2011		✓	✓			✓			
	HisA146	29/4/2011		✓	✓				✓		
	HisA147	29/4/2011		✓	✓					✓	
	HisA148	29/4/2011	✓		✓				✓		
	HisA149	29/4/2011	✓		✓					✓	
	HisA150	29/4/2011	✓			✓					✓
	HisA151	21/5/2011		✓		✓					✓
	HisA152	21/5/2011	✓		✓			✓			
	HisA153	21/5/2011	✓		✓				✓		
	HisA154	25/6/2011	✓		✓					✓	

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Hybosoridae (*P. emarginatus*)	HybA057	1/4/2011		✓		✓					✓
	HybA058	4/4/2011	✓		✓			✓			
Coleoptera: Silphidae (*N. luciae*)	SilA002	30/3/2011	✓		✓				✓		
Coleoptera: Silphidae (*D. osculans*)	SilB002	15/4/2011		✓		✓					✓
	SilB003	29/4/2011		✓	✓				✓		
Coleoptera: Bruchidae (*Conicobruchus* sp.)	BruA002	1/4/2011	✓		✓					✓	
Coleoptera: Scutellidae (*S. chinense*)	ScuA002	4/4/2011	✓		✓			✓			
Coleoptera: Chrysomelidae (Unidentified 1)	ChrA002	15/4/2011	✓		✓		✓				
Coleoptera: Chrysomelidae (*Danacia* sp.)	ChrB002	29/4/2011	✓		✓			✓			

Table 4.17 (Cont.) Database of carrion arthropods in summer season.

Identification	Voucher specimens	Date	Habitats		Conditions		Aerial net	Handling			
			Forest	Sub urban	Laid on the ground	Hang above the ground		Head	Abdomen	Anus	Maggot mass
Coleoptera: Chrysomelidae (*Monolepta* sp.)	ChrC002	8/4/2011	✓		✓		✓				
Coleoptera: Chrysomelidae (*P. pereginus*)	ChrD002	15/4/2011	✓		✓		✓				
Coleoptera: Tenebrionidae (*Unidentified 1*)	TenA001	4/4/2011		✓		✓					✓
Coleoptera: Tenebrionidae (Unidentified 2)	TenB002	8/4/2011		✓		✓					✓

CHAPTER VI

DISCUSSION

Stages of decomposition

The number of decomposition stages and their types found in the present study were similar to those of previous studies (Boremissza, 1957; Wolff et al., 2001), but they were different in the decomposition rates. Decomposition rate in each habitat depend upon biotic and abiotic factors and so shows local and regional variations.

Temperature is one of the extrinsic factors that are important for the development of bacteria (Campobasso, 2001). Other factors affecting decomposition rates include the age of corpse, constitution, cause of death, ventilation and humidity (Campobasso, 2001).

Ambient temperature and relative humidity play an important role on decomposition and development of carrion insects. As shown in figure 4.9 A-D, the average ambient temperature in monsoon wet season was higher than in summer, and winter season respectively. The low ambient temperature (15-25^{o}C) and high percentage of relative humidity due to seven consecutive days of rain influenced the decomposition.

During study period, north of Thailand was attacked by several monsoons. Consequently, there was high level of precipitation throughout the year; the level of relative humidity was highly varied.

The forming of maggot masses from the number of aggregated maggots, higher the level of their body temperature. Furthermore, the high temperature activated the maggots and accelerated the decomposition process. The correlation between body temperature of maggots and temperature of maggot mass was strongly found. The greater body temperature was driven by the high level of maggot mass temperature.

From all carcasses, the presence of maggot mass in winter, monsoon wet and summer season were at 9th, 4th and 5th day, respectively (Figure 4.13A-D). The meteorological data showed the records of first seven consecutive days of rain in summer season. Accordingly, the low level of ambient temperature facilitated the decrease activity of flies. In addition, they also inhibited egg laying process, the maggot mass was delayed in this summer season.

During the first two to four days after death, the internal carcass temperature had decreased. Subsequently on 4th day, the body temperature tended to increase consistency, due to the supplement of maggot mass process. As shown in Figure 4.12A-D, internal carcass temperature had decreased on 7th day in wet and winter season, assuming the higher rate of decomposition in winter season than monsoon wet season.

Insect succession

The insect species collected from pig carcasses such as *A. rufifacies*, *C. megacephala*, *C. nigripes, H. ligurriens, H. spinigera, M. domestica*, *P.casei*, *D. maculatus*, *N. ruficollis, N. rufipes* and *D. masulatus*. This finding agreed with the previous reports on the study of vertebrate carcasses (Wolff et al., 2001; Arnaldos et al., 2004). The predominant species collected in this study were *A. rufifacies* and *C. megacephala* which have been first used in PMI determination in the floating corpse in Lumpang province, northern Thailand (Sukontason, 2005). This indicated that *C. rufifacies* was the forensically important fly in the north of Thailand. Factors such as climate, season, sun exposure, urban or sub urban scenarios, frequency of collection and the number of animal models can affect the species diversity of insect associated with the corpses in several regions of the world (Anderson, 2001; Campobasso et al., 2001).

Several species of beetles associated with corpses have been found in many parts of the world, but this study was the first to report about beetles (*D. maculatus*, *N. rufipes* and *N. ruficollis*.) associated with the pig carcasses. They have also been collected from vertebrate cadavers in Brazil (deCarvalho et al., 2000), Columbia (Wolff et al., 2001), Spain (Arnaldos et al., 2004) and the United States of America (Watson and Carlton, 2003; Tabor, Fell, and Brewster, 2005). The previous study in Spain (Arnaldos et al., 2004), on the ecological relationship between the insects and the corpses were categorized as necrohpagous, necrophilous and omnivorous. In this study, this was also observed, that is, necrophagous species which feed only on decaying tissues are *Chrysomya* spp., *M. domestica*, *P. ruficornis*, *P. casei* and *D.maculatus*; necrophilous species which prefer to feed on decaying tissues and spiders; and omnivorous species which feed on decaying tissues are *N. rufipes*, ants and bees. This indicated that the roles of ecological systems of insects associated with corpses in Thailand are similar in Spain.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

This study considered the impact of seasons and condition on insect succession and carcass. Focus was placed on the succession of carrion insects and other arthropods, as representatives of these orders were considered the primary indicator species for estimating time since death.

On site 1 (mixed deciduous forest), *C. megacephala* and *A. rufifacies* (Calliphoridae) were the first arrival flies in succession process for all three seasons. On the first day after death in wet season, hanging carcass was observed the succession of flies, laying eggs at the openings of body. Furthermore, *O. smaragdina* was found feeding from dead body in all seasons. The later stage of insect succession were beetles, they exploited from dead body and necrophagous species. The presence of beetles was on 4^{th} day after death or found from the 3^{rd} stage of decomposition (active decay stage) until skeletonization.

H. illucens was the greatest potential fly as indicator species for wet season. The presence of *H. illucens* in summer season was due to the high amount of rainfall from several monsoons. The diversity of carrion insect was highest in monsoon wet season, following with summer season and winter season, respectively. The low temperature in winter season decrease the activity of insect was shown the lowest diverse.

On site 2 (sub urban area), the pattern of insect succession and diversity of carrion insects was almost similar to site 1. Difference was only found in monsoon wet season, the presence of Phoridae was firstly observed followed by Calliphoridae and Formicidae, respectively.

Both the season and the spatial position of the carcass had an effect on the decomposition rate of the carcasses, being greater in the ground-laid carcasses than in those hung above the ground in the wet and winter seasons. The highest average internal carcass temperature always coincided with the earliest presence of 3rd instar larvae, as expected under the temperature-day developmental rule. The pattern of insect succession occurred in a predictable sequence that varied across different seasons and conditions. Over 40 taxa were collected and identified. *C. megacephala* and *A. rufifacies* were the dominant fly species in all seasons. *C. megacephala* the first dipteran colonizer in all seasons and conditions.

In the future, I have in mind to study mitochondrial DNA sequence based for identification of forensically important blowflies (Diptera: Calliphoridae). The purpose of this study: is to learn how to identify and classify specimens by molecular sequence typing (MOTU: molecular operational taxonomic units) and conversion where possible to species by sequence comparison, including phylogenetic analysis, to sequences from known species. This would thus unambiguously link larval and imago forms of the same species and discriminate between morphologically similar forms of different species.

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APPENDIX

Table 1A List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Diptera	Calliphoridae/ Carrion feeders	*Chrysomya megacephala*	713	1209	2189
		Chrysomya bezziana	3	9	2
		Chrysomya nigripes	72	34	29
		Chrysomya thanomthini	1	0	0
		Chrysomya pinguis	0	0	1
		Chrysomya chani	0	0	2
		Achoetandrus rufifacies	781	1974	1932
		Achoetandrus villeneuvi	13	3	0
		Lucilia cuprina	1	4	0
		Hypopygiopsis infumata	0	0	1
		Hemipyrellia ligurriens	23	129	0
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	28	76	88
		Musca domestica	29	2	14
		Musca sorben	11	0	0
		Atherigona sp.1	17	43	29
		Synthesiomyia nudiseta	0	0	0
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	12	29	4
		Sarcophaga peregrina	8	4	8
		Sarcophaga ruficornis	9	0	3
	Drosophilidae	*Drosophila melanogaster*	0	2	0
	Phoridae / Carrion feeder	Unidentified	2	5	1
	Piophilidae / Scavenger	*Piophila casei*	1	0	0
	Sepsidae / Scavenger	Unidentified	7	49	48
	Stratiomyidae / Predatory	*Hermetia illucens*	4	0	0
	Asilidae / Predatory	Unidentified	4	1	6

Table 1A (Cont.) List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	39	149	138
		Necrobia rufipes	167	44	149
	Dermestidae / Scavenger	*Demestes maculatus*	210	171	196
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	2	2	13
	Scarabaeidae / Scavenger	*Coprophanaeus sp.*	1	1	0
		Onthophagus tricornis	24	13	1
	Trogidae / Scavenger	*Polynonchus sp.*	1	0	1
		Afrromorgus chinensis	0	1	0
	Staphylinidae / Predator	Unidentified 1	13	34	12
		Unidentified 2	23	13	19
		Unidentified 3	35	28	12
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	0	1	0
	Cicindelidae / Predator	Unidentified	0	1	0
	Chrysomelidae / Accidental (leaf beetles)	Unidentified 1	0	0	0
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	13	48	19
		Pheidologeton diversus	21	23	14
		Crematogaster physocrema	12	11	18
		Camponotus rufoglaucus	49	8	23
		Monomorium destructor	1	31	1
	Braconidae / Parasitoid	Unidentified	1	6	2
	Apidae / Accidental-Saprophyte	*Melipona sp.*	1	1	5
	Acrididae/ Accidental	Unidentified	1	1	0

Table 1A (Cont.) List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Orthoptera	Coreidae / Accidental	Unidentified	9	7	6
Hemiptera	Blattidae / Accidental	Unidentified	9	8	1
Blattodea	Unidentified / Accidental	Unidentified	1	0	8
Isoptera	Unidentified / Scavenger	Unidentified	58	58	66
Acari	Unidentified	Unidentified	0	1	0
Scorpiones	Unidentified	Unidentified	1	0	0
Araneae	Unidentified	Unidentified	0	8	14

Table 1B List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Diptera	Calliphoridae/ Carrion feeders	*Chrysomya megacephala*	588	1389	1600
		Chrysomya bezziana	2	8	1
		Chrysomya nigripes	158	29	19
		Chrysomya thanomthini	1	0	0
		Chrysomya pinguis	0	0	1
		Chrysomya chani	0	0	0
		Achoetandrus rufifacies	889	1598	829
		Achoetandrus villeneuvi	19	3	1
		Lucilia cuprina	8	4	1
		Hypopygiopsis infumata	0	0	1
		Hemipyrellia ligurriens	38	121	0
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	49	45	32
		Musca domestica	22	12	13
		Musca sorben	13	0	0
		Atherigona sp.1	21	32	14
		Synthesiomyia nudiseta	2	0	0
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	10	3	9
		Sarcophaga peregrina	9	3	4
		Sarcophaga ruficornis	5	0	9
	Drosophilidae	*Drosophila melanogaster*	0	3	0
	Phoridae / Carrion feeder	Unidentified	3	8	7
	Piophilidae / Scavenger	*Piophila casei*	1	0	0
	Sepsidae / Scavenger	Unidentified	9	54	39
	Stratiomyidae / Predatory	*Hermetia illucens*	9	1	0
	Asilidae / Predatory	Unidentified	5	9	1

Table 1B (Cont.) List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	11	78	56
		Necrobia rufipes	31	24	54
	Dermestidae / Scavenger	*Demestes maculatus*	34	31	29
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	39	1	32
	Scarabaeidae / Scavenger	*Coprophanaeus sp.*	1	0	0
		Onthophagus tricornis	48	8	47
	Trogidae / Scavenger	*Polynonchus sp.*	1	1	1
		Afrromorgus chinensis	1	0	1
	Staphylinidae / Predator	Unidentified 1	32	31	13
		Unidentified 2	28	38	19
		Unidentified 3	41	32	24
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	1	0	0
	Cicindelidae / Predator	Unidentified	0	0	1
	Chrysomelidae / Accidental (leaf beetles)	Unidentified 1	1	1	0
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	23	29	38
		Pheidologeton diversus	179	372	208
		Crematogaster physocrema	2	13	15
		Camponotus rufoglaucus	9	28	29
		Monomorium destructor	3	36	9
	Braconidae / Parasitoid	Unidentified	2	4	1
	Apidae / Accidental-Saprophyte	*Melipona sp.*	1	0	4
	Acrididae/ Accidental	Unidentified	0	1	2

Table 1B (Cont.) List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 1 (mixed deciduous forest).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Orthoptera	Coreidae / Accidental	Unidentified	3	5	0
Hemiptera	Blattidae / Accidental	Unidentified	3	0	1
Blattodea	Unidentified / Accidental	Unidentified	0	21	8
Isoptera	Unidentified / Scavenger	Unidentified	10	23	13
Acari	Unidentified	Unidentified	1	0	1
Scorpiones	Unidentified	Unidentified	1	0	0
Araneae	Unidentified	Unidentified	0	6	10

Table 1C List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Diptera	Calliphoridae/ Carrion feeders	*Chrysomya megacephala*	686	1023	1804
		Chrysomya bezziana	3	9	0
		Chrysomya nigripes	62	27	25
		Chrysomya thanomthini	1	0	0
		Achoetandrus rufifacies	723	1896	1683
		Achoetandrus villeneuvi	7	1	0
		Lucilia cuprina	2	4	1
		Hemipyrellia ligurriens	14	87	0
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	24	67	55
		Musca domestica	27	1	16
		Musca sorben	8	0	0
		Atherigona sp.1	13	43	19
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	10	20	3
		Sarcophaga peregrina	7	3	6
		Sarcophaga ruficornis	8	0	2
	Phoridae / Carrion feeder	Unidentified	1	3	3
	Piophilidae / Scavenger	*Piophila casei*	1	0	0
	Sepsidae / Scavenger	Unidentified	5	43	41
	Stratiomyidae / Predatory	*Hermetia illucens*	0	0	0
	Asilidae / Predatory	Unidentified	2	2	4

Table 1C (Cont.) List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	19	130	112
		Necrobia rufipes	184	60	138
	Dermestidae / Scavenger	*Demestes maculatus*	187	149	166
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	3	5	17
	Scarabaeidae / Scavenger	*Coprophanaeus sp.*	0	1	1
		Onthophagus tricornis	32	19	13
	Trogidae / Scavenger	*Polynonchus sp.*	0	0	1
		Afrromorgus chinensis	0	1	0
	Staphylinidae / Predator	Unidentified 1	48	49	59
		Unidentified 2	28	21	16
		Unidentified 3	31	29	21
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	0	1	0
	Cicindelidae / Predator	Unidentified	0	0	0
	Chrysomelidae / Accidental (leaf beetles)	Unidentified 1	0	0	0
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	0	43	18
		Pheidologeton diversus	18	14	13
		Crematogaster physocrema	14	10	11
		Camponotus rufoglaucus	57	1	25
		Monomorium destructor	2	0	0
	Braconidae / Parasitoid	Unidentified	2	1	9
	Apidae / Accidental-Saprophyte	*Melipona sp.*	1	1	2

Table 1C (Cont.) List of the species and total number of samples collected from one pig carcass hung above the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Hung on a tree		
			Monsoon wet	Winter	Summer
Orthoptera	Acrididae/ Accidental	Unidentified	12	1	10
Hemiptera	Coreidae / Accidental	Unidentified	9	6	8
Blattodea	Blattidae / Accidental	Unidentified	1	1	7
Isoptera	Unidentified / Accidental	Unidentified	78	84	79
Acari	Unidentified / Scavenger	Unidentified	3	8	13

Table 1D List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Diptera	Calliphoridae/ Carrion feeders	*Chrysomya megacephala*	485	1424	1559
		Chrysomya bezziana	5	7	0
		Chrysomya nigripes	124	19	10
		Chrysomya thanomthini	0	0	0
		Achoetandrus rufifacies	751	1343	791
		Achoetandrus villeneuvi	11	2	0
		Lucilia cuprina	4	3	2
		Hemipyrellia ligurriens	1	153	0
	Muscidae / Carrion feeders	*Hydrotaea spinigera*	28	39	24
		Musca domestica	13	3	14
		Musca sorben	11	0	0
		Atherigona sp.1	11	41	16
	Sarcophagidae / Carrion feeders	*Sarcophaga dux*	9	2	8
		Sarcophaga peregrina	8	1	3
		Sarcophaga ruficornis	4	0	8
	Phoridae / Carrion feeder	Unidentified	2	7	5
	Piophilidae / Scavenger	*Piophila casei*	0	0	0
	Sepsidae / Scavenger	Unidentified	7	34	28
	Stratiomyidae / Predatory	*Hermetia illucens*	6	0	0
	Asilidae / Predatory	Unidentified	2	1	5

Table 1D (Cont.) List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Coleoptera	Cleridae / Scavenger-Predatory	*Necrobia ruficollis*	6	82	71
		Necrobia rufipes	57	30	78
	Dermestidae / Scavenger	*Demestes maculatus*	22	28	27
	Hybosoridae / Scavenger	*Phaeochrous emarginatus*	29	19	21
	Scarabaeidae / Scavenger	*Coprophanaeus sp.*	0	0	1
		Onthophagus tricornis	39	10	34
	Trogidae / Scavenger	*Polynonchus sp.*	1	1	0
		Afrromorgus chinensis	1	0	1
	Staphylinidae / Predator	Unidentified 1	44	54	31
		Unidentified 2	18	35	16
		Unidentified 3	52	31	41
	Silphidae / Carrion feeder	*Necrophila (Deutosilpha) luciae*	0	1	0
	Cicindelidae / Predator	Unidentified	0	0	1
	Chrysomelidae / Accidental (leaf beetles)	Unidentified 1	0	1	0
Hymenoptera	Formicidae / Predator-fresh carrion feeder	*Oecophylla smaragdina*	27	42	24
		Pheidologeton diversus	57	381	187
		Crematogaster physocrema	1	8	9
		Camponotus rufoglaucus	7	24	40
		Monomorium destructor	0	0	0
	Braconidae / Parasitoid	Unidentified	0	0	8
	Apidae / Accidental-Saprophyte	*Melipona sp.*	0	0	0

Table 1D (Cont.) List of the species and total number of samples collected from one pig carcass laid on the ground in each indicated season at site 2 (sub urban area).

Order	Family / Likely role	Species	Laid on the ground		
			Monsoon wet	Winter	Summer
Orthoptera	Acrididae/ Accidental	Unidentified	6	4	3
Hemiptera	Coreidae / Accidental	Unidentified	2	3	2
Blattodea	Blattidae / Accidental	Unidentified	1	28	16
Isoptera	Unidentified / Accidental	Unidentified	11	21	18
Acari	Unidentified / Scavenger	Unidentified	1	5	7

BIOGRAPHY

Miss Sutaporn Sukjit was born on February 5th, 1986. She received her Bachelor's Degree of Science, major Zoology and minor Biology, from the Department of Biology, Faculty of Science, Chulalongkorn University in 2009. Her Master's degree in Zoology, at the Department Biology, Faculty of Science, Chulalongkorn University, of which this thesis forms a part, was supported by the Science for Locale Project under the Chulalongkorn University Centenary Academic Development plan (2008-2012) and the 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund).