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DIPLOMARBEIT

Titel der Diplomarbeit

„Successional patterns of necrophilous beetles on domestic pig carcasses in urban and sylvan areas during spring and summer
–
a comparative study between four study sites in and around Vienna“

Verfasser

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"I have always looked upon decay as being just as wonderful and rich an expression of life as growth."

Henry Miller

INDEX

1. ABSTRACT

Successional patterns of necrophilous beetles (Coleoptera) on medium sized, clothed and exposed domestic pig carcasses (*Sus scrofa* Linnaeus) were studied on four sites in and around Vienna, Austria (16° 22´E, 48° 12´N) during two trials comprising spring (76 days) and summer (86 days) 2009. Two of these sites were located in the urban areas of the city, two in the large woods flanking it westward. So far only one study on arthropod succession has been conducted in Vienna (Grassberger and Frank, 2004). It was limited to the urban area, on one site and its main focus was on flies (Diptera).

The objective of present study was to provide baseline information on the coleoptera of forensic importance in order to be able to estimate postmortem interval (PMI) in cases of human death in these regions.
The research questions are as follows:

- Which species compose the carrion beetle fauna of urban and forest study sites in and around the city of Vienna?
- Can the present findings on the carrion succession be confirmed by other studies?
- Are there differences between the carrion beetle fauna of the urban and the forest study sites?
- Are there differences between the carrion beetle fauna of spring and summer?

A minimum of 50 species, belonging to 10 families of forensic importance (mainly Scarabaeidae, Staphylinidae, Histeridae, Silphidae, Cleridae and Dermestidae) collected manually, in pitfall traps and in traps underneath a three centimeter layer of earth and grass roots below the carcasses, have been identified. Ambient temperature, internal carrion temperature and rainfall also were measured.

Five stages of decomposition were recognized, influenced by season, the distinct precipitation pattern and varying arthropod successions. The number of species in the course of decomposition increased from the fresh stage, reached a maximum in the

overlap of the active and advanced decay stages, and from there on declined gradually until the end of the study trials in the dry/remains stage.

More species and individuals were collected in the woodland study sites than in the urban area study sites.

The total numbers of individuals were similar in spring and in summer, but the number of species was a third less in summer. *Oiceoptoma thoracica* L. (Silphidae), prominent during bloated stage and early decay in the forest of the spring trial, was absent in the summer trial. As expected, decomposition occurred faster in summer, due to higher temperatures, accelerating colonization.

In order to make any statements in forensic cases, further studies have to be conducted over several years. Data collected only over the course of one year are potential sources of error if used to estimate minimum post-mortem interval.

1.1 Zusammenfassung

Zur Untersuchung von Sukzessionsmustern aasbesuchender Käfer (Coleoptera), wurden im Frühling und Sommer 2009 an vier Standorten in Wien (Österreich) mittelgroße, bekleidete Hausschweine (*Sus scrofa* Linnaeus) ausgelegt. Zwei dieser Standorte befanden sich im städtischen Gebiet, die anderen beiden im Wienerwald.

Eine ähnliche Studie wurde bereits acht Jahre zuvor an einem der beiden städtischen Standorte durchgeführt (Grassberger und Frank, 2004), jedoch beschränkte diese sich auf den urbanen Raum und hatte ihr Hauptaugenmerk auf Fliegen (Diptera) gerichtet.

Ziel der vorliegenden Untersuchung war es, wichtige Daten und Informationen über forensisch bedeutsame Käfer zu erheben, um bei gerichtsmedizinischen Fällen in dieser Region, Hinweise zur Einschätzung des Postmortem Intervalles (PMI) zu liefern. Die Fragestellungen waren:

- Aus welchen Arten setzt sich die aasbesuchende Käferfauna im Wiener Raum zusammen?
- Bestätigen andere Untersuchungen den beobachteten Verlauf von Sukzession auf Aas?
- Gibt es Unterschiede zwischen der aasbesuchenden Käferfauna und deren Sukzession des urbanen und des bewaldeten Raumes?
- Gibt es Unterschiede zwischen der aasbesuchenden Käferfauna und deren Sukzession im Frühjahr und im Sommer?

Von zehn Käferfamilien mit forensischer Bedeutung (hauptsächlich Scarabaeidae, Staphylinidae, Histeridae, Silphidae, Cleridae und Dermestidae) wurden 50 Arten bestimmt. Gesammelt wurde manuell, in Barberfallen und in Fallen, die unter einer drei Zentimeter dicken Schicht Rollrasen, auf dem die Kadaver lagen, an einem speziellen Gestell befestigt waren. Lufttemperatur, Körpertemperatur des Aases und Niederschlag wurden gemessen.

Es wurden fünf Verwesungsstadien festgestellt, welche in ihrer Ausprägung und Dauer durch die Jahreszeit, den Niederschlag und die unterschiedlichen Besiedelungen durch Arthropoden beeinflusst wurden. Die Anzahl der Arten im Verlauf

der Verwesung wuchs vom frischen Zersetzungsstadium an, erreichte ihr Maximum während der Übergangsphase vom Aktiven Zerfall zum Fortgeschrittenen Zerfall und nahm graduell bis zum Ende der Versuchereihe im Zersetzungsstadium der trockenen Überreste ab.

Im bewaldeten Raum wurden mehr Arten und Individuen als im urbanen Raum gesammelt.

Was die Individuenzahl anbelangt, ähneln sich Frühjahr und Sommer, jedoch war der Artenreichtum im Sommer ein Drittel weniger. *Oiceoptoma thoracica* L. (Silphidae), welcher während des geblähten Zersetzungsstadiums und des frühen Aktiven Zerfalls im Frühjahr bei den beiden bewaldeten Standorten recht prominent war, fehlte im Sommer.

Wie zu erwarten, verlief der Zerfall des Aases im Sommer schneller, wohl wegen der höheren Temperaturen, welche Besiedelung durch Arthropoden beschleunigt.

Um in Zukunft gehaltvolle Aussagen für forensische Fälle zu machen, bedarf es weiterer Studien dieser Art, denn Daten, die über den Zeitraum eines einzelnen Jahres erhoben wurden, stellen potentielle Fehlerquellen in der Einschätzung des Postmortem Intervalles dar.

2. INTRODUCTION

2.1 Forensic entomology

Forensic entomology or more precisely, medicolegal forensic entomology deals with arthropod assamblages with felonies such as murder, suicide and rape. However, it is not restricted to such cases and has been used to determine the location of an incident (Goff, 1991), in cases involving physical abuse (Catts and Goff, 1992), the length of a period of child neglect (Benecke and Lessig, 2001), the detection of drugs or poisons and contraband trafficking (Smith, 1986). The first known use of entomology as a forensic aid was reported in China in the 13th century (Smith, 1986). Following a murder by sickle, all of the land workers in the community were assembled and ordered to lay their sickles before them upon the ground. Fly activity was observed on only one sickle, the owner of which then confessed to his crime and „knocked his head to the floor“ (Smith, 1986; Greenberg, 1991; Benecke and Leclercq, 1999; Gill, 2005). Until the 17th century it was believed that the presence of 'worms' (maggots) in corpses was due to spontaneous generation from rotting meat (Smith, 1986). This theory was disproved by Francesco Redi in 1668 (Smith, 1986).

Insects may represent an important tool in criminal investigation, allowing the estimation of time at which a dead body was colonized (Greenberg, 1991). The insects arrive in a determined sequence, with which, knowing their preference for the different stages of decay and the meteorological data, it is possible to deduce the minimal postmortem interval (PMI). In the year 1855 Louis François Etienne Bergeret d´Arbois first used entomological clues (fly pupae and moth larvae) to clear suspects of the murder of an infant found immured in a chimney (Grassberger, 2004; Gill, 2005; Gomes and Zuben, 2006).

The seldom mentioned first systematic investigations of grave fauna were conducted by Hermann Reinhard (1816-1892), the Viennese entomologist Friedrich Moritz Brauer (1832-1904) and Eduard von Hofmann (1837-1897) during mass exhumations in Saxony in the years 1880/1881. Finally, in 1894, Jean-Pierre Mégnin

published his acclaimed magnum opus „La faune des cadavres: application de l´entomologie à la médicine légale“, representing a milestone in forensic entomology.

The estimation of the postmortem interval (PMI) (i.e. the time elapsed between death and discovery) by means of insects, occurs by two main methods.

The first method is development-based in which the age of fly larvae on the corpse is used to indicate the time since death. Since flies are the primary colonizers of a corpse, laying eggs sometimes within minutes after death (Payne, 1965; Smith, 1986; Grassberger, 2004), PMI can be estimated by comparing the degree of development of the eggs, larvae or pupae with controlled laboratory data, using retrospective calculation.

The second method is based on the biological principle of succession. The order of succession of carrion invertebrates has been demonstrated to occur in a predictable sequence (Payne, 1965; Rodriguez and Bass, 1983; Early and Goff, 1986; Anderson and VanLaerhoven, 1996; Grassberger and Frank, 2004; Tabor et al., 2004; Gill, 2005). By this method, the PMI is estimated by comparing the variety of taxa found on human remains at the particular time of discovery with known succession patterns for that geographical area or habitat, obtained under controlled conditions on animal models (Tabor et al., 2005; Eberhardt and Elliot, 2008). An estimate is based on the presence of two definitive taxa, which define lower (minimal) and upper (maximal) PMI in a given case (Schoenly et al., 1992; Matuszewski et al., 2009).

2.2 Carrion ecology

Many different variables affect the rate of decomposition and hence the assemblage of carrion fauna drawn to distinct stages of decay. Ambient factors such as temperature, local weather conditions, season and micro-climate of the surrounding postmortem habitat play major roles in the determination of the invertebrate composition on carrion and may combine in different ways at a particular crime scene. If not considered, they may have a falsifying effect on the accuracy of a PMI estimate (Eberhardt and Elliot, 2008).

2.2.1 Characteristics of a carcass

Because of long time-spans, ecological succession, i.e. the changes in a species assemblage over time on a newly exposed or disturbed site, can rarely be observed directly (Erbeling and Erbeling, 1986). Here, carrion as an ecological system represents an exception. Instead of an autotrophic succession, which potentially results in a stable end stage, carrion shows a heterotrophic succession, which becomes more and more unstable and finally disintegrates (Erbeling and Erbeling, 1986). The ecological function of decomposition is the return of organic material, such as dead plant or animal matter, to the ecosystem.

2.2.2 Carrion as a habitat

Carrion is a temporary and rapidly changing food source for a varied and distinct community of organisms. It is an isolated, random resource colonized by insects that are specific to a geographic zone but influenced by seasonal effects (Catts and Goff, 1992; Archer, 2003; Gill, 2005). In the course of decomposition the body undergoes natural changes, passing through different stages of decay that are attractive to a variety of insects, which use it as food source, breeding medium or hunting ground.

2.2.3 Stages of decomposition

Although decomposition is a continuous process without discrete stages (Schoenly and Reid, 1987), for convenience in discussing the results, many researchers have divided this process into two (Howden, 1950) to eight (Mégnin, 1894) subjective stages. For this study five stages of decomposition were applied, using the revised criteria (Anderson and VanLaerhoven, 1996) set forth by Payne (1965) for exposed corpses:

2.2.3.1 First decomposition stage (DS1): **Fresh stage**

The fresh stage begins with the moment of death and ends with the first evidence of bloat. The body temperature falls to that of its surroundings (algor mortis) and ectoparasites, such as ticks and lice, then leave the body (Smith, 1986). The muscle fibers stiffen over the course of five to eight hours from the face downwards. This stiffness (rigor mortis) lasts for about 48 to 72 hours. Sarcophagidae (larviparva) and Calliphoridae start to lay maggots/eggs near body orifices and wounds.

2.2.3.2 Second decomposition stage (DS2): **Bloated stage**

Anaerobe bacteria and microorganisms within the body have started to break down the intestines and gas production (methane, ammonia, hydrogen sulphide, carbon dioxide

and nitrogen) from biochemical fermentation (autolysis) causes the abdomen to expand (Smith, 1986). The body becomes stained greenish and a sweet smell is detectable.

2.2.3.3 Third decomposition stage (DS3): **Active decay stage**

Maggots have hatched from eggs laid by muscoid flies during the fresh stage; their feeding and the gaseous pressure within the carcass cause skin openings and allows oxygen to re-enter the body. The carcass deflates from perforations in the abdominal wall and strong odors persist. Massive body weight loss resulting from the voracious feeding of maggots, as well as from the purging of decomposition fluids into the surrounding environment happens during this stage (Payne, 1965; Anderson and VanLaeroven, 1996). Surrounding vegetation has a typical burned look from black putrefaction a phenomenon known as “cadaver deposition island”. The internal temperature of the carcass increases drastically due to putrefaction process and increased larval fly activity. The end of this stage is when internal temperature matches ambient temperature and when most muscoid larvae have migrated from the carcass to pupate (Gill, 2005).

2.2.3.4 Fourth decomposition stage (DS4): **Advanced decay stage**

Decomposition is largely inhibited during advanced decay due to the loss of readily available cadaveric material. Internal organs are reduced to a paste-like or cheesy material.

2.2.3.5 Fifth decomposition stage (DS5): **Dry/Remains stage**

After desiccation of the cadaveric material only bones, cartilage and dry skin remain (Erbeling and Erbeling, 1986; Anderson and VanLaerhoven, 1996). Vegetation surrounding the carcass begins to recuperate.

2.3 Insect succession on carrion

Payne (1965) has shown that insects represent the primary accelerators of weight loss in carrion decomposition. While carrion protected from insects after 100 days still weighed 20% of the original amount, carrion open to insects lost in the first six days, 90% of its weight (Fig.1). This should illustrate the importance of insect activity to the recycling of dead animal matter.

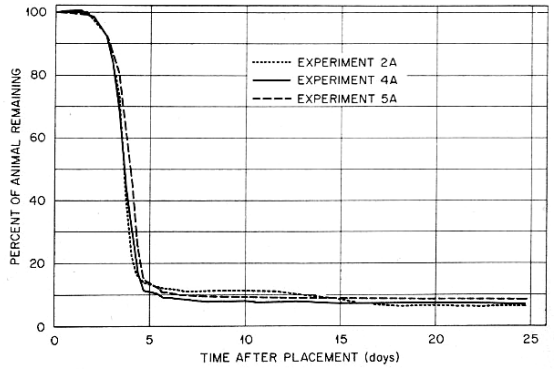

FIG. 13. Decay curve showing the loss of weight of pig carrion when exposed to insects during the summer of 1962. Each experiment consisted of four pigs.

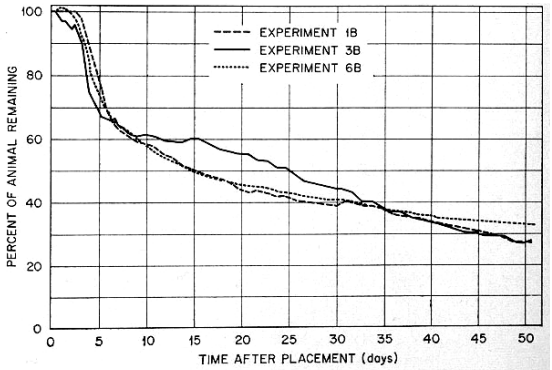

FIG. 14. Decay curve showing the loss of weight of pig carrion when free from insects during the summer of 1962. Each experiment consisted of four pigs.

Fig. 1: Decay curves showing the loss of weight of pig carrion, left (Fig. 13) exposed to insects, right (Fig. 14) free from insects. Taken and modified from Payne (1965).

Insect colonization of carrion can be described as a rapid invasion of the carcass by adult Calliphoridae, Sarcophagidae and Muscidae, resulting in humongous numbers of dipteran eggs and larvae, which supply predacious beetles (**Silphidae**, **Histeridae** and **Staphylinidae**) with food galore. After maximum insect diversity has been reached during bloated stage (DS2) and active decay (DS3), species richness decreases as the food resource is depleted. Most species of fly larvae disperse from the carcass for pupation and other species that prefer the later stages of decay for food and development arrive (**Piophilidae**, **Cleridae**, **Nitidulidae**). Finally further specialized taxa (**Dermestidae**) colonize the dry remains (DS5), feeding on dried skin, cartilage and bone or hunting for mites (Payne, 1965; Smith, 1986; Kočárek, 2003; Grassberger and Frank, 2004; Gill, 2005; Tabor et al., 2005; Eberhardt and Elliot, 2008; Matuszewski et al., 2008; Sharanowski et al., 2008; Souza et al., 2008; Michaud and Moreau, 2009). Studies on carrion have shown that species composition and succession on a cadaver vary according to the geographical region and the season (Carvalho and Linhares, 2001; Grassberger and Frank, 2004; Gill, 2005; Sharanowski et al., 2008).

2.4 Guilds

Insects associated with carrion may be classified according to their ecological role (Payne, 1965; Gill, 2005; Schnepf, 2007). Smith (1986) identifies four ecological categories in a carrion community: Necrophagous species, feeding and breeding on the

carrion; Predators and parasites; Omnivorous and Other species.

In this study we prefer the system of Amendt et al. (2004), modified by Schnepf (2007):

2.4.1 Necrophaga – carrion feeders

This guild feeds in one or all stages of development upon carrion and is dependent on it.

The family of **Silphidae** is represented in this guild with four genera: *Oiceoptoma*, *Necrodes*, *Necrophorus* and *Thanatophilus*.

The genera *Dermestes* of the family **Dermestidae** can be considered as necrophaga, since larvae as well as imagines feed upon dry cadaveric remains. *Dermestes* is one of the few beetle genera - along with the family of **Trogidae** – having enzymes that break down keratin.

2.4.2 Necrolesta – carrion-associated predators

This guild lives as a predator on carcasses, feeding upon fly or beetle larvae, without having any obligatory alliance with decaying meat.

This guild contains:

from the family of **Histeridae** the genera *Saprinus* and *Hister*, from the family **Cleridae** *Necrobia* and from the family **Nitidulidae** the genera *Nitidula* and *Omosita*.

Last, but not least, a large number of genera of **Staphylinidae** hunt on carrion as well (i.e. genera *Philonthus, Ontholestes, Aleochara* and the species *Creophilus maxillosus*).

2.4.3 Saprophaga – feeders upon decaying animal and plant matter

The family **Leiodidae** is represented here with the genera *Catops* and *Sciodrepoides*,

the family **Scarabaeidae** with *Geotrupes* and *Onthophagus*.

Some **Stapylinidae** that occur on carrion must be counted as saprophaga. Furthermore the family **Hydrophilidae** has a few representatives in this guild.

2.4.4 Sugkuria – random guests

Random guests are not associated with carrion, do not prey upon other carrion insects or feed upon decaying matter. The carcass just happened to be in their habitat.

2.5 Study objectives

The aim of the present study was to contribute to forensic science and to increase the knowledge of the carrion beetle fauna of Vienna, Austria. The research questions are as follows:

- Which species compose the carrion beetle fauna of urban and forest study sites in and around the city of Vienna?
- Can the present findings on the carrion succession be confirmed by other studies?
- Are there differences between the carrion beetle fauna of the urban and the forest study sites?
- Are there differences between the carrion beetle fauna of spring and summer?

3. THE STUDY SITES

3.1 Climate and classification of the natural space

Vienna has a temperate continental climate: cold winds from Eastern Europe and Russia can lower winter temperatures considerably, summer is generally hot and dry (22° to 30°). Spring and autumn bring fairly mild weather with temperatures ranging from 14° to 18°C. The average precipitation per year is 660mm, July being the wettest month with an average precipitation of 84mm (Ehrendorfer and Berger, 2011).

3.2 Vienna and the Vienna Woods

Vienna´s city center, the first district, lies on the western bank of the “Donau Kanal”, a branch of the formerly free flowing Danube River. The center is surrounded from southeast to north by now-urbanized former suburbs (districts III to IX) and peripherally by the built-up former outskirts (the districts X to XIX and XXIII). On the island between the “Donau Kanal” and the Danube's main river bed we find districts II and XX and to the east the transdanubial districts XXI and XXII (Fig. 2).

Vienna is situated on the western edge of the Vienna Basin, at 16˚ east longitude and 48˚ north latitude**,** at the transition between two climate zones: the moderate, Central European transitional climate and the dryer, Pannonian climate. It lies on the gentle slopes of the Vienna Woods, the eastern end of the foothills of the Alps. The Vienna Woods is a legally protected green belt, sometimes referred to as Vienna's “Green Lung”. In 2005, the Vienna Woods were designated by UNESCO as a Biosphere Reserve, a designation for areas with a special cultural and natural landscape. Covering 1,350 km^2**,** from St. Andrä-Wördern in the north, it includes parts of Vienna's districts XIX, XVIII, XVII, XVI, XIV, XIII, XXIII and reaches Bad Vöslau in the south and Hainfeld in the west. The Vienna Woods provides a habitat for 2,000 plant species and is relatively rich in fauna, including 150 species of breeding birds and a number of

endangered animals.

The Vienna Woods lie in the transition area between the Eastern Alps and the Carpathians, mountain ranges that are separated by the Danube and various tectonic lines near Vienna. The northern Vienna Woods belong to the Alps' sandstone zone, while its south is part of the Northern Limestone Alps.

The green crescent of the Vienna Woods is complimented by the Lobau floodplain on the eastern banks of the Danube River. The Lobau, part of the Donau-Auen National Park, starts on the same latitude as the city's center and reaches downstream all the way to the Slovakian border. This 22 km^2 National Park, created in 1996, has been a protected area since 1978 (Ehrendorfer and Berger, 2011)

For some reasons the Lobau seems (statistically) less attractive for homicidal body dumping than the Vienna Woods (personal note from Prof. Dr. Christian Reiter). This study, therefore, focuses only on the sylvan regions within the city limits in the western part of Vienna, and compares them with the urban locations in the suburbs and inner city.

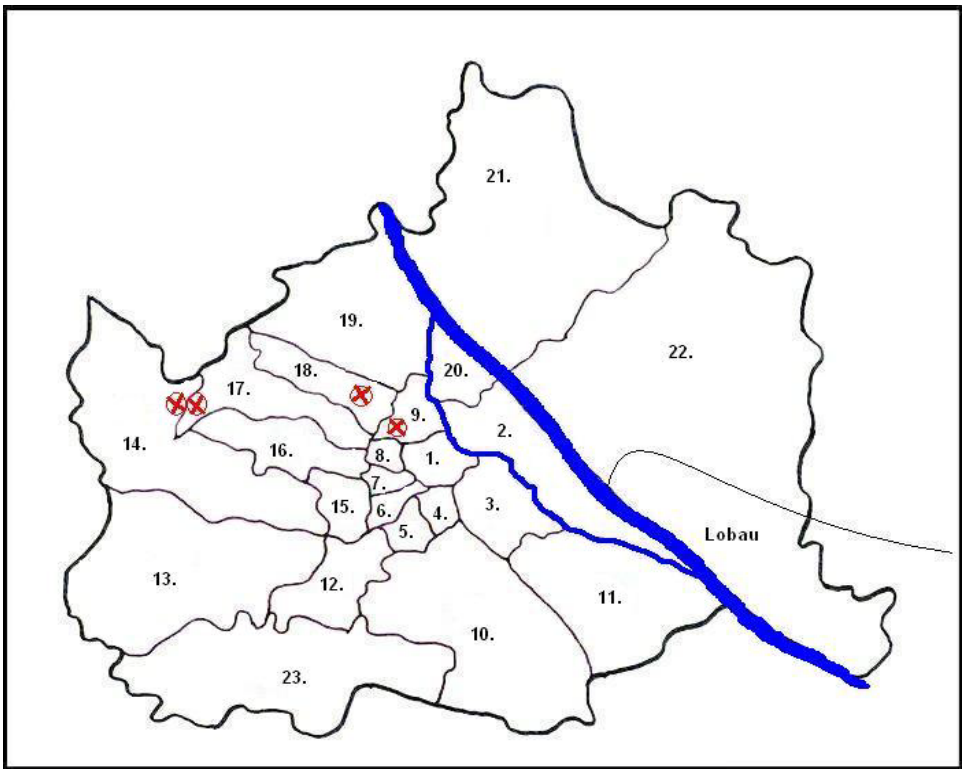

Fig. 2: Vienna with its numbered districts. The locations of the four study sites are marked with red X.

3.2.1 Study site “Narrenturm – inner city”

The Campus of the University of Vienna, formerly the General Hospital, is situated in the IXth district. In this area stood the old poor house, enlarged over the years and re-designated in 1784 under Joseph II into Vienna's General Hospital. During this re-designation the so-called “Narrenturm”, or Fool's Tower, was erected in the northern part of the General Hospital, which was the first building worldwide for the accommodation and treatment of mental patients. On its grounds, in an enclosed area, on silt and loess depositions from the middle Pleistocene (Plachy, 1981; Pfleiderer and Hofmann, 2007) the study site “Narrenturm - inner city” was established.

Table 1: Characteristics of the study site "Narrenturm - inner city"

site	coordinates	meters above sealevel
Narrenturm – inner city	48°13´08.56´´N 16°21´10.63´´E	180m

While in the other three study sites the positions of the carrion during spring and summer trials were at least 150 meters apart so to make sure that “fresh” insects colonized the cadavers, lack of space did not allow this here.

Table 2: List of plant species found at the “Narrenturm - inner city” site

Vegetation at the 'Narrenturm – inner city' site			
Acer campestre	*Taxus baccata*	*Campanula sp.*	*Ailanthus altissima*
Sambucus nigra	*Acer platanoides*	*Alliaria petiolata*	*Arctium sp.*
Robinia pseudacacia	*Prunus sp.*	*Glechoma hederacea*	*Galium aparine*
Acer pseudoplatanus	*Clematis vitalba*	*Urtica dioica*	*Syringa vulgaris*
Prunus avium	*Fragaria sp.*	*Geum urbanum*	*Juglans regia*
Hedera helix	*Taraxacum officinale*	*Fraxinus excelsior*	
Chelidonium majus		*Parthenocissus inserta*	

Fig. 3: The author (with black T-shirt) and pig Dolores at the study site “Narrenturm – inner city”, on the fourth day of the summer trial.

3.2.2 Study site “Sternwartepark - suburb”

The astronomical observatory of the University of Vienna is located on an approximately six hectare parcel of land in the XVIIIth district. It was built between 1874 and 1879, and inaugurated by Emperor Franz Joseph I of Austria in 1883. Today the estate is surrounded by an exclusive residential area with large mansions and moderately sized gardens. The park lies on consolidated sand depositions from the Sarmatium stage (12,1-11,6 million years ago) of the Neogen (Plachy, 1981; Pfleiderer and Hofmann, 2007).

The two sites were 187m beeline apart from each other.

Table 3: Characteristics of the spring and summer study sites "Sternwartepark - suburb"

site	coordinates	meters above sealevel
Sternwartepark – suburb spring	48°13´54.90´´N 16°20´07.59´´E	234m
Sternwartepark – suburb summer	48°13´52.50´´N 16°19´56.39´´E	230m

Table 4: List of plant species found at the “Sternwartepark - suburb” site

Vegetation at the 'Sternwartepark – suburb' site			
Acer platanoides	*Euonymus europaea*	*Sorbus sp.*	*Apiaceae sp.*
Aesculus hippocastrum	*Ulmus minor*	*Viburnum lantanum*	*Rubus sp.*
Tilia platyphyllos	*Philadelphus sp.*	*Rosa sp.*	*Ailanthus altissima*
Robinia pseudacacia	*Crategus monogyna*	*Polygonatum latifolium*	*Mahonia aquifolia*
Fraxinus excelsior	*Cornus sanguinea*	*Alliaria petiolata*	*Viscum album*
Cornus mas	*Prunus padus*	*Geum urbanum*	*Viburnum album*
Prunus avium	*Ligustrum sp.*	*Hedera helix*	
Acer campestre	*Lonicera xylosteum*		

Fig. 4: The author and pig Lionel at the study site "Sternwartepark – suburb", on the twelfth day of the summer trial.

3.2.3 Study site "Schottenhof - oak forest"

Where the XIVth, XVIIth and XVIIIth districts meet, lies a well-managed forest known as the "Schottenwald". This property of about 500 hectares is owned by the "Benedictine Abbey of Our Dear Lady to the Scots" or "Schottenstift", a Roman Catholic monastery founded in Vienna in 1155 when Henry II brought Irish monks to Vienna. In the center of the forest, along Amundsenstraße, an administrative building, the "Schottenhof", was constructed in 1837. Today a restaurant has taken space in the "Schottenhof" and a parking lot is situated on the opposite side of the building. From this parking lot a forest track leads toward Dornbach and the bird sanctuary of the "Wiener Tierschutzverein". South of this track, in an oak forest with a southeasterly aspect, the study sites for the spring and summer experiments were established.

The two sites were 175m beeline apart.

This part of the Vienna Woods is in a section of the flysch zone called "Schottenhofzone", made of sandstone and marl. Flysch is a deep marine sediment, deposited during an early stage of the orogenesis, in this case during the late cretaceaous/early tertiary (100-53 million years ago) (Plachy, 1981; Pfleiderer and Hofmann, 2007).

Table 5: Characteristics of the spring and summer study sites "Schottenhof - oak forest"

site	coordinates	meters above sealevel
Schottenhof – oak forest spring	48°13´46.28´´N 16°15´37.23´´E	360m
Schottenhof – oak forest summer	48°13´43.57´´N 16°15´32.95´´E	345m

Table 6: List of plant species found at the “Schottenhof – oak forest” site

Vegetation at the 'Schottenhof – oak forest' site

Quercus petrea	*Rubus sp.*	*Euphorbia amygdaloides*	*Larix decidua*
Fagus sylvatica	*Melittis melissophyllum*	*Fragaria sp.*	*Quercus robur*
Galium odorata	*Viola sp.*	*Fraxinus excelsior*	*Quercus cerris*
Impatiens parviflora	*Sambucus nigra*	*Daphne mezereum*	*Lamium sylvaticum*
Clematis vitalba	*Carex sp.*	*Carpinus betulus*	

Fig. 5: Day zero of the summer trial at the study site “Schottenhof – oak forest”

3.2.4 Study site “Schottenhof - beech grove”

Near to the “Schottenhof”, north of Amundsenstraße, lies an ecological wastewater treatment plant, known euphemistically as “the lake”. The woods spread out from here, typically made up of European beech (*Fagus sylvatica*), and interrupted only by forest tracks. Just north of “the lake”, the spring study site was established on a north-east-facing slope. For the summer trial the site was moved a further 190m into the woods.

Table 7: Characteristics of the spring and summer study sites "Schottenhof - beech grove"

site	coordinates	meters above sealevel
Schottenhof – beech grove spring	48°13´55.66´´N 16°15´32.90´´E	361m
Schottenhof – beech grove summer	48°13´58.20´´N 16°15´27.86´´E	363m

Table 8: List of plant species found at the "Schottenhof – beech grove" site

Vegetation at the 'Schottenhof – beech grove' site

Fagus sylvatica	*Carex sp.*	*Impatiens parviflora*	*Viola sp.*
Carpinus betulus	*Galium odoratum*	*Urtica dioica*	*Sanicula europea*
Quercus petrea	*Lamium galeobdolom*	*Hedera helix*	*Prunus pardus*
Fraxinus excelsior			*Rubus sp.*

Fig. 6: Day zero of the summer trial at the study site "Schottenhof – beech grove".

4. MATERIAL AND METHODS

4.1 The carcasses

To simulate a human cadaver realistically, pigs (*Sus scrofa domestica*) were used, as pigs are similar to humans in many and various ways. Their thoraxes have comparable proportions, the quantity of body hair, the skin type and the digestive process and gut fauna are alike. In previous studies, pigs have been used successfully, demonstrating with certainty that decomposition ensues analogously to that in a human cadaver (Rodriguez and Bass, 1983; Schoenly et al., 1991; Catts and Goff, 1992; Anderson and VanLaerhoven, 1996; Richards and Goff, 1997; Avila and Goff, 1998).

The pigs for this study were transported by car from a veterinarian and pig farmer in Lower Austria. They were narcotized with a blend of Ketamin (Narketan®) and Azaperone (Stresnil™) and then put down with T61, a mixture of Tetracainhydrochloride, Mebezoniumiodide and Embutramide.

As human bodies are mostly found clothed, and clothing is known to influence decomposition (Mellen et al., 1993; Dillon, 1997; Grassberger and Frank, 2004), each carcass was dressed in jeans and T-shirt before final placement.

The day of death was recorded as Day 0 for each trial. One pig from the first trial died the night before it was picked up, but for the sake of simplicity the start of the spring trial is listed for all pigs as May 12, 2009.

Table 9 and 10 show the locations and the individual pigs with their characteristics.

Table 9: Pigs' characteristics of the spring trial.
Abbreviations: f = female; m = male

Location	Name	Date of death	sex	weight	length
Narrenturm – inner city	Marla	12.05.09	f	20 kg	82 cm
Sternwartepark – suburb	Knuth	11.05.09	m	24 kg	90 cm
Schottenhof – oak forest	Fridolin	12.05.09	m	17 kg	80 cm
Schottenhof – beech grove	Berta	12.05.09	f	34 kg	104 cm

Table 10: Pigs' characteristics of the summer trial.
Abbreviations: f = female; m = male

Location	Name	Date of death	sex	weight	length
Narrenturm – inner city	Dolores	27.07.09	f	30 kg	92 cm
Sternwartepark – suburb	Lionel	27.07.09	m	28 kg	98 cm
Schottenhof – oak forest	Valeria	27.07.09	f	31 kg	110 cm
Schottenhof – beech grove	Alma	27.07.09	f	30 kg	97 cm

4.2 Site setup

4.2.1 The purpose-built racks

Beetles visiting carrion tend to rove below the carcass; they scurry around it and bury themselves in the surrounding ground. In order to collect them, a device had to be built. I designed and then welded four customized structures which allowed me to collect burrowing beetles.

These racks consisted of a platform of one square meter, 25 cm above ground. The platform had a steel frame with two bracings covered with wide-meshed netting-wire, as used for rabbit hutches. Then, 7 cm below this platform a second platform was fixed, consisting of a steel frame covered by aluminum fly-screen. In the four corners of this second platform, holes of 4 cm in diameter were cut into the close-meshed fly-screen and clamping fixtures were welded to the frame, allowing the fastening of glass jars, which served as traps underneath the holes.

To block access to the lower platform from the side, the gap between the two platforms was closed off with fly-screen, so insects could only arrive at the second platform through the upper one, on which had been placed lawn turf. (The lawn material was Hobby Rasen® from Richter Rasen GmbH, a brand of lawn grown in eastern Austria, lifted from the ground in manageable strips with a thickness of 30 mm and delivered rolled-up for instant placement on bare ground.) On this square meter of lawn turf, the clothed pig cadaver was placed.

Carrion is attractive to many vertebrate scavengers such as wild boar, foxes, badgers, dogs and also attracts vandalism by humans. Therefore cages built from wood and wire mesh were constructed to minimize interference by unwelcome guests. These cages, which measured 1 m x 1 m x 0.5 m, were placed on top of the racks once the pigs cadavers had been positioned. To prevent the removal of cages, they were fixed to the racks with four locks each. As a deterrent, especially to wild boar, pieces of clothing, such as my grandmother's old bikini, were soaked in human urine and positioned in the surrounding vegetation and regularly re-soaked over the course of the study.

4.2.2 Rack-mounted traps

The glass jars fixed in the four corners of the lower catchment platforms were 250 ml HiPP© baby food jars, filled with 80 ml diluted ethylene glycol (50%). They were checked on every visit (see chapter 4.4 Sampling period) and collected when necessary. Only animals having been in close proximity to the carcass and having dug into the lawn turf could have fallen into these traps because access to the lower platform was possible only via the 3 centimeter-thick turf layer on which the carrion had been placed.

4.2.3 Pitfall traps

For collecting less specific and more abundant beetles, four pitfall traps were dug into the ground surrounding the rack, representing the four corners of a square of 140 cm side length (Fig.7). These traps consisted of two plastic cups of 250 ml with an opening of 6,5 cm diameter,

Fig. 7: Site setup, viewed from above

placed one inside the other to prevent the hole from collapsing whenever the inner cup was removed for collecting the prey. A solution of 80 ml diluted ethylene glycol (50%) with a drop of detergent was used to drown the insects.

Ethylene glycole in its pure form is an odorless, colorless, syrupy, sweet-tasting liquid, said to act neither as an attractant nor a repellant to insects. It is often used in pitfall traps as it is a safer temporary insect preservative than formaldehyde.

A drop of detergent was added in each trap to reduce the surface tension of the liquid, which ensured that the insects sank to the bottom of the pitfall trap. The traps were collected on every visit. The contents were poured together into one larger glass jar and sorted out the same day, keeping insects clearly labeled in small glass jars with 70% ethanol for preservation and identification.

4.2.4 Temperature measurement

Since insect activity and carrion decomposition are influenced by temperature (Gill, 2005), "testo 175-T2®" temperature data loggers were used to record the ambient and internal carcass temperatures at all four locations every thirty minutes. Internal temperature probes, measuring 115 mm long with a diameter of 5 mm, were stabbed into the thorax of the carcass. Ambient air temperature readings were taken at approximately 75 cm above ground level, on the inside of the protective cage, directly above the corpse. The logged data was secured and processed with Set ComSoft 3-Basic software at the end of each trial.

4.2.5 Precipitation measurement

A pluviometer (also known as a rain gauge, udometer or ombrometer) as used by meteorologists to gather and measure the amount of liquid precipitation over a set period of time, was placed at every site in the immediate vicinity of the carrion. Care was taken that the amount of arboreal canopy above the pluviometers was similar to the foliage covering the corresponding racks with the pig cadaver, in order to ensure that the quantity of rainwater would be comparable. On every visit, content was noted and poured out.

4.3 Photographs

In order to determine the arrival and duration of the consecutive stages of decomposition, at least four photographs of each carcass were taken on every visit using a Canon Digital IXUS 90 IS with a 3648x2736 resolution. The pictures helped to reconfirm that numerous insect species arrived in a predictable sequence in the decay process of pig carrion.

Furthermore it was attempted to generate a time lapse sequence by taking one picture at a time from a specific position using a fixed tripod and a Canon Digital IXUS 500. Later these images were aligned and rapidly flashed to create an illusion of fast-occurring decomposition. Unfortunately, the time intervals between the pictures, especially at the beginning of the decay process, were too long, so the moving images seem rather staccato than smooth.

Further field protocol

Hand written notes were taken on every sample day to record general observations about temperature, wind speed, precipitation and cloud cover at the time of sampling, the overall state of the carcass, insect activity, rough estimate of different beetle families or, when possible, species and other conspicuities.

4.4 Sampling period

The spring trial lasted from May 12 until July 26, 2009 (Table 11) and the summer trial from July 27 until October 20, 2009 (Table 12).

Examinations of each site took place during spring trial the first three weeks regularly every two days (one day, the two urban sites, the next day, the two sylvan sites), the next four weeks, every two to three days and the last three weeks, every five to seven days.

During the summer trial the examinations were carried out every two to three days during the first four weeks; the following visitation took place eight days later and a final visit came seven weeks thereafter.

Every visitation lasted for about half an hour and was conducted under all

weather conditions.

Weeks are numbered for the tables and the diagrams as follows (Table 11 and 12):

Table 11: Sampling periods in the spring trial.
Abbreviation: W = week

12.05.09 – 19.05.09	W1
19.05.09 – 26.05.09	W2
26.05.09 – 02.06.09	W3
02.06.09 – 09.06.09	W4
09.06.09 – 16.06.09	W5
16.06.09 – 22.06.09	W6
22.06.09 – 30.06.09	W7
30.06.09 – 07.07.09	W8
07.07.09 – 14.07.09	W9
14.07.09 – 20.07.09	W10
20.07.09 – 26.07.09	W11

Table 12: Sampling periods in the summer trial.
Abbreviation: W = week

27.07.09 – 03.08.09	W1
03.08.09 – 10.08.09	W2
10.08.09 – 16.08.09	W3
16.08.09 – 23.08.09	W4
23.08.09 – 30.08.09	W5
30.08.09 – 02.09.09	W6
02.09.09 – 20.10.09	W7

4.5 Identification of species

The collected beetles were kept in 70% ethanol, clearly labeled and later identified using a binocular microscope (Nikon SMZ645 four- to fiftyfold magnification) with a 32 LED ring cold-light emitter. For identification the following literature was used:

- Freude et al., 1971
- Lohse et al., 1974; Geisthardt et al., 1979
- Vogt et al., 1967
- Cymorek et al., 1969
- Schaefer et al., 2002
- Harde et al., 2000

Of every identified species at least one individual was pinned and kept in a special collection.

If possible or necessary, genitalia were examined for ascertain identification of certain species.

Beetle larvae were not identified, but handled as an entity.

5. RESULTS

5.1 Temperature & rainfall data

In general, temperatures in the months May to July 2009 were very close to the thirty year mean for Vienna (Klimadaten von Österreich 1971-2000), whereas temperatures from August to October were ~2-4°C above average. There was less fluctuation in internal carcass temperatures than in ambient air temperatures. During the spring trial, temperature loggers were put in place only on the second day, so *algor mortis* (the reduction in body temperature following death), can be seen solely on the temperature curves of the summer trial (see addendum), where the corresponding green curve drops significantly from 38-39°C, (normal body temperature of *Sus scrofa domestica*), during the first day and night. After 12-14 days following the pigs' death in spring and 6-8 days in summer, internal temperatures rose significantly to almost 20°C above ambient temperatures, (see addendum page 85 “Sternwartepark spring” day 11: 40.1°C internal, while ambient temperatures lingered around 21°C). This heated-up state lasted as long as 19 days in one of the carcasses (see addendum page 87 “Schottenhof Beech-grove spring”), but was generally over after 3-9 days.

These heated states were interrupted in both seasons by rainfalls and corresponding drops in ambient temperature. However, in some cases this did not stop the production of heat from continuing (see addenda page 87 “Beech-grove spring”, page 91 “Beech-grove summer”, and page 86 “Oak-forest spring”).

5.2 Decomposition

Carcasses in summer decayed much faster than those in spring. Table 16 and 17 show the number of days each of the respective stages lasted.

During the **fresh stage** (DS1) no visible morphological changes in the carcass were notable. This stage had begun at the moment of death and continued until bloat was evident, with no significant odor emanating from the carcass. In summer, this stage lasted only two days, in spring four or five days (Table 16 and 17). Adults of Calliphoridae were present within half an hour after the dead pigs were placed on the rack, depositing eggs around the eyes, mouth, nostrils, and on the forehead (Fig. 8).

Fig. 8: The fresh stage: day 2 spring trial, „Schottenhof – beech grove“

Bloated stage (DS2) begins when bloating of the carcass becomes visible, its color changes (to the characteristic blue-green marbling from gaseous build-up in the abdomen), and bubbles of blood form at the nostrils. In the later part of this stage, odor can be noticed and fluids seep out. (Fig. 3)

The bloated stage (DS2) changes into the **active decay stage** (DS3), when the carcass deflates from perforations in the abdominal wall, as feeding Calliphoridae larvae break the skin and eventually consume most of the flesh. Strong putrefaction odor associated with tissue liquefaction can (must!) be detected. Internal temperatures rise drastically due to putrefaction process and increased larval fly activity. Several braconid wasps were observed among the many insects at the carrion. Clothing became soaked with putrefactive liquids and later on served as a growth medium for mold. Outer edges of skin and the underlying lawn took on the characteristic burned appearance of black putrefaction (“cadaver deposition island”) (Fig. 9).

Fig. 9: The active decay stage: day 7 summer trial, „Schottenhof – beech grove“

When most of the muscoid fly larvae have left the carcass, the **advanced decay stage** (DS4) begins and from then on the internal temperature matches more closely the

ambient one. These two phenomena did not occur in all cases simultaneously; for example, at beech-grove in summer the fly-maggot migration appeared on August 5 (day 9), but it was decided to set the start of decay stage 4 on August 11 (day 15), because temperatures and overall carcass appearance suggested that date. (Fig. 4)

After the internal organs, now reduced to a paste-like or cheesy material, are consumed or desiccated, the **dry stage** (DS5) begins. By this time, there is little odor associated with the remains. While the dry stage will continue until carrion fauna is no longer present on the remains or until complete decomposition - and this can take many months - the trials of this study lasted only 76 days in spring and 86 days in summer. By the end of the experiments, only dried skin, cartilage, textile fabric (hardened from the drying of decompositional fluids) and bones were all that was left of the carcasses (Fig. 10).

Fig. 10: The dry stage: day 22 summer trial, „Sternwartepark - suburb“

5.3 Full range of beetle species trapped at the study sites

In this study 60 species from 21 beetle families have been identified among 7337 individual beetles collected (Table 13).

Table 13: List of all beetle species and their numbers found during this study.
Abbreviation sp. = unidentified species

Family	Species	Numbers
Anobiidae	sp.	1
Byturidae	sp.	3
	Byturus aestivus (Linné, 1758)	29
Carabidae	sp.	437
Cerambycidae	sp.	1
Chrysomelidae	sp.	1
Cleridae	sp.	2
	Necrobia ruficollis (Fabricius, 1775)	10
	Necrobia rufipes (DeGeer, 1775)	13
	Necrobia violacea (Linné, 1758)	91
Curculionidae	sp.	26
Dermestidae	sp.	2
	Dermestes haemorrhoidalis (Küster, 1852)	3
	Dermestinus frischi (Kugelann, 1792)	1
	Dermestinus murinus (Linné, 1758)	3
	Dermestinus undulatus (Brahm, 1790)	4
Elateridae	sp.	5
Erotylidae	*Dacne notata* (Gmelin, 1788)	1
Histeridae	sp.	3
	Carcinops pumilio (Erichson, 1834)	1
	Gnathoncus nannetensis (Marseul, 1862)	1
	Grammostethus ruficornis (Grimm., 1852)	2
	Hister cadaverinus (Hoffmann, 1803)	196
	Hister distinctus (Erichson, 1834)	1
	Hister merdarius (Hoffmann, 1803)	3
	Hister striola (Sahlberg, 1819)	176
	Hister unicolor (Linné, 1758)	3
	Kissister minima (Aubé, 1850)	1
	Paralister stercorarius (Hoffmann, 1803)	4
	Saprinus cuspidatus (Ihssen, 1949)	4
	Saprinus rugifer (Paykull, 1809)	1
	Saprinus semistriatus (Scriba, 1790)	1094
	Saprinus sp.	1
	Saprinus tenuistrius (Marseul, 1855)	1
Hydrophilidae	*Cercyon unipunctatus* (Linné, 1758)	5
	Sphaeridium marginatum (Fabricius, 1787)	1
	Cryptopleurum minutum (Fabricius, 1775)	1
Leiodidae	sp.	4
	Catops longulus (Kellner, 1846)	12
	Catops nigrita (Erichson, 1837)	2
	Choleva cisteloides (Frölich, 1799)	3
	Ptomaphagus subvillosus (Goeze, 1777)	1
	Sciodrepoides alpestris (Jeannel, 1934)	13
	Sciodrepoides fumatus (Spence, 1815)	1
	Sciodrepoides watsoni (Spence, 1815)	1
Lucanidae	*Dorcus parallelopipedus* (Linné, 1758)	3
Melyridae	sp.	1
Nitidulidae	sp.	8
	Nitidula rufipes (Linné, 1767)	1
	Omosita colon (Linné, 1758)	11
	Omosita depressa (Linné, 1758)	21
	Omosita discoidea (Fabricius, 1775)	146
Pselapidae	*Bryaxis* sp.	1
Scarabaeidae	*Decamara philanthus* (Fuessly, 1775)	1
	Esymus merdarius (Fabricius, 1775)	1
	Geotrupes stercorarius (Linné, 1758)	1719
	Onthophagus taurus (Schreber, 1759)	4
	Onthophagus vacca (Linné, 1767)	53
	Onthophagus verticicornis (Laicharting, 1781)	1
	Valgus hemipterus (Linné, 1758)	1
Silphidae	*Necrodes littoralis* (Linné, 1758)	860
	Necrophorus fossor (Erichson, 1837)	35
	Necrophorus humator (Olivier, 1790)	58
	Necrophorus sepultor (Charpentier)	1
	Necrophorus vespillo (Linné, 1758)	3
	Necrophorus vespilloides (Herbst, 1784)	44
	Oiceoptoma thoracica (Linné, 1758)	56
	Phosphuga atrata (Linné, 1758)	2
	Thanatophilus rugosus (Linné, 1758)	80
	Thanatophilus sinuatus (Fabricius, 1775)	310
Staphylinidae	sp.	1728
Trogidae	*Trox cadaverinus* (Illiger, 1801)	1
	Trox scaber (Linné, 1767)	18
Total number		**7337**

Following the scale established by Engelmann (1978), four families (**Scarabaeidae**, **Staphylinidae**, **Histeridae** and **Silphidae**) have been found as "dominant" (>10% - 32% percentual share of individuals), **Carabidae** were "subdominant" (>3,2% - 10%), **Nitidulidae** and **Cleridae** "recedent" (>1% - 3,2%), **Leiodidae**, **Byturidae** and **Curculionidae** were "subrecedent" (>0,32% - 1%) and the rest (**Trogidae**, **Dermestidae**, **Hydrophilidae**, **Elateridae**, **Lucanidae**, **Erotylidae**, **Pselapidae**, **Anobiidae**, **Melyridae**, **Chrysomeliae** and **Cerambycidae**) were "sporadic" (<0,32%) (Fig. 11).

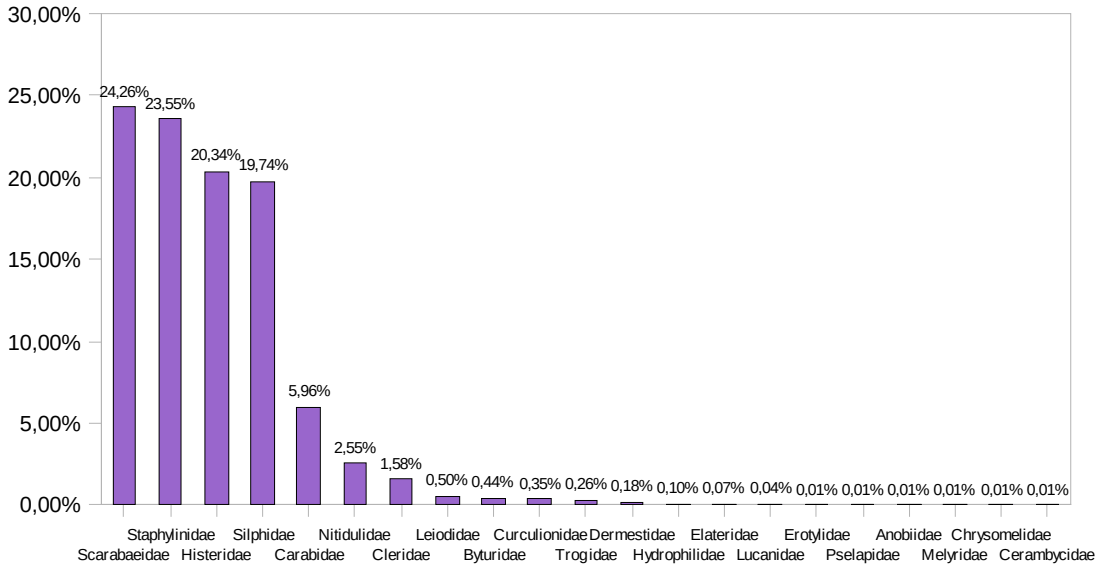

Fig. 11: Percentages of species found among all individual beetles collected

5.4 Range of species relevant for the study

As mentioned earlier (see chapter 2.4), only the families belonging to the ecological groups of necrophaga, necrolesta and saprophaga are of relevance for this study.

Pitfall trap contents vs. rack-mounted trap contents

Comparing the collection results of pitfall traps and rack-mounted traps (Table 14) it was found that most species were trapped more often in the less specific pitfall traps set in the ground around the carrion (5431 individuals in the pitfall traps, 1389 individuals in the rack-mounted traps).

Only *Necrobia violacea* (**Cleridae**), *Omosita discoidea* (**Nitidulidae**) and *Necrophorus*[1] *fossor* (**Silphidae**) were present significantly more frequently in the rack-mounted traps, fixed directly underneath the carcass below the lawn turf.
Necrophorus humator (**Silphidae**) was represented equally in the both kinds of traps.

[1] From a strict nomenclatorial rule the taxon „Nicrophorus“ would be correct because the first description of Johann Christian Fabricius in 1775 (Systema entomologiae) used this (erroneous) type of writing. Since the author himself corrected it in 1801 (Systema Eleuthatorum) to „Necrophorus“, this emendation will be respected in this study.

Table 14: List of species relevant for this study and number of individuals trapped in the two trap types.
Abbreviations: PT = pitfall traps; RMT = rack-mounted traps

Family	Species	PT	RMT	total number
Cleridae	sp.	2		**2**
	Necrobia ruficollis (Fabricius, 1775)	2	8	**10**
	Necrobia rufipes (DeGeer, 1775)	5	8	**13**
	Necrobia violacea (Linné, 1758)	28	63	**91**
Dermestidae	sp.	2		**2**
	Dermestes haemorrhoidalis (Küster, 1852)		3	**3**
	Dermestinus frischi (Kugelann, 1792)	1		**1**
	Dermestinus murinus (Linné, 1758)	3		**3**
	Dermestinus undulatus (Brahm, 1790)	2	2	**4**
Histeridae	sp.	2	1	**3**
	Carcinops pumilio (Erichson, 1834)		1	**1**
	Gnathoncus nannetensis (Marseul, 1862)	1		**1**
	Grammostethus ruficornis (Grimm., 1852)		2	**2**
	Hister cadaverinus (Hoffmann, 1803)	158	38	**196**
	Hister distinctus (Erichson, 1834)	1		**1**
	Hister merdarius (Hoffmann, 1803)	1	2	**3**
	Hister striola (Sahlberg, 1819)	108	68	**176**
	Hister unicolor (Linné, 1758)	1	2	**3**
	Kissister minima (Aubé, 1850)		1	**1**
	Paralister stercorarius (Hoffmann, 1803)	4		**4**
	Saprinus cuspidatus (Ihssen, 1949)	4		**4**
	Saprinus rugifer (Paykull, 1809)		1	**1**
	Saprinus semistriatus (Scriba, 1790)	848	246	**1094**
	Saprinus sp.		1	**1**
	Saprinus tenuistrius (Marseul, 1855)		1	**1**
Hydrophilidae	*Cercyon unipunctatus* (Linné, 1758)	1	4	**5**
	Sphaeridium marginatum (Fabricius, 1787)	1		**1**
	Cryptopleurum minutum (Fabricius, 1775)	1		**1**
Leiodidae	sp.	3	1	**4**
	Catops longulus (Kellner, 1846)	12		**12**
	Catops nigrita (Erichson, 1837)	2		**2**
	Choleva cisteloides (Frölich, 1799)	3		**3**
	Ptomaphagus subvillosus (Goeze, 1777)	1		**1**
	Sciodrepoides alpestris (Jeannel, 1934)	12	1	**13**
	Sciodrepoides fumatus (Spence, 1815)	1		**1**
	Sciodrepoides watsoni (Spence, 1815)		1	**1**
Nitidulidae	sp.	2	6	**8**
	Nitidula rufipes (Linné, 1767)	1		**1**
	Omosita colon (Linné, 1758)	4	7	**11**
	Omosita depressa (Linné, 1758)	15	6	**21**
	Omosita discoidea (Fabricius, 1775)	55	91	**146**
Scarabaeidae	*Decamara philanthus* (Fuessly, 1775)	1		**1**
	Esymus merdarius (Fabricius, 1775)	1		**1**
	Geotrupes stercorarius (Linné, 1758)	1574	145	**1719**
	Onthophagus taurus (Schreber, 1759)	4		**4**
	Onthophagus vacca (Linné, 1767)	51	1	**52**
	Onthophagus verticicornis (Laicharting, 1781)	1		**1**
	Valgus hemipterus (Linné, 1758)	1		**1**
Silphidae	*Necrodes littoralis* (Linné, 1758)	663	197	**860**
	Necrophorus fossor (Erichson, 1837)	8	27	**35**
	Necrophorus humator (Olivier, 1790)	29	29	**58**
	Necrophorus sepultor (Charpentier)	1		**1**
	Necrophorus vespillo (Linné, 1758)	3		**3**
	Necrophorus vespilloides (Herbst, 1784)	34	10	**44**
	Oiceoptoma thoracica (Linné, 1758)	56		**56**
	Phosphuga atrata (Linné, 1758)	2		**2**
	Thanatophilus rugosus (Linné, 1758)	75	5	**80**
	Thanatophilus sinuatus (Fabricius, 1775)	273	37	**310**
Staphylinidae	sp.	1354	374	**1728**
Trogidae	*Trox cadaverinus* (Illiger, 1801)	1		**1**
	Trox scaber (Linné, 1767)	15	3	**18**
total number		**5434**	**1393**	**6827**

Table 15 shows which beetles were present at which location and in which season**.**

Table 15: List of species relevant to this study with their occurance at the four locations in spring and in summer.
(+ = at least one individual)

Family	Species	Narrenturm		Sternwartepark		Oak-forest		Beech-grove	
		spring	summer	spring	summer	spring	summer	spring	summer
Cleridae	*Necrobia ruficollis* (Fabricius, 1775)	+	+			+			
	Necrobia rufipes (DeGeer, 1775)	+	+		+	+			
	Necrobia violacea (Linné, 1758)	+	+	+	+	+	+	+	+
Dermestidae	*Dermestes haemorrhoidalis* (Küster, 1852)	+	+		+				
	Dermestinus frischi (Kugelann, 1792)	+							
	Dermestinus murinus (Linné, 1758)			+					+
	Dermestinus undulatus (Brahm, 1790)			+	+		+		
Histeridae	*Carcinops pumilio* (Erichson, 1834)	+			+				
	Gnathoncus nannetensis (Marseul, 1862)							+	
	Grammostethus ruficornis (Grimm., 1852)							+	
	Hister cadaverinus (Hoffmann, 1803)	+	+	+	+	+	+	+	+
	Hister distinctus (Erichson, 1834)						+		
	Hister merdarius (Hoffmann, 1803)						+	+	+
	Hister striola (Sahlberg, 1819)			+	+	+	+	+	+
	Hister unicolor (Linné, 1758)						+		+
	Kissister minima (Aubé, 1850)							+	
	Paralister stercorarius (Hoffmann, 1803)			+					
	Saprinus cuspidatus (Ihssen, 1949)	+		+					
	Saprinus rugifer (Paykull, 1809)				+				
	Saprinus semistriatus (Scriba, 1790)	+	+	+	+	+	+	+	+
	Saprinus tenuistrius (Marseul, 1855)	+							
Hydrophilidae	*Cercyon unipunctatus* (Linné, 1758)							+	
	Sphaeridium marginatum (Fabricius, 1787)							+	
	Cryptopleurum minutum (Fabricius, 1775)					+			
Leiodidae	*Catops longulus* (Kellner, 1846)					+		+	
	Catops nigrita (Erichson, 1837)					+	+		
	Choleva cisteloides (Frölich, 1799)					+			
	Ptomaphagus subvillosus (Goeze, 1777)				+				
	Sciodrepoides alpestris (Jeannel, 1934)					+	+	+	+
	Sciodrepoides fumatus (Spence, 1815)						+		
	Sciodrepoides watsoni (Spence, 1815)						+		
Nitidulidae	*Nitidula rufipes* (Linné, 1767)					+			
	Omosita colon (Linné, 1758)		+	+	+			+	
	Omosita depressa (Linné, 1758)			+		+	+	+	+
	Omosita discoidea (Fabricius, 1775)	+		+		+		+	
Scarabaeidae	*Decamara philanthus* (Fuessly, 1775)			+					
	Esymus merdarius (Fabricius, 1775)							+	
	Geotrupes stercorarius (Linné, 1758)					+	+	+	+
	Onthophagus taurus (Schreber, 1759)					+		+	
	Onthophagus vacca (Linné, 1767)	+		+		+	+	+	
	Onthophagus verticicornis (Laicharting, 1781)							+	
	Valgus hemipterus (Linné, 1758)			+					
Silphidae	*Necrodes littoralis* (Linné, 1758)		+	+	+	+	+	+	+
	Necrophorus fossor (Erichson, 1837)			+	+	+	+	+	+
	Necrophorus humator (Olivier, 1790)					+	+	+	+
	Necrophorus sepultor (Charpentier)					+			
	Necrophorus vespillo (Linné, 1758)			+				+	
	Necrophorus vespilloides (Herbst, 1784)						+	+	+
	Oiceoptoma thoracica (Linné, 1758)					+	+	+	
	Phosphuga atrata (Linné, 1758)							+	
	Thanatophilus rugosus (Linné, 1758)	+		+		+	+	+	
	Thanatophilus sinuatus (Fabricius, 1775)	+	+	+	+	+	+	+	+
Staphylinidae	sp.	+	+	+	+	+	+	+	+
Trogidae	*Trox cadaverinus* (Illiger, 1801)						+		
	Trox scaber (Linné, 1767)			+					

5.5 Spring vs. Summer

5.5.1 Species' seasonal preferences

Comparing the lists of collected beetle species in spring and summer, table 15 shows that some species appear primarily or only in one season.
A certain number of species dominated in spring, for instance:
Oiceoptoma thoracica (collected 55 times in spring whereas only once in summer)
Thanatophilus sinuatus (217 individuals in spring – 93 individuals in summer), its near relative *Thanatophilus rugosus* (79 times more often in spring, one in summer) similar to the **Scarabaeid** *Onthophagus vacca* (52 individuals in spring, one in summer).

From the family **Trogidae** 18 *Trox scaber* fell into the traps in spring, while none was found in summer.

Omosita discoidea from the family **Nitidulidae** was collected solely in spring (146 individuals), same as *Catops longulus* (**Leiodidae**) - 12 individuals.

5.5.2 Families' seasonal preferences

Taking a step upward and focusing on the family level, figure 12 illustrates that the four major families in this study show different patterns of appearance: more individuals in spring, more in summer or no seasonal preference:
Spring visiting **Histeridae** and **Staphylinidae** outnumbered summer arrivals, **Silphidae** and **Scarabaeidae** were rarer in spring but very present in summer.
The families **Trogidae**, **Nitidulidae** and **Hydrophilidae** were almost not present at all in the summer period. The numbers of **Dermestidae**, **Cleridae** and **Leiodidae** trapped during this study do not point to any seasonal preference (Fig. 12).

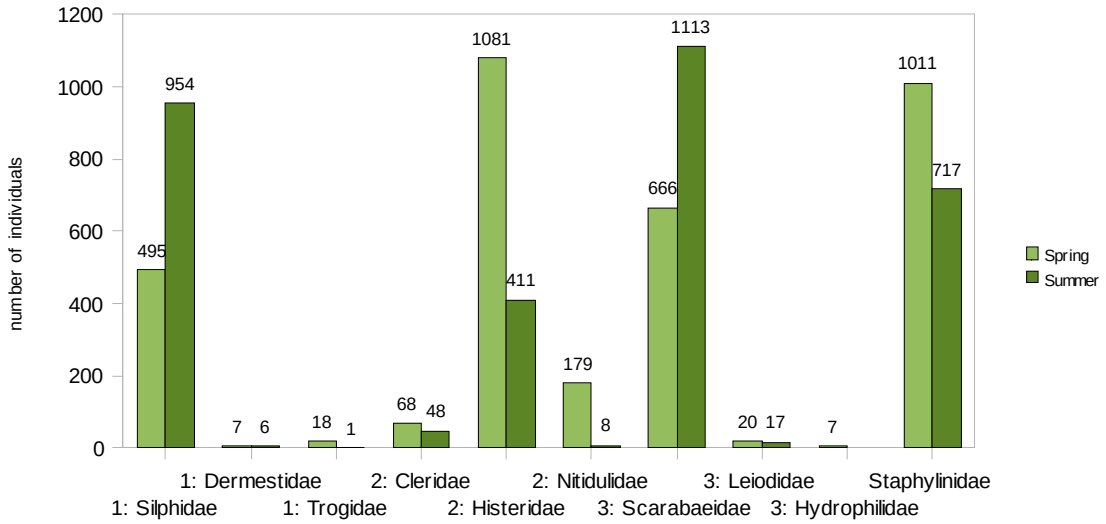

Fig. 12: Comparison between numbers of individuals in spring and in summer.
(Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

Families' seasonal preferences according to locations

Still looking at the families' spring and summer prevalence, a breakdown of the four locations shows deviations and differences from the general pattern described before: **Silphidae** follow their aforementioned trend on all study sites, having a greater presence in summer. **Cleridae** show one exception from their general tendency at the site "Narrenturm-inner city" (Fig. 13), three times as many individuals were collected during the summer trial. On the same site another "irregularity" occurred, since a few more **Staphylinidae** showed up in summer, not congruent with the common trend of this family.

Finally, the **Histeridae** stick to their seasonal preferences on all study sites and appear more in spring than in summer, in the oak-forest of the Schottenhof only by a small margin (Fig. 15).

In the two woodland study sites ("Schottenhof – oak forest" and "Schottenhof – beech grove"), the number of larvae doubles in summer, while on the "Sternwartepark – suburb" study site it recedes, and on the "Narrenturm – inner city" site it stays similar (Fig. 17).

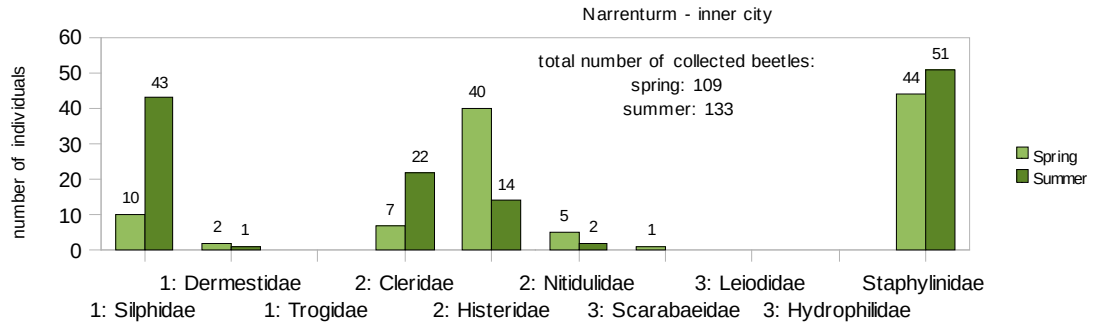

Fig. 13: Comparison between numbers of individuals in spring and in summer at the location "Narrenturm - inner city". (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

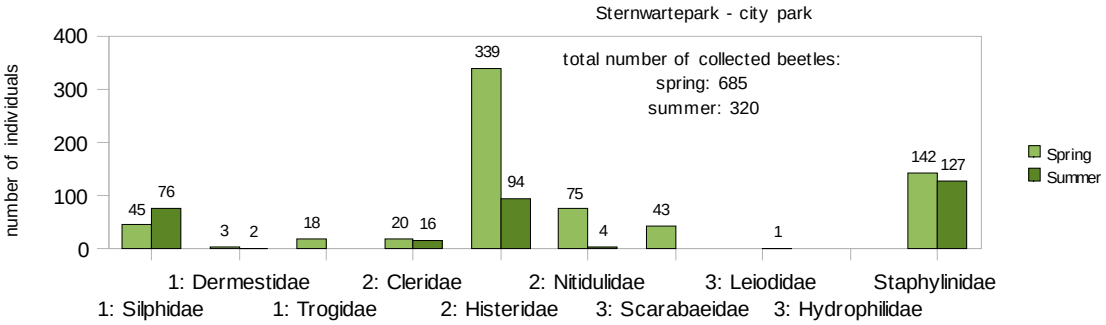

Fig. 14: Comparison between numbers of individuals in spring and in summer at the location "Sternwartepark - city park". (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

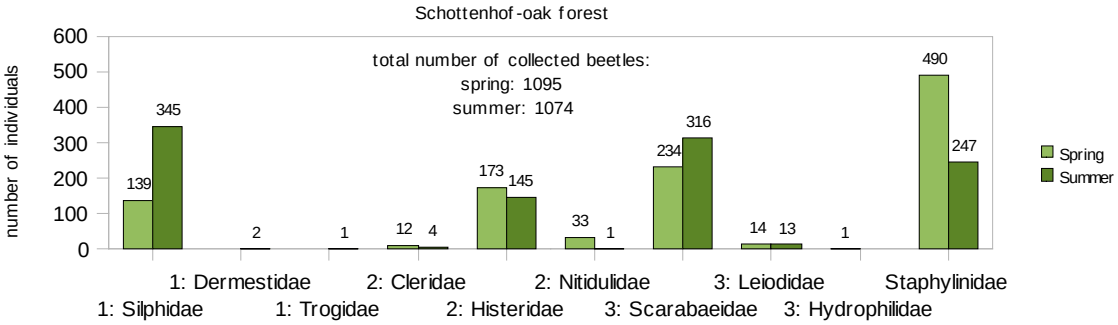

Fig. 15: Comparison between numbers of individuals in spring and in summer at the location "Schottenhof - oak forest". (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

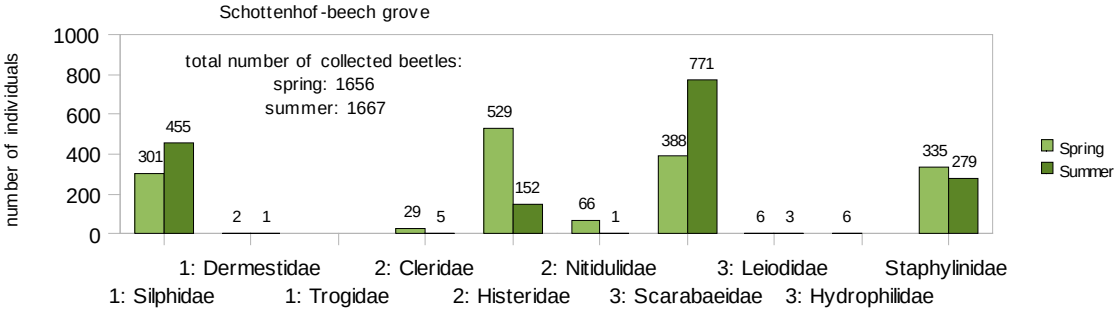

Fig. 16: Comparison between numbers of individuals in spring and in summer at the location "Schottenhof - beech grove". (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

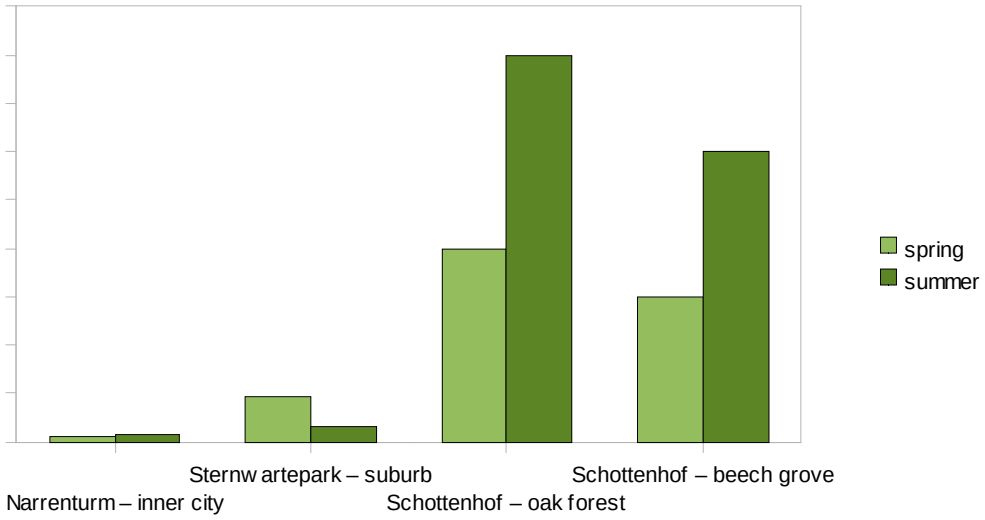

Fig. 17: Comparison between numbers of larvae individuals in spring and in summer at all locations

5.5.3 Succession of families

In order to refine the depiction of succession, two different time scales will be used in this study: patterns based on weeks (i.e. W1 for week one, W2 for week two, etc.) and patterns using the decay stages as time units (DS1 for decay stage one, etc.).

5.5.3.1 Spring succession pattern in weeks

The succession pattern of the relevant families showed a peak of **Histeridae** after the first week of spring (W2), which ebbed away in the following three weeks. **Silphidae** equally appeared in the second week (W2) but rose to their maximum only in the third week (W3) and then, like the **Histeridae**, faded away after the fifth. (Fig. 18)

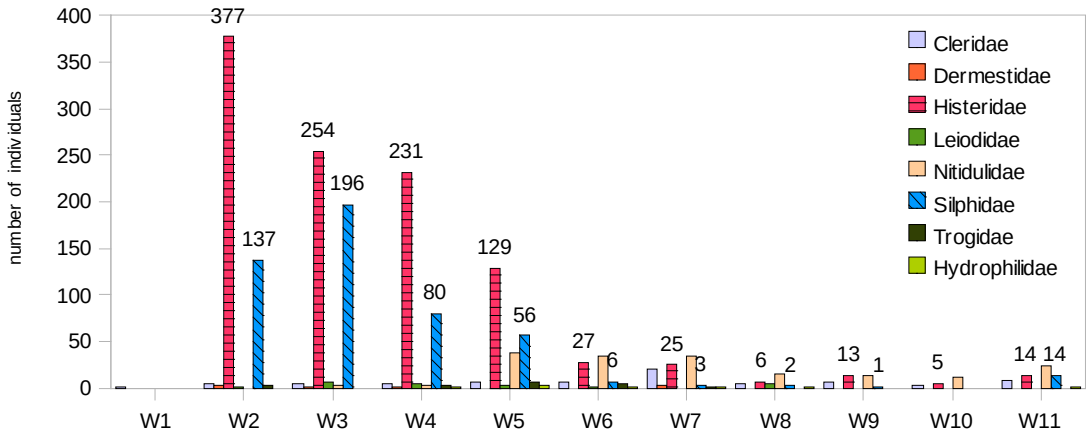

Fig. 18: Succession of all families (except Scarabaeidae and Staphylinidae) in spring at all study sites. **Silphidae** and **Histeridae** with numbers of individuals indicated.
(Abbreviation: W = week)

Cleridae seemed to be present the whole time, with a culmination in the seventh week (W7) of the pigs' decay. **Nitidulidae** only showed up in force after one month (W5), while **Trogidae** had a slight peak in week 5 (W5). (Fig. 19)

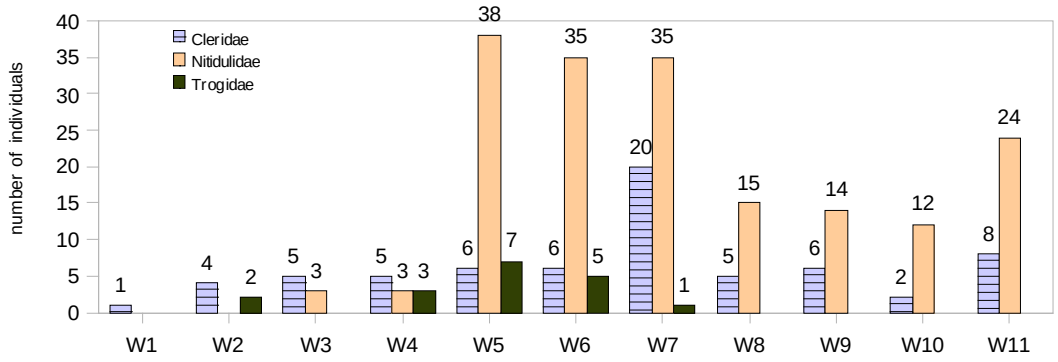

Fig. 19: Succession of **Cleridae**, **Nitidulidae** and **Trogidae** in spring at all study sites.
(Abbreviation: W = week)

Dermestidae and **Hydrophilidae** were not abundant; **Dermestidae** favored the first month and **Hydrophilidae** the second. (Fig. 20)

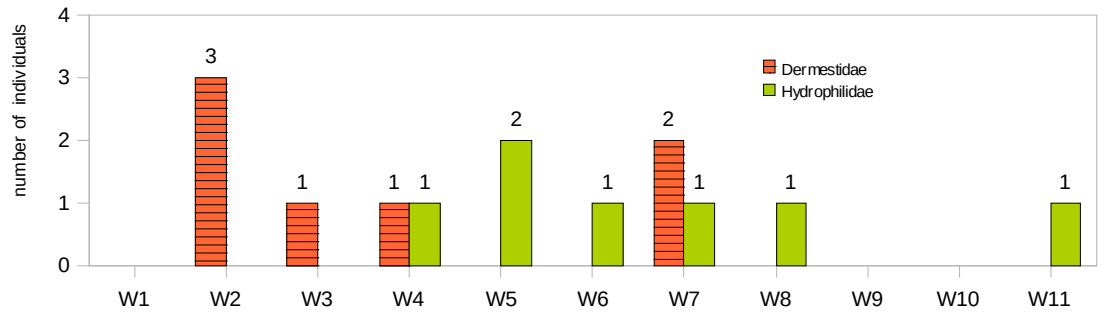

Fig. 20: Succession of **Dermestidae** and **Hydrophilidae** in spring at all study sites.
(Abbreviation: W = week)

Staphylinidae were present from the beginning until the end of the spring trial. They cropped up in the second week (W2), stayed steady during the next two weeks and built up to an apex in the fifth week (W5), before receding back to the steady level and slowly declining further with a last upsurge in the eleventh week (W11). (Fig. 21)

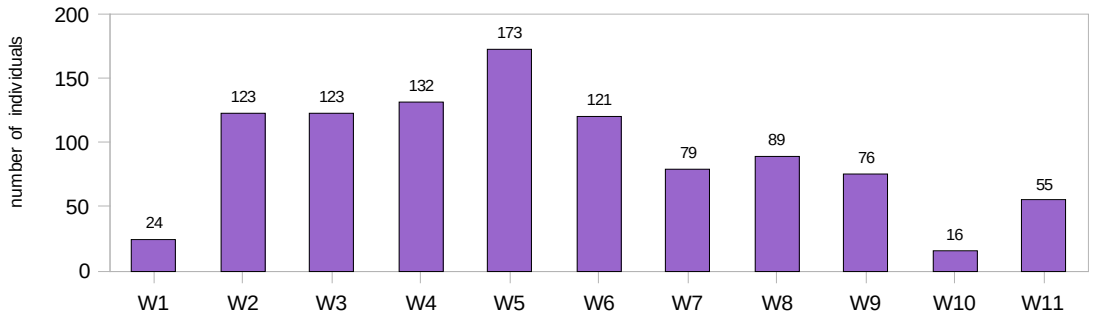

Fig. 21: Succession of **Staphylinidae** in spring at all study sites.
(Abbreviation: W = week)

The first instars of beetle larvae eclosed in the third week. The number of individuals rose during the next two weeks, with a rapid decline after the fifth week. (Fig. 22)

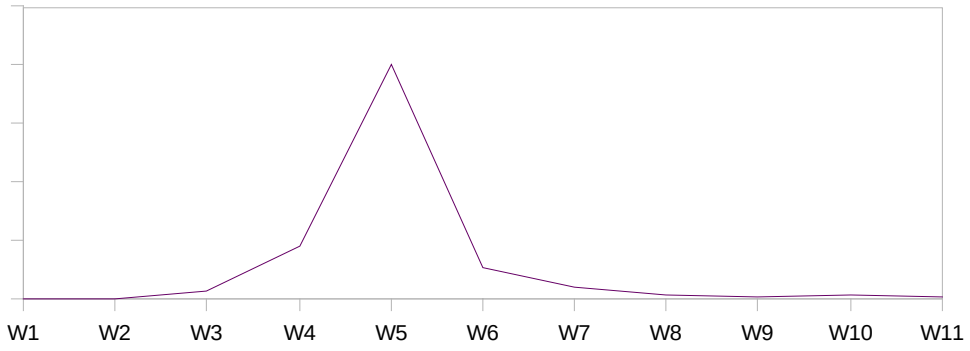

Fig. 22: Succession of beetle larvae in spring at all study sites.
(Abbreviation: W = week)

5.5.3.2 Summer succession pattern in weeks

During the summer trial, the numbers of **Histeridae** and **Silphidae** rose and fell in the first three weeks and vanished into insignificance after that.

Dermestidae, again, showed a preference for the first month of the pigs' decay (Fig.23).

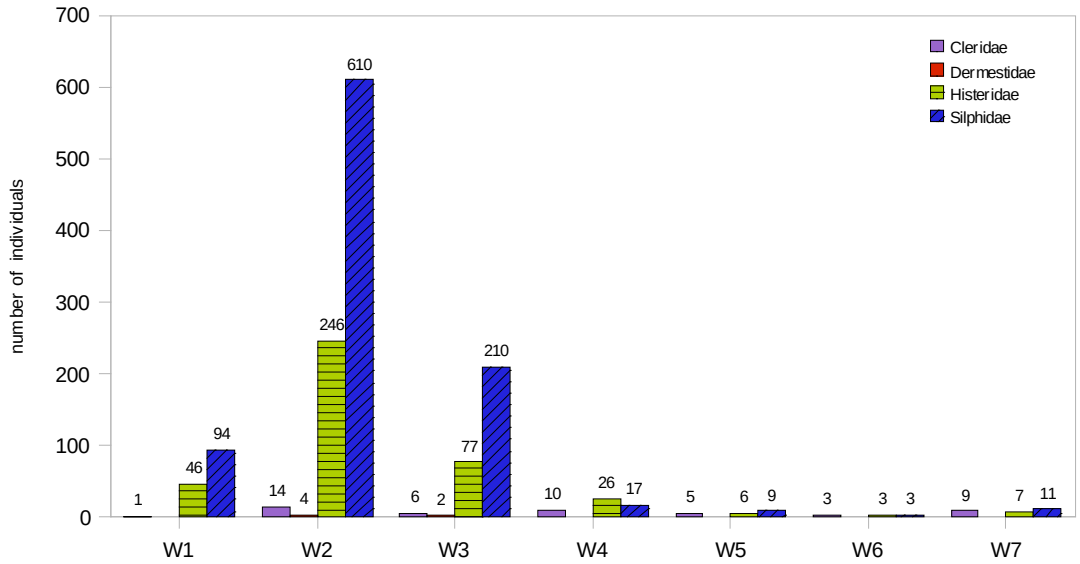

Fig. 23: Succession of **Cleridae**, **Dermestidae**, **Histeridae** and **Silphidae** in summer at all study sites.
(Abbreviation: W = week)

Cleridae already appeared in the first week (W1), became more abundant in the second (W2), ebbed away in the third (W3) with a secondary peak in the fourth (W4) before the numbers declined again, though they stayed very present until the end of the summer trial. (Fig. 24) The same pattern could be found with **Staphylinidae**. (Fig. 25)

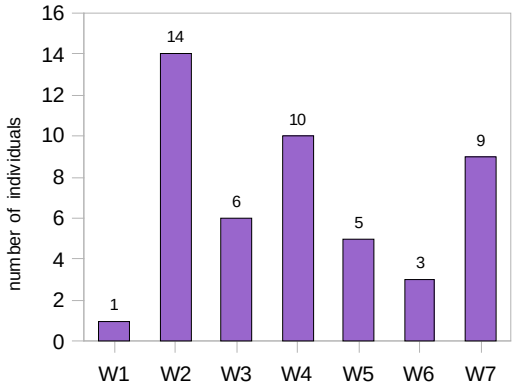

Fig. 24: Succession of **Cleridae** in summer at all study sites.
(Abbreviation: W = week)

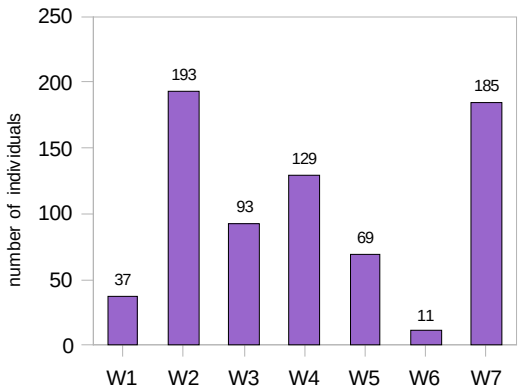

Fig. 25: Succession of **Staphylinidae** in summer at all study sites.
(Abbreviation: W = week)

In the summer trial the first instars of beetle larvae eclosed after nine days, 6 days earlier than in spring. The number of individuals peaked in the following week (W3) and declined thereafter. (Fig. 26)

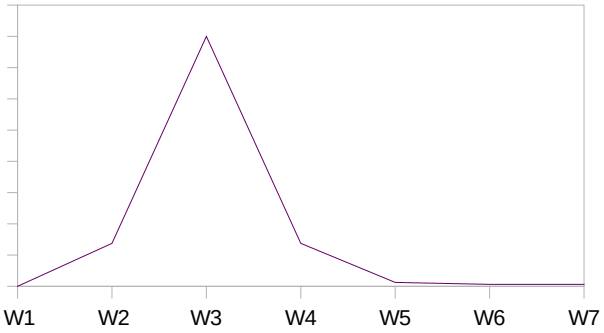

Fig. 26: Succession of beetle larvae in summer at all study sites.
(Abbreviation: W = week)

5.5.3.3 Pattern of families' presence during the stages of decay

As the respective lengths of the trials differed, (spring 11 weeks, summer 7 weeks), the units of measurement used for this particular analysis are the five stages of decay (DS1 to 5) instead of calendar weeks, so to enable a meaningful comparison between spring and summer succession patterns. Table 16 and 17 show the duration of the stages of decay during the spring and summer trials.

Table 16: decay stages during the spring trials and their duration in days.
(Abbreviation: DS = decay stage)

Spring pig's name	site	fresh (DS1)	bloat (DS2)	active decay (DS3)	advanced decay (DS4)	dry (DS5)
Marla	Narrenturm – inner city	4	3	14	42	13
Knuth	Sternwartepark – suburb	4	7	4	40	19
Fridolin	Schottenhof – oak-forest	5	8	12	33	18
Berta	Schottenhof – beech-grove	5	10	12	31	18

Table 17: decay stages during the summer trials and their duration in days.
(Abbreviation: DS = decay stage)

Summer pig's name	site	fresh (DS1)	bloat (DS2)	active decay (DS3)	advanced decay (DS4)	dry (DS5)
Dolores	Narrenturm – inner city	2	4	8	23	48
Lionel	Sternwartepark – suburb	2	8	12	15	48
Valeria	Schottenhof – oak-forest	2	4	7	9	54
Alma	Schottenhof – beech-grove	2	5	8	9	52

Histeridae and **Silphidae** showed a preference for the earlier weeks of decomposition, having their maximum appearance in spring and in summer during the active decay stage (DS3) (Fig. 27 and 28).

In the spring trial **Scarabaeidae** and **Staphylinidae** were most present during advanced decay (DS4), whereas in the summer trial they favored the dry stage (DS5).

Cleridae showed a tidier distribution during the spring experiment, preferring the advanced decay stage (DS4). In summer, from active decay (DS3) onward, the presence of **Cleridae** stayed more or less constant.

Nitidulidae were significantly active only during spring time and were present at the carrion throughout the later stages of decomposition, mainly during the advanced decay stage (DS4). (Fig. 27 and 28)

Larvae had their maximum presence both in spring and in summer during the active decay stage (DS4).

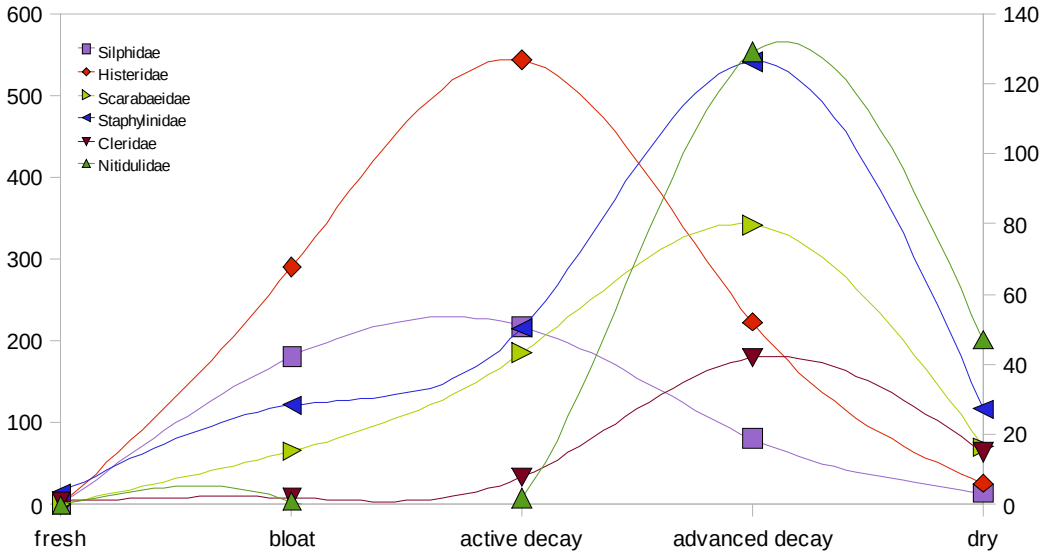

Fig. 27: Decay pattern succession of **Silphidae**, **Histeridae**, **Scarabaeidae**, **Staphylinidae**, **Cleridae** and **Nitidulidae** during the spring trial. (**Cleridae** and **Nitidulidae** are measured by the scale on the right)

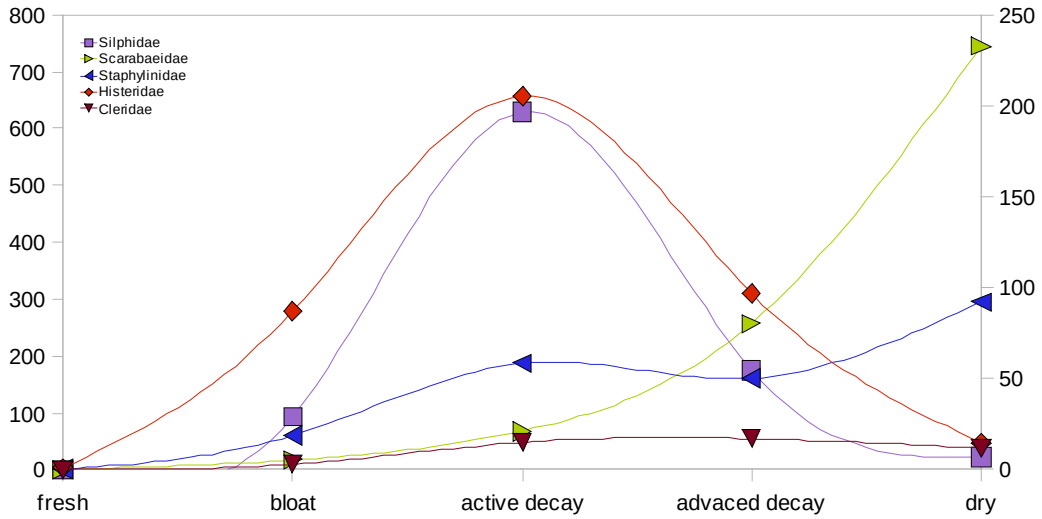

Fig. 28: Decay pattern succession of **Silphidae**, **Scarabaeidae**, **Staphylinidae**, **Histeridae** and **Cleridae** during the summer trial. (**Histeridae** and **Cleridae** are measures by the scale on the right)

5.5.4 Comparison of species' succession spring – summer

5.5.4.1 Comparison spring - summer of species' presence based on calendar weeks

A closer look at the patterns of succession of species in the family **Silphidae**, as observed during the trial period, reveals the following:

In spring the presence of *Necrodes littoralis* as well as *Oiceoptoma thoracica* peaked right after their arrival in the second week (W2) and the two species disappeared after the fifth week (Fig. 29).

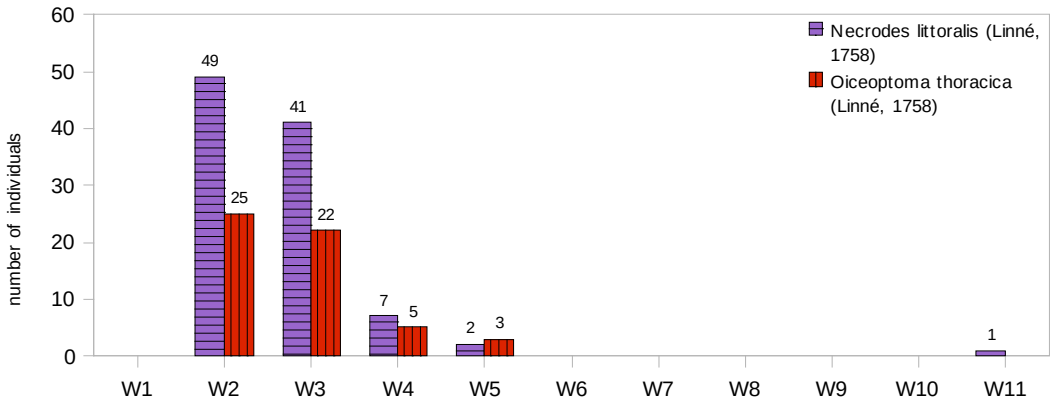

Fig. 29: Succession of *Necrodes littoralis* and *Oiceoptoma thoracica* in spring at all study sites. (Abbreviation: W = week)

Fig. 30 shows a different sequence of succession for *Necrodes littoralis* in summer: it appeared in the first week (W1), also peaked in the second and then declined into insignificance after one month of the pigs' decay.

Oiceoptoma thoracica occurred in summer only once, during the third week (W3).

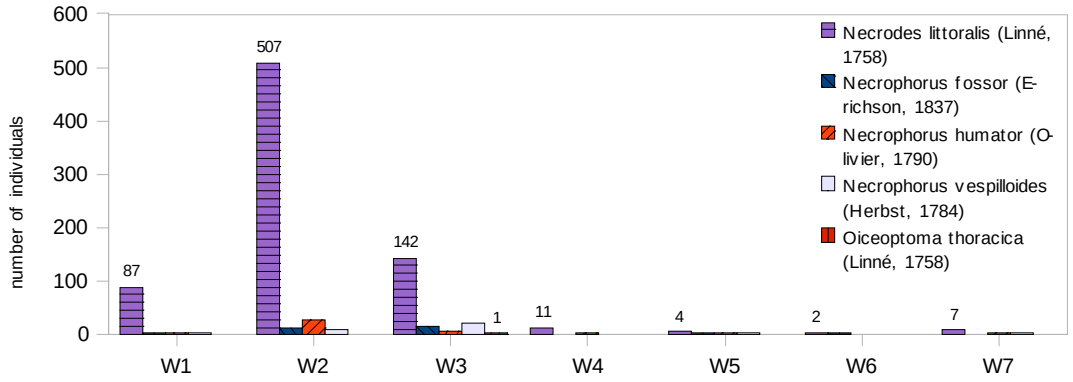

Fig. 30: Succession of *Necrodes littoralis, Necrophorus fossor, Necrophorus humator, Necrophorus vespilloides* and *Oiceoptoma thoracica* in summer at all study sites.
(Abbreviation: W = week)

In spring *Necrophorus humator* arrived during the same week as *Necrodes littoralis* (W2), was present for the two weeks thereafter and then only every other week for one month before a full return in the last week (W11). (Fig.31)

In summer *Necrophorus humator*'s presence started modestly in week one (W1), surged impressively in week two (W2) and declined steadily in the following weeks with a total absence in week six (W6). (Fig. 31)

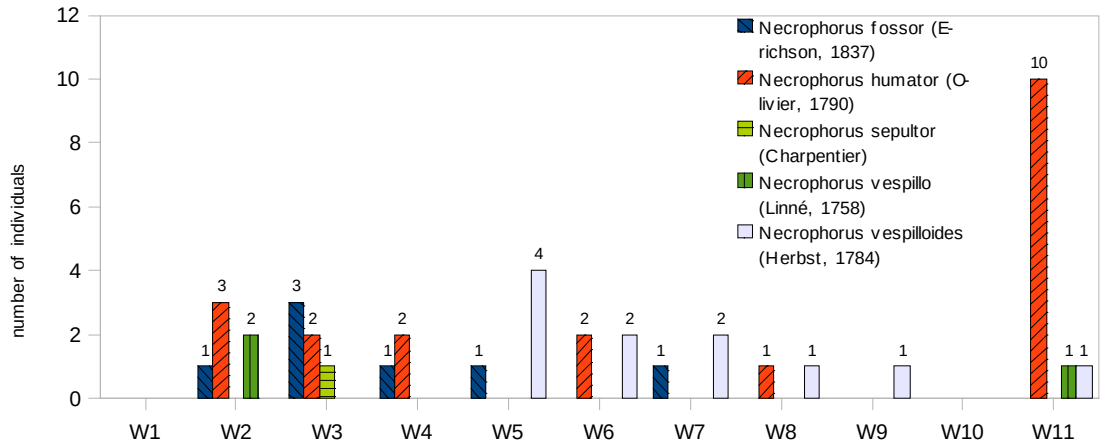

Fig. 31: Succession of *Necrophorus fossor, N. humator, N. sepultor, N. vespillo* and *N. vespilloides* in spring at all study sites.
(Abbreviation: W = week)

During the spring trial *Necrophorus fossor* and *Necrophorus vespilloides* occurred together only in the fifth and seventh week (W5 & 7), the former appearing in the second week (W2), having its maximum number in the following (W3) and slowly declining thereafter, vanishing after the seventh week. *Necrophorus vespilloides* did not appear until the fifth week (W5), and continued a modest presence, only missing in the tenth week (W10). (Fig. 31)

In summer, those two species arose together during the first three weeks and were almost absent after that. (Fig. 32)

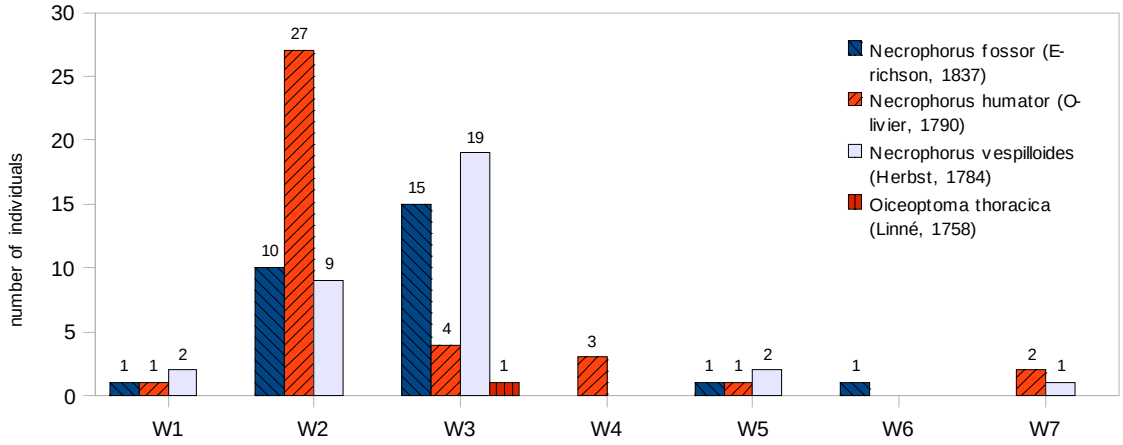

Fig. 32: Succession of *Necrophorus fossor*, *N. humator*, *N. vespilloides* and *Oiceoptoma thoracica* in summer at all study sites.
(Abbreviation: W = week)

The illustration of *Thanatophilus sinuatus*' presence shows - both in spring and in summer - a near perfect bell-shaped curve, having its peak in summer one week earlier (W2) into the decay process than in spring (W3). The beetle was almost gone in week six in spring (W6) and week four (W4) during the summer trial.

Thanatophilus rugosus was much less abundant and its distribution curve is not as spectacular.

In spring, the beetle was present during the same time as its sister species (W2 - 5), in summer only one individual was caught while *Thanatophilus sinuatus* was at its peak (W2). (Fig. 33 and 34)

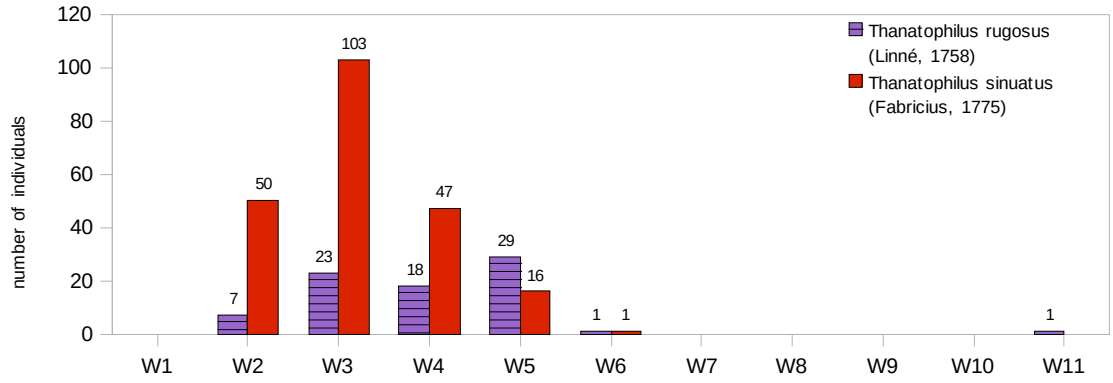

Fig. 33: Succession of *Thanatophilus rugosus* and *T. sinuatus* in spring at all study sites.
(Abbreviation: W = week)

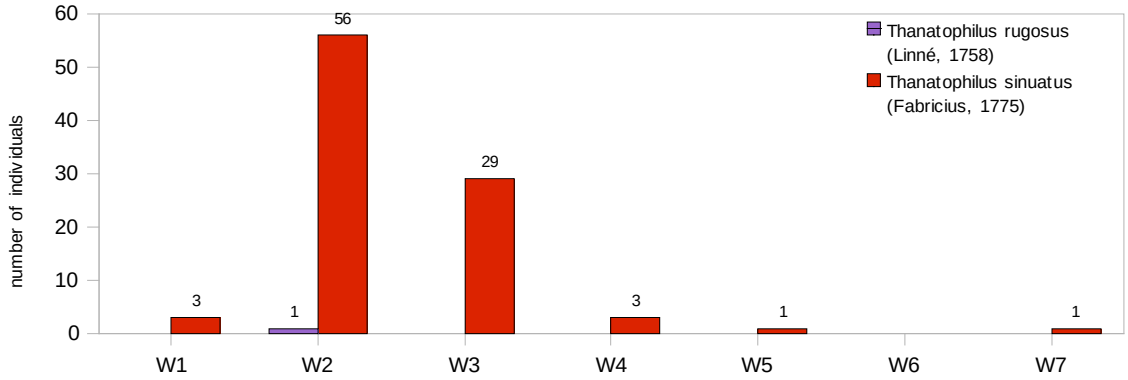

Fig. 34: Succession of *Thanatophilus rugosus* and *T. sinuatus* in summer at all study sites.
(Abbreviation: W = week)

The family of **Histeridae** was mainly represented by *Saprinus semistriatus*.

In spring this species arose during the second week of the carrion´s decomposition (W2) (shown in Fig. 35) and stayed predominant for two more weeks, thereafter falling below the ´100 individuals´ mark and fading away into insignificance.

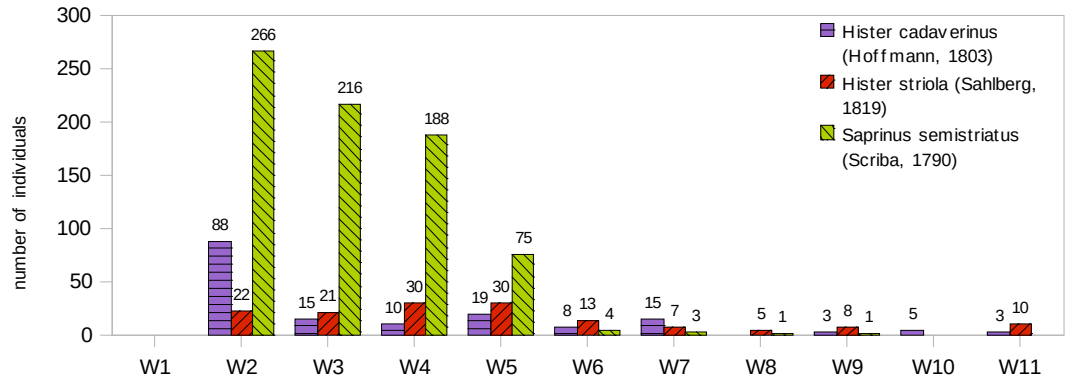

Fig. 35: Succession of *Hister cadaverinus*, *H. striola* and *Saprinus semistriatus* in spring at all study sites. (Abbreviation: W = week)

During the summer trial its phase of predominance only lasted one week (W2).

Hister cadaverinus and *Hister striola* were represented almost evenly in both seasons (166:146 in spring, 30:30 in summer) and did not show any divergence of this pattern, except in week two during spring (W2) when a peak of *Hister cadaverinus* coincided with a strong showing of *Saprinus semistriatus*. (Fig. 36)

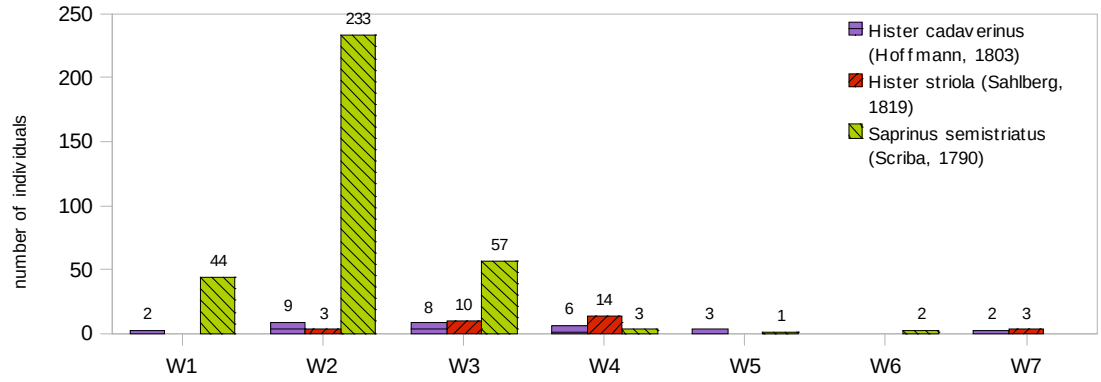

Fig. 36: Succession of *Hister cadaverinus*, *H. striola* and *Saprinus semistriatus* in summer at all study sites. (Abbreviation: W = week)

In this study three species represented the family of **Cleridae**, with *Necrobia violacea* being the most common.

In spring, it showed a slow but steady increase during the first one and a half months, followed by a sudden, steep rise well into advanced decay (W7) before oscillating back to its former level.

In summer, this peak occurred in the second week (W2) and in the course of the pigs' remaining decay *Necrobia violacea* stayed present without spectacular rises and falls.

The two other species of **Cleridae**, *Necrobia ruficollis* and *Necrobia rufipes* were much less abundant and appeared during prime Cleridae-activity in spring (W7). In summer *Necrobia ruficollis* appeared after three weeks and lingered on until the end. (Fig. 37 and 38)

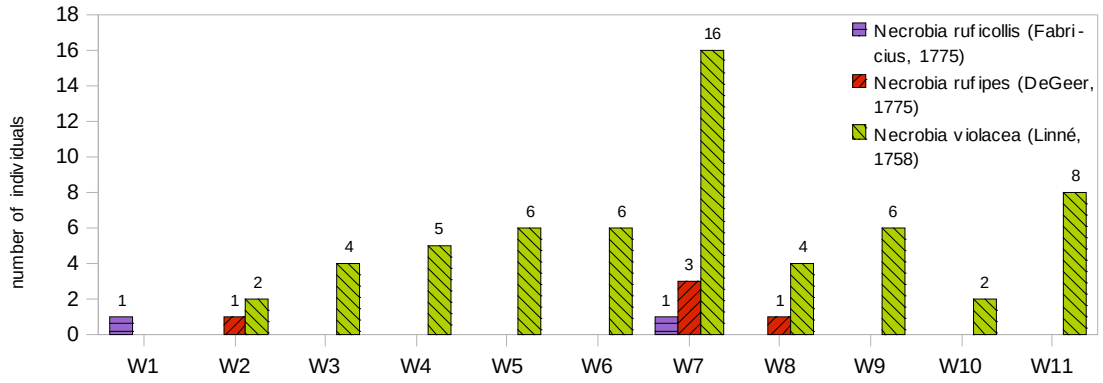

Fig. 37: Succession of *Necrobia ruficollis*, *N. rufipes* and *N. violacea* in spring at all study sites. (Abbreviation: W = week)

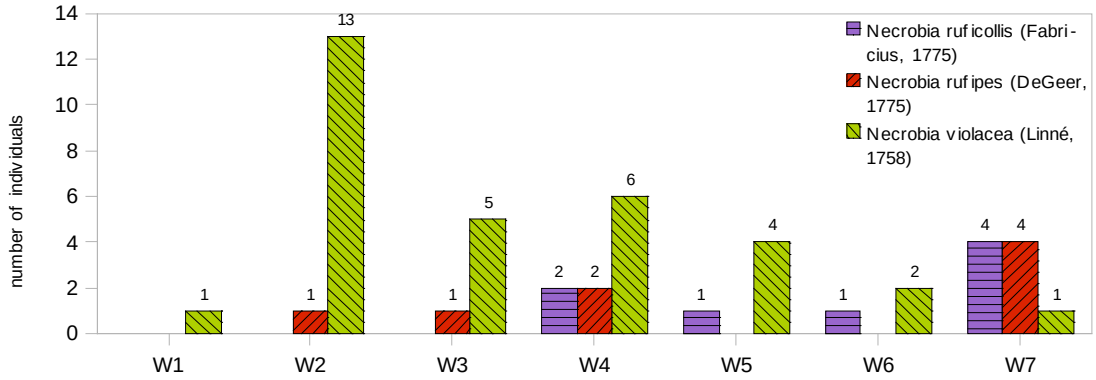

Fig. 38: Succession of *Necrobia ruficollis*, *N. rufipes* and *N. violacea* in summer at all study sites. (Abbreviation: W = week)

5.5.4.2 Comparison spring - summer of species' presence during the stages of decay

Fig. 39 and 40 show that *Necrodes littoralis* and *Thanatophilus sinuatus* appear more often during the active decay stage (DS3) than during any other time. In spring, this preference seems less marked, as a large number of individuals arrived during the bloated stage (DS2).

Oiceoptoma thoracica was on the scene mostly during the bloated stage (DS2), but lingered around until the dry stage (DS5).

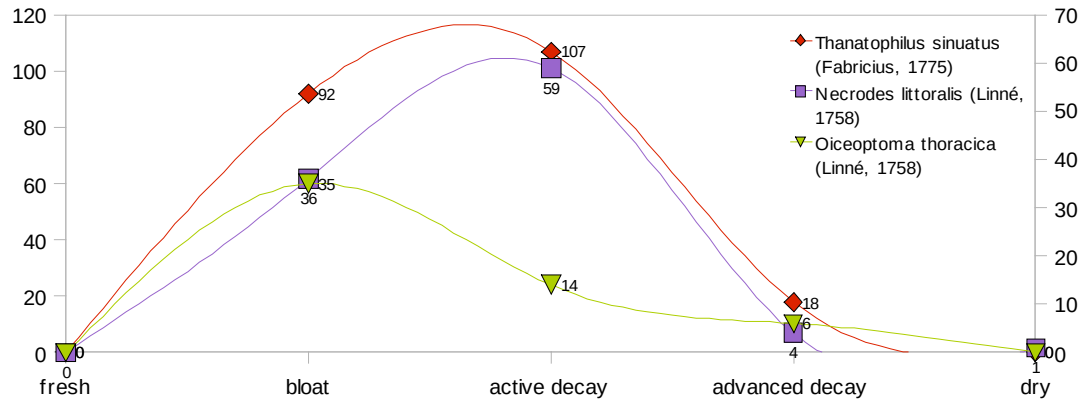

Fig. 39: Decay pattern succession of *Thanatophilus sinuatus*, *Necrodes littoralis* and *Oiceoptoma thoracica* during the spring trial. (Only *Thanatophilus sinuatus* use the scale on the left)

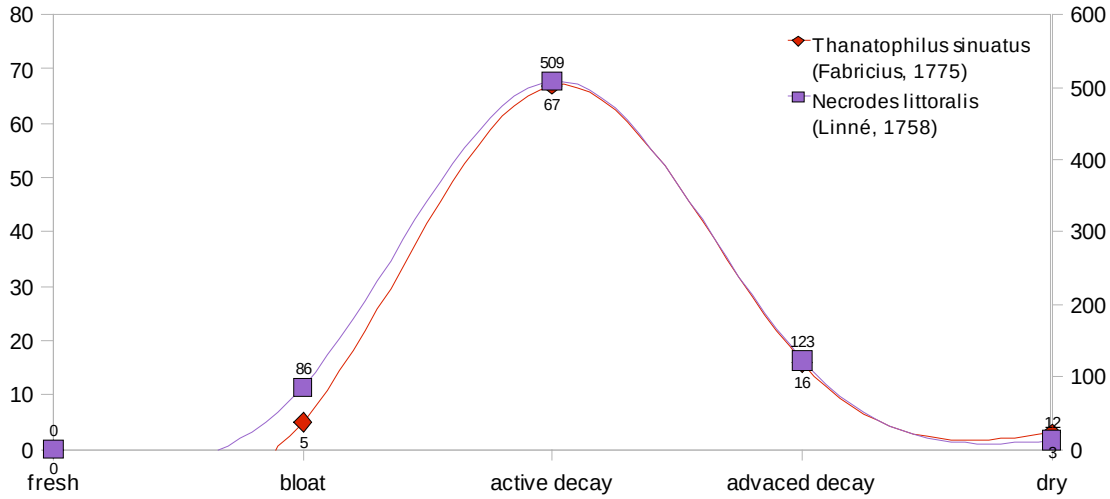

Fig. 40: Decay pattern succession of *Thanatophilus sinuatus* and *Necrodes littoralis* during the summer trial. (*Thanatophilus sinuats* uses the scale on the left)

5.6 Urban vs. sylvan

Many more beetle individuals were collected in the woodlands than in the urban habitats:
5499 beetles were found in the woodlands, 1247 in the urban areas.

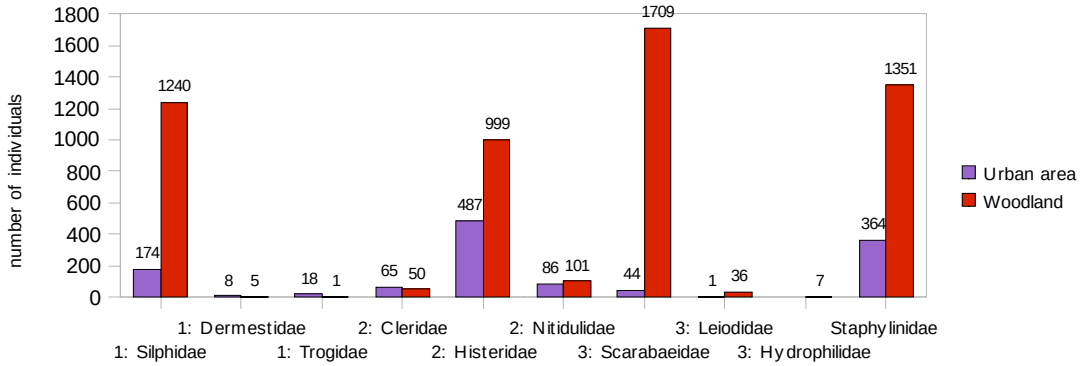

Fig. 41: Comparison of the numbers of individuals in the families between urban area and woodland. (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

The same can be said for the particular beetle families, with three exceptions: **Dermestidae**, **Trogidae** and **Cleridae** were found more often in the urban habitat.

Silphidae, for example, were seven times more present in the woodlands, **Histeridae** twice and **Staphylinidae** fourfold.

Scarabaeidae, **Leiodidae** and **Hydrophilidae** were found only or almost entirely in forest areas (Fig.41).

As expected, larvae were more than twice as abundant in the two bosky study sites.

These ratios do not change much if the woodland and urban area data are broken down into spring and summer. Only the family **Cleridae** shows a difference. While overall they were more present in urban areas than in the woodlands (Fig. 41), this ratio only applied to summer (Fig. 43). In spring, more individuals were collected in the woodlands. (Fig. 42).

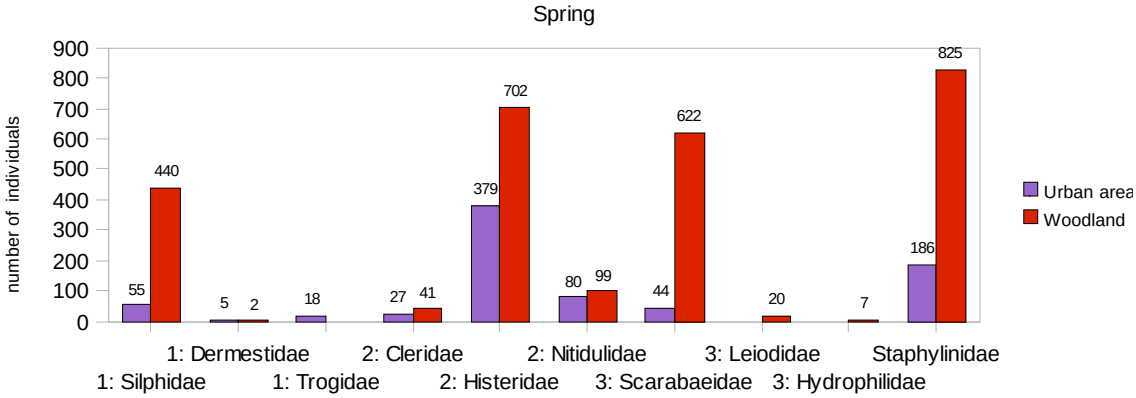

Fig. 42: Comparison of the numbers of individuals in the families between urban area and woodland in spring. (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

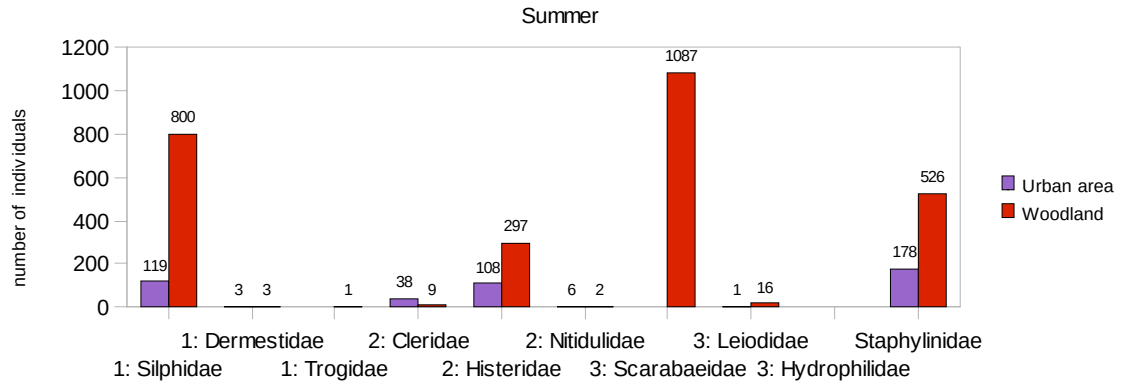

Fig. 43: Comparison of the numbers of individuals in the families between urban area and woodland in summer. (Families classified according to their guild: 1 = necrophaga; 2 = necrolesta; 3 = saprophaga; Staphylinidae without affiliation)

5.6.1 Family succession in terms of calendar weeks

Figures 44 to 56 show differences in succession patterns of the studied beetle families between the two urban study sites (urban area) and the two woodland sites (woodland). Figures 44 to 50 concern the spring experiment, figures 51 to 56 the summer trial.

In order to illustrate one of the main findings of this study, namely an analysis of various succession patterns of species and families, the tables in this chapter use different quantitative scales for the comparison of urban and woodland “behavior”. For instance, the two curves in Fig.51 (Silphidae in summer), illustrate the nearly identical summer patterns of succession of Silphidae in urban areas and Silphidae in woodlands, although the succession curve “urban area” is a result of 119 observations and the

succession curve “woodland” is the result of 800 observations.

In spring the observed pattern in urban areas differed markedly from the one in woodland areas.

For instance, **Silphidae** (and larvae) reached their maximal presence one week later in the woodlands than their counterparts in urban areas (Fig. 46 and 50) and also **Histeridae** had a later and longer, though less pronounced peak in the woodlands (Fig. 44).

The sylvan succession curves of **Nitidulidae** and **Cleridae** in contrast, reached their spring peak earlier in the woodland areas than in the urban areas (Fig. 45 and 47).

In the woods, **Staphylinidae** rose to their only peak in the sixth week (W6), the urban beetle count had a first surge in the second week (W2), a decline until the end of week five (W5) and a second short-lived increase in week six (W6) (Fig. 48).

The various succession curves for **Scarabaeidae** are completely different from each other, due to the total lack of the most common species of this family, *Geotrupes stercorarius*, in the urbanized regions both in spring and in summer. (Fig. 49) However, in the woodland areas *Geotrupes stercorarius* was the dominant species of all beetles (1719 individuals) where genus *Onthophagus* sp., representing the family **Scarabaeidae**, was completely absent in both seasons. In urban areas, 66 individuals of *Onthophagus* were found in spring.

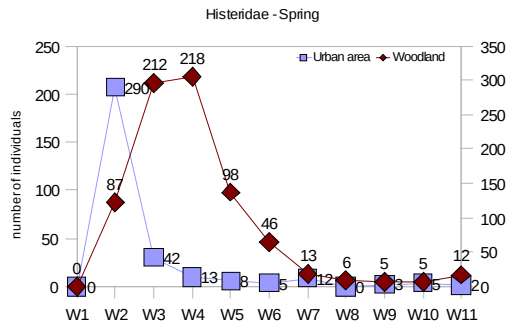

Fig. 44: Comparison of succession of **Histeridae** between urban area (right scale) and woodland in spring

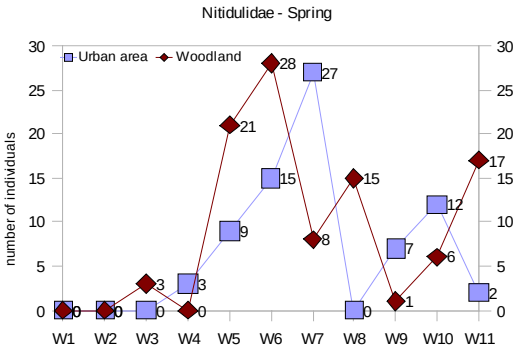

Fig. 45: Comparison of succession of **Nitidulidae** between urban area and woodland in spring

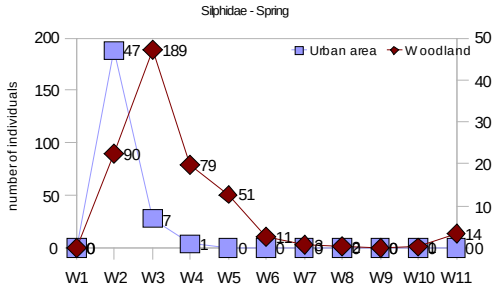

Fig. 46: Comparison of succession of **Silphidae** between urban area (right scale) and woodland in spring

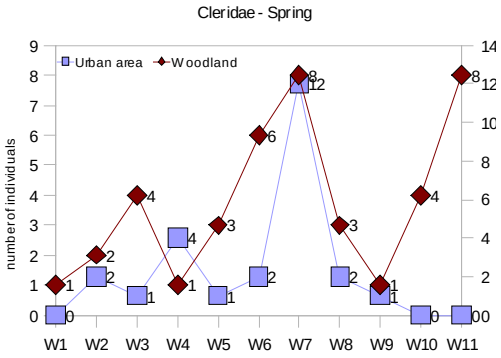

Fig. 47: Comparison of succession of **Cleridae** between urban area (right scale) and woodland in spring

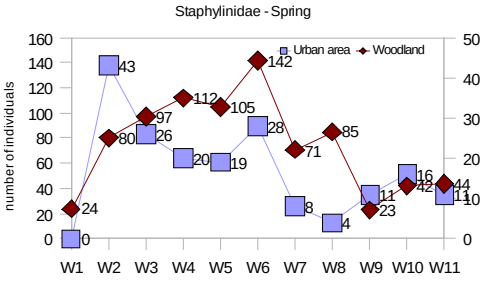

Fig. 48: Comparison of succession of **Staphylinidae** between urban area (right scale) and woodland in spring

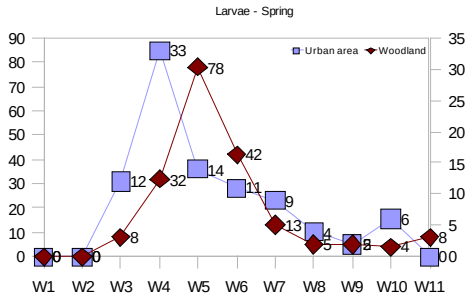

Fig. 50: Comparison of succession of beetle larvae between urban area (right scale) and woodland in spring

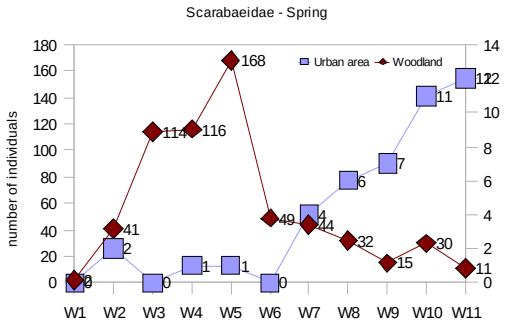

Fig. 49: Comparison of succession of **Scarabaeidae** between urban area (right scale) and woodland in spring

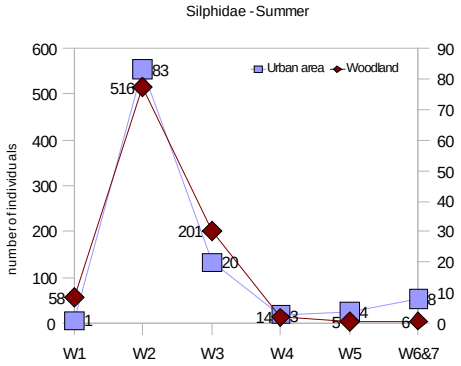

Fig. 51: Comparison of succession of **Silphidae** between urban area (right scale) and woodland in summer

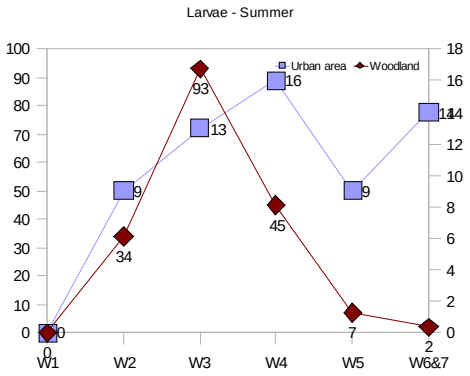

Fig. 52: Comparison of succession of beetle larvae between urban area (right scale) and woodland in summer

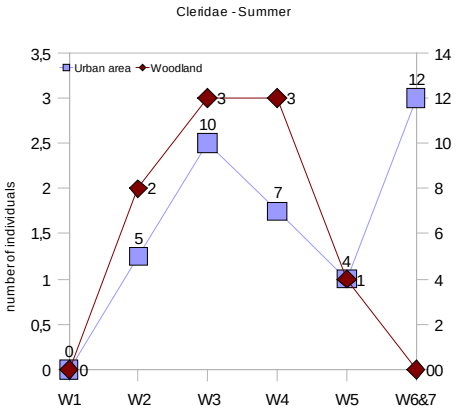

Fig. 53: Comparison of succession of **Cleridae** between urban area (right scale) and woodland in summer

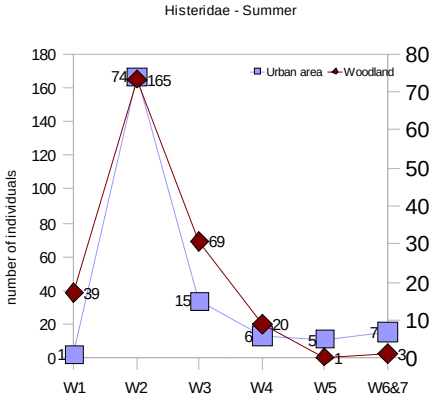

Fig. 54: Comparison of succession of **Histeridae** between urban area (right scale) and woodland in summer

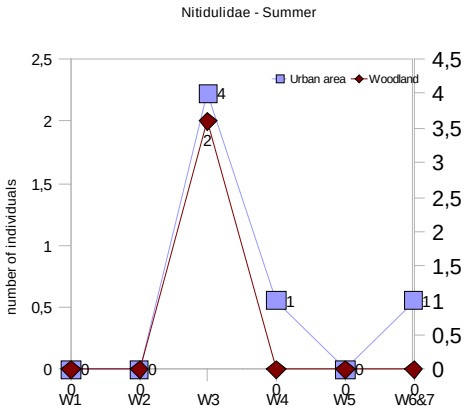

Fig. 55: Comparison of succession of **Nitidulidae** between urban area (right scale) and woodland in summer

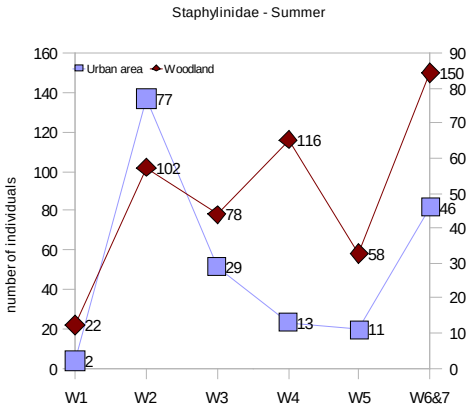

Fig. 56: Comparison of succession of **Staphylinidae** between urban area (right scale) and woodland in summer

5.6.2 Family succession in regard of decay patterns

As far as decay stages are concerned, succession, both in urban and woodland areas as observed in this study, does not differ very much from the general decay pattern succession described in chapter 5.5.3.3 . Because of the huge difference between the number of beetle individuals in the two regions, the tables in this chapter again use different quantitative scales for the comparison of urban and woodland “behavior”.

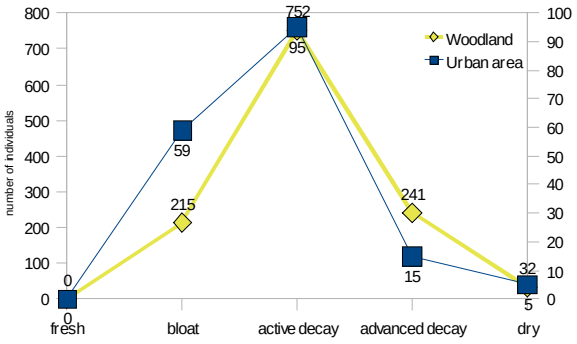

Fig. 57: decay pattern succession of **Silphidae** during both trials in regard of Urban area (right scale) and Woodland

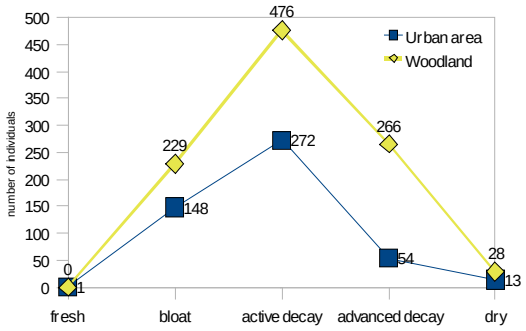

Fig. 58: decay pattern succession of **Histeridae** during both trials in regard of Urban area and Woodland

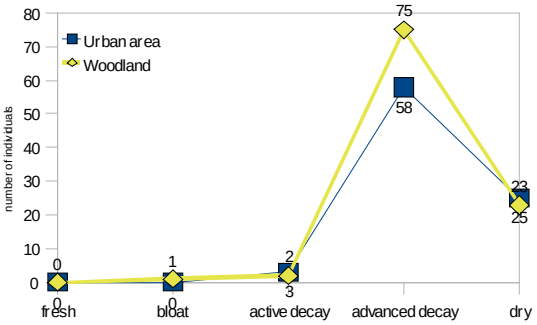

Fig. 60: decay pattern succession of **Nitidulidae** during both trials in regard of Urban area and Woodland

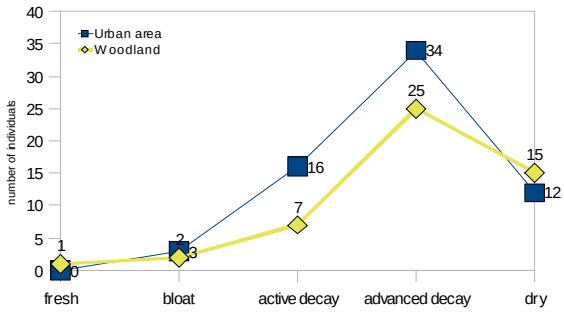

Fig. 59: decay pattern succession of **Cleridae** during both trials in regard of Urban area and Woodland

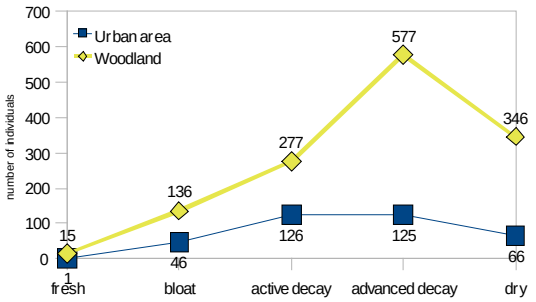

Fig. 61: decay pattern succession of **Staphylinidae** during both trials in regard of Urban area and Woodland

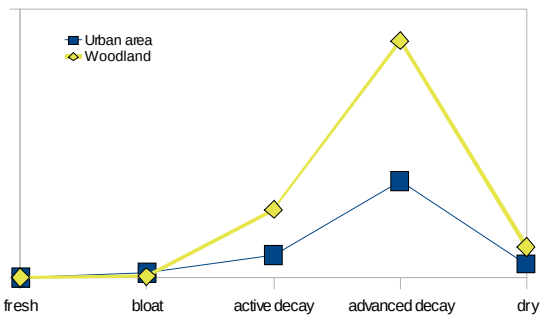

Fig. 62: decay pattern succession of Larvae during both trials in regard of Urban area and Woodland

6. DISCUSSION

6.1 Temperature data & decomposition

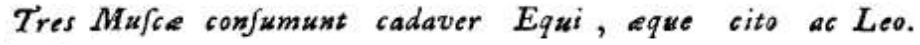

Fig. 63: Quotation taken from Carolus Linnaeus' „Systema naturae, per regna tria naturae, secundum classes, ordines, genera, species, cum caracteribus, differentiis, synonymis, locis.“ (1767) page 990

Decaying bodies and carcasses show a successive process in which a series of decomposition stages with a characteristic assemblage of invertebrates proper to them, ensue one another (Payne, 1965; Kočárek, 2003). The number of decomposition stages and their types observed in the present study were similar to those of previous studies (Payne, 1965; Anderson and VanLaerhoven, 1996; Kočárek, 2003; Grassberger and Frank, 2004; Matuszewski et al., 2008; Gill, 2007; Schnepf, 2007; Vitta et al., 2007; Eberhardt and Elliot, 2008; Sharanowski et al., 2008;).

As established before (Reed, 1958; Kočárek, 2003; Gill, 2005; Sharanowski et al., 2008), the numbers of days of the particular decay stages vary seasonally, with longer time spans in the cooler seasons of the year.

Decomposition rate depends on many factors: biotic and abiotic conditions of the habitat, type and weight of the carcasses, and clothing or hairiness are just some examples of replicable variables having an effect on decomposition. The soil's humidity, as well, has a substantial influence on abiotic conditions, as it directly determines air humidity near the ground (Matuszewski, 2008).

Smith (1986) states that the major factors determining oviposition and the rates of development of sarcosaprophagous insects are temperature and humidity: cold weather and rain inhibit fly activity; high temperature and very low humidity cause more rapid desiccation of the carrion, which makes most of the food unavailable to maggots (Fuller, 1934).

Carolus Linnaeus declared in 1767 that „tres Muscae consumunt cadaver Equi,

aeque cito ac Leo“(„[the progeny of] three flies can consume a horse carcass as fast as a lion can“)(Fig. 63). This in mind, it can be noted that very hot and dry as well as cold and wet weather conditions will reduce the loss of weight of the carrion due to the decreased fly larvae activity. Studies with carrion isolated from insects have shown that insect activity is the prime cause for the accelerated rate of decomposition and removal of carrion (Payne, 1965; Abell et al., 1982; Kočárek, 2003).

The elevated internal temperatures recorded 12-14 days after the pigs' death in spring and 6-8 days in summer were due to the high metabolic rates of the bacteria and dipterous larvae present, and have been shown to be common in previous studies (Payne, 1965; Greenberg, 1991; Turner and Howard, 1992; Grassberger and Frank, 2004; Tabor et al., 2005). Heat generated by dipteran larval aggregations can accelerate larval development within a carcass (Grassberger and Frank, 2004).

Both in the spring and the summer trial, the carcasses showed considerable differences in their internal temperatures during comparable stages of decomposition. Thus, the observed differences between internal and ambient temperatures were not equal at the different study sites during comparable periods: while at the Narrenturm the difference in spring was as low as 10°C (see addendum page 84 “Narrenturm - spring”), it was 19°C at Sternwartepark (see addendum page 85 “Sternwartepark – spring”); in summer the difference at Sternwartepark was only 7°C (see addendum page 90 “Sternwartepark – summer”) while at the oak-forest site it was measured at 17°C (see addendum page 91 “Schottenhof Oak-forest – summer”). Small distinctions between ambient temperatures at the various sites play a minor role in explaining those differences. These observations confirm the findings of Sharanowski et al. (2008), who also noted inconsistencies in the extent of difference between internal and ambient temperatures in various habitats.

6.2 Collected beetles

The total number of invertebrate taxa reported in similar studies on vertebrate carcasses ranged from 30 to 522 including diptera (Reed, 1958; Payne, 1965; Early and Goff, 1986; Tullis and Goff, 1987; Anderson and VanLaerhoven, 1996; Richards and Goff, 1997; Carvalho et al., 2000; Gill, 2005; Tabor et al., 2005).

Considering only coleoptera, total numbers ranged from 4 to 217 (Payne, 1965;

Kočárek, 2003; Grassberger and Frank, 2004; Tabor et al. 2005; Schnepf, 2007; Vitta et al. 2007; Sharanowski et al., 2008; Matuszewski et al., 2009).

A total of 54 species belonging to the families considered associated with carrion were identified in this study; the figure would be higher, but the highly complex family of **Staphylinidae** was not subdivided for further identification. Bernhard Schnepf (2007) has shown in his study that more than two thirds of all **Staphylinidae** individuals collected on carrion (representing 28 different species) can be assumed to belong to the ecological group of necrolesta, being predators upon other carrion-associated invertebrates. Less than a third of **Staphylinidae** individuals collected on carrion were classified by Schnepf as saprophaga, feeding on decaying matter and only one percent was considered to consist of random guests (sugkuria).

27 species from 10 families identified in this study do not show up in the list of beetles of Vienna by Legorsky (2007) (Table 18).

Table 18: List of species not in the publication on the beetle fauna of Vienna by Legorsky, 2007.

Family	Species
Cleridae	*Necrobia ruficollis* (Fabricius, 1775)
Dermestidae	*Dermestes haemorrhoidalis* (Küster, 1852)
Erotylidae	*Dacne notata* (Gmelin, 1788)
Histeridae	*Carcinops pumilio* (Erichson, 1834) *Gnathoncus nannetensis* (Marseul, 1862) *Grammostethus ruficornis* (Grimm., 1852) *Hister distinctus* (Erichson, 1834) *Hister merdarius* (Hoffmann, 1803) *Hister striola* (Sahlberg, 1819) *Kissister minima* (Aubé, 1850) *Saprinus cuspidatus* (Ihssen, 1949) *Saprinus rugifer* (Paykull, 1809)
Hydrophilidae	*Sphaeridium marginatum* (Fabricius, 1787)
Leiodidae	*Catops longulus* (Kellner, 1846) *Catops nigrita* (Erichson, 1837) *Choleva cisteloides* (Frölich, 1799) *Ptomaphagus subvillosus* (Goeze, 1777) *Sciodrepoides alpestris* (Jeannel, 1934) *Sciodrepoides fumatus* (Spence, 1815)
Nitidulidae	*Omosita colon* (Linné, 1758) *Omosita depressa* (Linné, 1758)
Scarabaeidae	*Decamara philanthus* (Fuessly, 1775) *Esymus merdarius* (Fabricius, 1775) *Onthophagus taurus* (Schreber, 1759)
Silphidae	*Necrophorus vespilloides* (Herbst, 1784) *Oiceoptoma thoracica* (Linné, 1758)
Trogidae	*Trox cadaverinus* (Illiger, 1801)

6.3 Succession

Colonization of the carcasses and succession in this study followed similar patterns as established by other researchers (Payne, 1965; Kočárek, 2003; Grassberger and Frank, 2004; Gill, 2005; Tabor et al., 2005; Sharanowski et al., 2008).

In summer, succession occurred during a shorter time span, due to higher temperatures, which promoted intense insect activity (Payne, 1965), and hence faster decomposition of the carcass. Fresh, bloat and active decay (DS1-3) stages in total lasted about three weeks in spring, and in summer just about two weeks. Succession peaks of forensically significant beetle families and species drawn to these stages of decomposition (DS1-3) occurred a week earlier in summer than in spring. The advanced decay stage (DS4) lasted as long as nearly five weeks in spring, whereas summer temperatures and humidity reduced the process to approximately two weeks.

In summer colonization was accelerated and the population peaks were reached two weeks earlier than in spring (Fig. 22 and 26).

The succession of species on a carcass „develops primarily as a continuum of change“ (Kočárek, 2003) and has been described by several authors as a discrete process (e.g. Payne, 1965). Schoenly and Reid (1987) in contrast, focused on the dynamics of heterotrophic succession and proposed that this pattern was not discrete but continuous in the majority of cases (Moura et al., 2005).

In this study **Silphidae** and **Histeridae** seem drawn more towards the earlier decay stages, bloated (DS2) and active (DS3), **Staphylinidae**, **Scarabidae**, **Cleridea** and **Nitidulidae** more to the advanced decay (DS4) (see Fig. 27 and 28). The number of species reached their maximum during the overlap of active (DS3) and beginning of advanced decay (DS4).

The early stages of decomposition and the late dry stage (DS5) were characterized by a low diversity of species, also observed by Nabaglo (1973) and Kočárek (2003).

Most of the observed beetle species being predatory, so their occurrence on carrion correlates with the abundance of their basic prey, blowfly maggots, which are typical for the active decay stage (DS3). This explains the culminated activity of **Histeridae** and **Silphidae**, both being predators, during this particular decomposition

stage (DS3): Vast numbers of blowfly maggots grow exuberantly and simultaneously on the carcass and are harvested by the beetles. Before pupation, the leftover maggots disperse from the corpse into the surroundings, heralding the start of the advanced decay stage (DS4) and „minimiz[ing] interaction with predators highly concentrated at the carcass„ (Kočárek, 2003).

Collecting of adult burying beetles (genus *Necrophorus*, **Silphidae**) started at the bloated stage (DS2) and continued until the last day of the study; their number peaked during the active decay stage (DS3), (especially in the summer trial). Matuszewski et al. (2008) note that „it is thought that reproductively mature individuals of *Nicrophorus* [sic!] show strong preference for carrion of small vertebrates, and that reproductively immature ones prefer larger carcasses where they feed on Diptera larvae“. The nutritional preference for Diptera larvae would explain the connection of *Necrophorus* adults with the active decay stage (DS3). Reproductively mature individuals of *Necrophorus* were probably not active in the decomposition process in this study, because, although the pig corpses were laid on lawn turf, the burying beetles could not bury the carcasses as they do with smaller vertebrates in order to raise their brood upon. Nevertheless Benecke (2006) notes that in larger vertebrate carrion, brood chambers are made directly in the carcass, giving an impression of gunshot wounds.

One exception in the genus *Necrophorus* is mentioned by Pierre Mégnin, the Army Veterinarian and accredited founder of forensic entomology, in his publication 'La faune des cadavres' (1894): *Necrophorus humator*, which is rather solitary, does not bury the carcass and prefers larger carrion, such as humans.

In the same publication, Mégnin notes another **Silphidae** attracted to larger carrion: *Necrodes littoralis* is said to flock to horse and cattle cadaver and to appear in very large numbers. In the present study *Necrodes littoralis* adults occurred in active decay stage (DS3), which corresponds to findings in previous studies (Payne, 1965; Grassberger and Frank, 2004; Gill, 2005; Matuszewski et al., 2008). In my experience, especially during the summer trial in the oak forest, the number of *Necrodes littoralis* appearing was gargantuan. The ground was literally rustling from scurrying beetles. One week later, with the onset of the advanced decay stage (DS4), a very large quantity of *Necrodes* larvae were clustered at the carcass, suggesting their connection with this stage of decomposition. [2]

[2] An idea for further scientific research comes from an observation of

Thanatophilus adults occurred during the active decay stage (DS3) and vanished almost completely in the advanced decay stage, which is in line with results of other research findings (Kočárek, 2003; Grassberger and Frank, 2004; Matuszewski et al., 2008).

Grassberger and Frank (2004) named in their study, conducted on the exact same spot as this present survey, the „Narrenturm – inner city" location, *Thanatophilus lapponicus* (Herbst, 1793) as one of the collected species. This must be an error of identification, since this species has never been found in Central Europe south of Norway (Schawaller, 1981). Most probably the species found was *Thanatophilus rugosus*, which has similar characteristics.

Oiceoptoma tharacica, which in this study occurred just in spring (only one individual was found in summer), seems to have an equal preference for the active decay stage (DS3) as *Necrodes littoralis*. Other studies (Kočárek, 2003; Gill, 2005) suggest otherwise, postulating that this species comes later than *Necrophorus*, which would mean after the active decay stage (DS3).

In the family **Histeridae**, *Saprinus semistriatus* indicates a strong connection with the active decay stage (DS3), but appears already during the bloated stage (DS2), a behavior which has also been observed for this genera in some previous studies (Reed, 1958; Tabor et al., 2004). The family **Histeridae** being predators upon Diptera larvae, show a predictable preference for the stage with the peak activity of their prey, namely DS3.

The two species *Hister cadaverinus* and *Hister striola* show no such clear connection to one particular stage of decomposition, except for an unexpected accumulation of *Hister cadaverinus* during the bloated stage (DS2) in the spring trial at the Sternwartepark location. Also in the publication of Tullis and Goff (1987) the *Hister* genera occurred earlier in the decomposition process.

The family **Cleridae**, in the present and similar studies represented by three

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male *Necrodes littoralis*, known to have incrassated and dentate hind femora. During this study, specimens collected included some freshly emerged adult males that did not have this characteristic feature. It would be interesting to know what induces the difference and what those very visible hind femurs are used for. Most likely sexual selection plays a prominent role and mating behavior must be studied.

species (*Necrobia violacea*, *Necrobia rufipes* and *Necrobia ruficollis*), occurred mainly during the advanced decay stage (DS4) in the spring trial, which corresponds to findings of other reports (Early and Goff, 1986; Tabor et al., 2004; Gill, 2005; Matuszewski et al., 2008). In the studies conducted by Grassberger and Frank (2004) **Cleridae** were the first beetles to arrive at the carcass.

During the summer trial of the present study, no preference of **Cleridae** for any decomposition stage could be detected. After the study was completed and the sites disassembled, I kept the remains of the pigs in plastic garbage bags for another six months in front of my home; when I inspected them before discarding, I found to my surprise about 40 – 45 *Necrobia ruficollis* and *Necrobia rufipes* individuals living among the dry remains. This is in line with the findings of Payne and King (1970) and Kočárek (2003). Either the beetles found were of the second generation, having hatched from eggs already attached to the remains before being put in the bags or the scent had attracted adult beetles to the XVIIIth district.

The **Nitidulidae** are mostly sap-feeders on trees, flowers and decaying fruit but some occur on carrion (Smith, 1986). Payne and King (1970) collected nine species on pig carrion during the dry stage (DS5), noting that both larvae and adults tend to feed on dried skin but prefer the moister areas of the carcass.

In this study a connection to the advanced decay stage (DS4) was found, extending into the dry phase only during the spring trial. In the summer trial, just eight individuals bothered to show up. Except for the seasonality, Kočárek (2003) had obtained similar results. In other studies (Rodriguez and Bass, 1983; Anderson and VanLaerhoven, 1996) a continual succession and an increasing number of individuals from the bloated stage (DS2) onward have been noted.

Scarabaeidae regularly visited the carcasses in the forest sites, which is in line with the results of Kočárek (2003). In this study well-aimed direct flight to the carrion from *Geotrupes stercorarius* was observed. The succession though differed in spring from that in summer. In spring, occurrence increased during the advanced decay stage (DS4), whereas in summer it grew during the dry stage (DS5).

Members of the family **Staphylinidae** showed a similar behavior as **Scarabaeidae**: maximal occurrence during the advanced decay stage (DS4) in spring and during the dry stage (DS5) in summer.

Further investigations, especially identification of the species and possible differences in their habits, are necessary. Kočárek (2003) found ten predatory species

belonging to five genera with a rather broad spectrum of preferred occurrence from bloated to dry stage (DS2-5).

6.4 Pitfall vs. rack-mounted traps

Beetles collected in the rack-mounted traps placed below the carcasses could only have reached them by digging their way through the lawn turf layer on which the pig lay. Most species were found in larger quantities in the much less selective pitfall traps placed in the four corners around the carrion. This could mean that species collected in pitfall traps either do not burrow into the ground directly next to the carrion, or do not dig deeper than three centimeters. Of course, the catchment area of the pitfall traps was much larger than the one square meter covered by the rack-mounted traps. It could also mean that they simply are above-ground hunters... or the stratagem used did not work as well as expected.

The families **Cleridae** and **Nitidulidae** were the only ones of which more individuals fell into the rack-mounted traps than into the pitfall traps (**Cleridae**: 37 in pitfall traps – 79 in rack-mounted traps; **Nitidulidae**: 77 in pitfall traps – 110 in rack-mounted traps).

In the family **Silphidae**, most species were found in the pitfall traps. Only *Necrophorus fossor* and *Necrophorus humator* show a divergence, one being more and the other equally represented in the rack-mounted traps. (*Necrophorus fossor*: 8 in pitfall traps – 27 in rack-mounted traps; *Necrophorus humator*: 29 in pitfall traps – 29 in rack-mounted traps)

The two *Thanatophilus* species also seem less keen on digging through the turf (348 in pitfall traps – 42 in rack-mounted traps).

6.5 Spring vs. summer

The number of individuals collected in spring was similar to the number of individuals collected in summer (3934 : 3397). However, diversity was less in summer, with 33 forensically important species, versus 47 species in spring. These findings conform to the results of Kočárek (2003), who noted a continuous decline of the number of species

on carcasses from spring through summer to autumn.

The presence of several species turned out to be seasonal. *Oiceoptoma thoracica* was collected 55 times in spring (and seen a lot more) whereas only once in summer. Matuszewski et al. (2009) also observed such a seasonality for this species. Other studies have obtained different results, collecting this species (Kočárek, 2003) or a closely related species (Tabor et al., 2005), both in spring and in summer and even in spring and in autumn (Sharanowski et al., 2008).

Studies conducted in various European countries with differing results show that no generalization of seasonality of beetle species can be postulated. Only further research concerning insect activity and decay rate in well-defined biogeographical regions will add valuable knowledge to forensic entomology.

I myself observed one individual of *Oiceoptoma thoracica* ripping the T-shirt of pig Fridolin (day 15, spring trial, Schottenhof - oak forest), getting stuck half way through and dying there after a while. This dead beetle was easily recognizable throughout the trial and given seasonality for this species it could provide important clues in forensic cases if the cadaver was found years after death, since beetle skins can be dated to estimate the season of death (Strong and Adams, 1990).

In the present study, the two species of the genera *Thanatophilus* seem to have a preference for the earlier part of the year. Taking into account the findings of Matuszewski et al. (2009), this claim could be broadened to a preference for the cooler seasons of the year, since in their study *Thanatophilus sinuatus* and *Thanatophilus rugosus* occurred in spring and in autumn, missing completely in summer. Again, Kočárek (2003) found these species in Poland throughout the year, equally in spring and in summer, a bit less in autumn.

On the seasonality of **Trogidae**, the two studies of Kočárek (2003) and Matuszewski et al. (2009) are aligned with the findings of the current study, confirming a postulated preference for spring. For the species *Omosita discoidea* from the family **Nitidulidae**, the work of Matuszewski et al. (2009) again confirm this study's results, since they also have found this species (and most of the family) only in their spring trial. Kočárek (2003) however did get different results.

At least on the family **Hydrophilidae** our findings go in line with the results of Kočárek (2003), for he also observed most individuals in his spring trial. On the other hand, Smith (1986) states, that he found *Cryptopleurum minutum* on a fox corpse in November.

Families that seem without a preferred season in this study (**Dermestidae**, **Cleridae** and **Leiodidae**), are said to have one in other studies (Kočárek, 2003; Grassberger and Frank, 2004; Sharanowski et al., 2008; Matuszewski, 2009). This may also have to do with the fact, that only two trials were conducted, one in spring, one in summer. Originally three trials from early spring to late autumn had been planned, but due to organizational delays, mechanical difficulties and public complaints about `olfactory harassment´, only two trials were conducted.

6.6 Urban vs. Sylvan

No studies known to the researcher in this study have dealt with the differences in decomposition of carrion and arthropod colonization between an urban habitat and woodland. Grassberger and Frank (2004) conducted a study in the urban area of Vienna, but no comparative data has been obtained from the surrounding woods.

As expected, diversity and individual numbers are greater in the woodlands. Sealed soil, traffic and limited vegetation in the urban surroundings can account for that. Still three families came up with more individuals in the Viennese urban area: **Dermestidae**, **Trogidae** and **Cleridae**. They are the same that Kočárek (2003), who did not investigate an urban site, shows as having a habitat preference for open grassland rather than deciduous forest.

6.7 Conclusion

So far, very little information about decomposition, decay and succession patterns in Eastern Austria has been gathered. In order to make any statements in forensic cases, further studies have to be conducted over several years. Archer (2003) has shown that data collected only over the course of one year are potential sources of error if used to estimate minimum post-mortem interval, since „inter-year variation in arrival and departure times of carrion taxa can occur“.

Comparing the study of Grassberger and Frank (2004) with results of this study from the same Narrenturm site, some differences can be noted. During the spring trial, which was started 10 days later than theirs, the fresh stage (DS1) lasted about four days,

whereas Grassberger and Frank note first signs of the bloated stage (DS2) at the end of the second day. This is probably attributable to the fact that during the beginning of this study, ambient temperatures were 9 C° lower than during the study conducted eight years earlier. Temperatures during the bloated stage (DS2) went in opposite directions in the two studies. While this study measured rising temperatures, Grassberger and Frank experienced lower temperatures, which may explain why they note a bloated stage (DS2) lasting up to day 11, while it took only six days for pig Marla to pass to the active decay stage (DS3). It also has to be taken into account that Marla weighted less than half the pig Grassberger used (20kg - 44kg).

They collected as first arriving beetles **Cleridae** (not further specified) on the fifth day. The first **Cleridae** (*Necrobia rufipes*) in this study was found on the eleventh day, the first beetle of forensic importance being *Saprinus semistriatus* two days earlier. During the spring trial not one *Necrodes littoralis* was seen on the "Narrenturm – inner city" site, while Grassberger and Frank write having collected it on the same site during the decay stage.

This should illustrate the necessity for further experiments and data collection in this fascinating field.

6.8 Further research

This study has provided valuable baseline information on the carrion-visiting beetle fauna in and around Vienna. However, Archer (2003) has pointed out the necessity to conduct this kind of study over the course of several years in order to make any conclusions useful in real forensic cases.
Matuszewski et al. (2009) note several **Staphylinidae** species as taxa of moderate and high usefulness for the succession-based PMI estimation. This complicated family, with species that are hard to differentiate, could be studied further from specimens collected for this study and also should be observed closely during future trials. Furthermore, the various beetle larvae collected on and around the carrion would yield important information and could serve as research material for a different project.

In order to complete the city´s inventory of the necrophage beetle fauna, studies should be conducted in the Lobau, the large natural wetland area on the Eastern banks of the Danube.

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8. LIST OF FIGURES

All figures and tables, except the labelled, are created by the author.

9. LIST OF TABLES

10. REFERENCES

Abell, D.H., Wasti, S.S. and G.C. Hartmann. 1982. Saprophagous arthropod fauna associated with turtle carrion. Applications of Entomological Zoology 17: 301-307.

Amendt, J., Krettek, R. and R. Zehner. 2004. Forensic entomology. Naturwissenschaften 91: 51-65.

Anderson, G.S. and S.L. VanLaerhoven. 1996. Initial studies on insect succession on carrion in southwestern British Columbia. Journal of Forensic Sciences 41: 617-625.

Archer, M.S. 2003. Annual variation in arrival and departure times of carrion insects at carcasses: implications for succession studies in forensic entomology. Australian Journal of Zoology 51: 569-576.

Avila, F.W. and M.L. Goff. 1998.Arthropod succession patterns onto burnt carrion in two contrasting habitats in the Hawaiian Island. Journal of Forensic Sciences 43: 581-586.

Benecke, M. and M. Leclercq. 1999. Ursprünge der modern angewandten rechtsmedizinisch-kriminalistischen Gliedertierkunde bis zur Wende des 20. Jahrhundert. Rechtsmedizin 9: 41-45.

Benecke, M. and R. Lessig. 2001. Child neglect and forensic entomology. Forensic Science International 120: 155-159.

Benecke, M. 2006. Dem Täter auf der Spur. So arbeitet die moderne Kriminalbiologie. 1. Auflage. Bergisch Gladbach: Lübbe GmbH & Co. KG. 335p.

Carvalho, L.M.L., Thyssen, P.J., Linhares A.X. and F.A.B. Palhares. 2000. A checklist of arthropod associated with pig carrion and human corpses in Southeastern Brazil. Memórias do Instituto Oswaldo Cruz 95: 135-138.

Carvalho, L.M.L. and A.X. Linhares. 2001. Seasonality of insect succession and pig carcass decomposition in a natural forest area in southeastern Brazil. Journal of Forensic Sciences 46: 604-608.

Catts, E.P. and M.L. Goff. 1992. Forensic entomology in criminal investigations. Annual Review of Entomology 37: 253-272.

Cymorek, S., Lohse, G.A., Freude, H., Kaszab, Z., Kinzelbach, R.K., & Ermisch, K. (1969). Teredilia, Heteromera, Lamellicornia. Die Käfer Mitteleuropas. Freude, H., Harde, K.W., Lohse, G.A. (Hrsg.) Krefeld, Goeck & Evers. 388p.

Dillon, L.C. and G.S. Anderson. 1996. Forensic entomology – the use of insects in death investigations to determine elapsed time since death in interior and northern British Columbia regions. Technical Report TR-03-96, Canadian Police Research Centre, Ottawa.

Dillon, L.C. 1997. Insect succession on carrion in three biogeoclimatic zones of British Columbia. Medical Science Thesis, Simon Fraser University, Burnaby, BC.

Early, M. and M.L. Goff. 1986. Arthropod succession on the island of O´ahu, Hawaiian Islands, USA. Journal of Medical Entomology 23: 520-531.

Eberhardt, T.L. and D.A. Elliot. 2008. A preliminary investigation of insect colonisation and succession on remains in New Zealand. Forensic Science International 176: 217-223.

Ehrendorfer, F and R. Berger. (Hrsg.) 2011. Ökosystem Wien. Die Naturgeschichte einer Stadt. Böhlau Verlag Wien. 744p.

Engelmann, H.-D. 1978. Zur Dominanzklassifizierung von Bodenarthropoden. Pedobiologia 18, 378-380.

Erbeling, L. and M. Erbeling. 1986. Faunistische und ökologische Untersuchungen zur Sukzession aasbesuchender Coleopteren im südlichen Eggegebirge. Decheniana 139: 231-240.

Fabricius, J.C. 1775. Systema entomologiae, sistens insectorum classes, ordines, genera, species adiectis synonymis, locis, observationibus, descriptionibus. Kortii, Flensburgi et Lipsiae. 832p.

Fabricius, J.C. 1801. Systema Eleuthatorum secundum ordines, genera, species adiectis synonymis, locis, observationibus, desciptionibus. Tomus II. Bibliopolii Academici Novi, Kilae. 687p.

Freude, H., Schäflein, H., Lohse, G.A., Vogt, H., Witzgall, K., Szymczakowski, W., Peez, A.v., Endrädy-Younga, S., Besuchet, C., Franz, H., & Sundt, E. (1971). Adephaga 2, Palpicornia, Histeroidea, Staphylinoidae. Die Käfer Mitteleuropas. Freude, H., Harde, K.W., Lohse, G.A. (Hrsg.) Krefeld, Goeck & Evers. 365p.

Fuller, M.E. 1934. The insect inhabitants of carrion, a study in animal ecology. Bulletin of the Council for Scientific and Industrial Research, Melbourne 82: 5-62.

Geisthardt, M., Dahlgren, G., Wittmer, W., Evers, A.M.J., Lohse, G.A., Harde, K.W., Lompe, A., Steffan, A.W., Drechsel, U., & Paulus, H.F. (1979). Diversicornia. Die Käfer Mitteleuropas. Freude, H., Harde, K.W., Lohse, G.A. (Hrsg.) Krefeld, Goeck & Evers. 367p.

Gill, G.J. 2005. Decomposition and arthropod succession an above ground pig carrion in rural Manitoba. Technical Report TR-06-2005, Canadian Police Research Centre, Ottawa.

Goff, M.L. 1991. Comparison of insect species associated with decomposing remains recovered inside dwellings and outdoors on the island of Oahu, Hawaii (USA). Journal of Forensic Sciences 36: 748-753.

Gomes, L. and C.J von Zuben. 2006. Forensic entomology and main challenges in Brazil. Neotropical Entomology 35: 1-11.

Grassberger, M. 2004. Grundlagen und historische Entwicklung der forensischen Entomologie. Denisa 13: 541-546.

Grassberger, M. and C. Frank. 2004. Initial study of arthropod succession on pig carrion in a central European urban habitat. Journal of Medical Entomology 41: 511-523.

Greenberg, B. 1991. Flies as forensic indicators. Journal of Medical Entomology. 28: 565-577.

Harde, K.W., & Severa, F. (2000) Der Kosmos Käferführer. 4. Auflage. 352p.

Howden, A.T. 1950. The succession of beetles on carrion. Unpublished dissertation for degree of MS, North Carolina State College, Raleigh.

Kočárek, P. 2001. Diurnal patterns of postfeeding larval dispersal in carrion blowflies (Diptera: Calliphoridae) European Journal of Entomology 98: 117-119.

Kočárek, P. 2003. Decomposition and Coleoptera succession on exposed carrion of small mammal in Opava, the Czech Republic. European Journal of Soil Biology 39: 31-45.

Legorsky, F.J. 2007. Zur Käferfauna von Wien. Wissenschaftliche Mitteilungen aus dem Niederösterreichischen Landesmuseum 18: 47-261.

Linnaeus, C. 1767. Systema naturae, per regna tria naturae, secundum classes, ordines, genera, species, cum caracteribus, differentiis, synonymis, locis. Ed 13 rev. 1(2): 533-1327 [see page 990].

Lohse, G.A., Benick, G., Likowski & Besuchet, Ch. 1974. Staphylinidae II & Pselaphidae. Die Käfer Mitteleuropas.Freude, H., Harde, K.W., Lohse, G.A. (Hrsg.) Krefeld, Goeck & Evers. 381p.

Matuszewski, S., Bajerlein, D., Konwerski, S. and Szpila, K. 2008. An initial study of insect succession and carrion decomposition in various forest habitats of Central Europe. Forensic Science International 180: 61-69.

Matuszewski, S., Bajerlein, D., Konwerski, S. and Szpila, K. 2009. Insect succession and carrion decomposition in selected forest habitats of Central Europe. Part 2: Composition and residency patterns of carrion fauna. Forensic Science International doi:10.1016/j.forsciint.2009.11.007

Mégnin, P. 1894. La Faune des Cadavres. Application de l´entomologie a la médicine légale. Encyclopédie Scientifique des Aide-Memoire. Edition Gauthier-Villars et Fils, Paris. 214p.

Mellen, P.F.M., M.A. Lowry and M.S. Micozzi. 1993. Experimental observations on adipocere formation. Journal of Forensic Sciences 38: 91-93.

Moura, M.O., Monteiro-Filho, E.L.A. and C.J.B. de Carvalho. 2005. Heterotrophic succession in carrion arthropod assemblages. Brazilian Archives of Biology and Technology 48: 477-486.

Nabaglo, L. 1973. Participation of invertebrates in decomposition of rodent carcasses in forest ecosystem. Ekologia Polska 21: 251-269.

Payne, J.A. 1965. A summer carrion study of the baby pig *Sus scrofa* Linnaeus. Ecology 46: 592-602.

Payne, J.A. and E.W. King. 1970. Coleoptera associated with pig carrion. Entomologist´s Monthly Magazine 105: 224-232.

Pfleiderer, S. and T. Hofmann. 2007. Digitaler Angewandter Geo-Atlas – Stadtgeologie am Beispiel von Wien. Jahrbuch der geologischen Bundesanstalt 147: 263-273.

Plachy, H. 1981. Neue Erkenntnisse zur Tektonik im Wiener Raum. Mitteilungen der österreichischen geologischen Gesellschaft 74/75: 231-243.

Reed, H.B. 1958. A study of dog carcase communities in Tennessee, with special reference to the insects. The American Midland Naturalist 59: 213-245.

Richards, E.N. and M.L. Goff. 1997. Arthropod succession on exposed carrion in three contrasting tropical habitats on Hawaii Island, Hawaii. Journal of Medical Entomology 34: 328-339.

Rodriguez, W.C. and W.M. Bass. 1983. Insect activity and its relationship to decay rates of human cadavers in east Tennessee. Journal of Forensic Sciences 28: 423-432.

Schaefer, M., Brohmer, P., Bohlken, H., Reichstein, H., Sattler, K., Schmidt, E., & Sick, F. (2002) Fauna von Deutschland. Quelle & Meyer Verlag Wiebelsheim 360-444.

Schawaller, W. 1981. Taxonomie und Faunistik der Gattung *Thanatophilus* (Coleoptera: Silphidae). Stuttgarter Beiträge zur Naturkunde. Serie A (Biologie) Nr. 351 21p.

Schnepf, B. 2007. Untersuchungen zur aasbewohnenden Käferfauna Erlangens. Zulassungsarbeit am Institut für Biologie, Lehrstuhl für Entwicklungsbiologie der Friedrich-Alexander-Universität Erlangen-Nürnberg

Schoenly, K., Griest, K. and S. Rhine. 1991. An experimental field protocol for investigating the postmortem interval using multidisciplinary indicators. Journal of Forensic Sciences 36: 1395-1415.

Schoenly, K. and W. Reid. 1987. Dynamics of heterotrophic succession in carrion arthropod assemblages: discrete series or a continuum of change? Oecologia (Berlin) 73: 192-202.

Schoenly, K., Goff, M.L. and M. Early. 1992. A BASIC algorithm for calculating the postmortem interval from arthropod successional data. Journal of Forensic Sciences 37: 808-823.

Scott, P.M. 1998. The ecology and behavior of burying beetles. Annual Review of Entomology 43: 595-618.

Sharanowski, B.J., Walker, E.G. and G.S. Anderson. 2008. Insect succession and decomposition patterns on shaded and sunlit carrion in Saskatchewan in three different seasons. Forensic Science International 179: 219-240.

Smith, K.G.V. 1986. A manual of forensic entomology. Trustees of the British Museum (Natural History), London. 205p.

Strong, L. and R.G. Adams. 1990. *Dermestes leechi* Kalik (Coleoptera: Dermestidae) from an Egyptian mummy. Entomologist´s Gazette 41: 119-120.

Tabor, K.L., Brewster, C.C. and R.D. Fell. 2004. Analysis of the successional patterns of insects on carrion in Southwest Virginia. Journal of Medical Entomology 41: 785-795.

Tabor, K.L., Fell, R.D. and C.C.Brewster. 2005. Insect fauna visiting carrion in Southwest Virginia. Forensic Science International 150: 73-80.

Tullis, K. and M.L. Goff. 1987. Arthropod succession in exposed carrion in a tropical rainforest on O´ahu, Hawaii. Journal of Medical Entomology 24: 332-339.

Turner, B.D. and T. Howard. 1992. Metabolic heat generation in dipteran larval aggregations: a consideration for forensic entomology. Medical and Veterinary Entomology 6: 179-181.

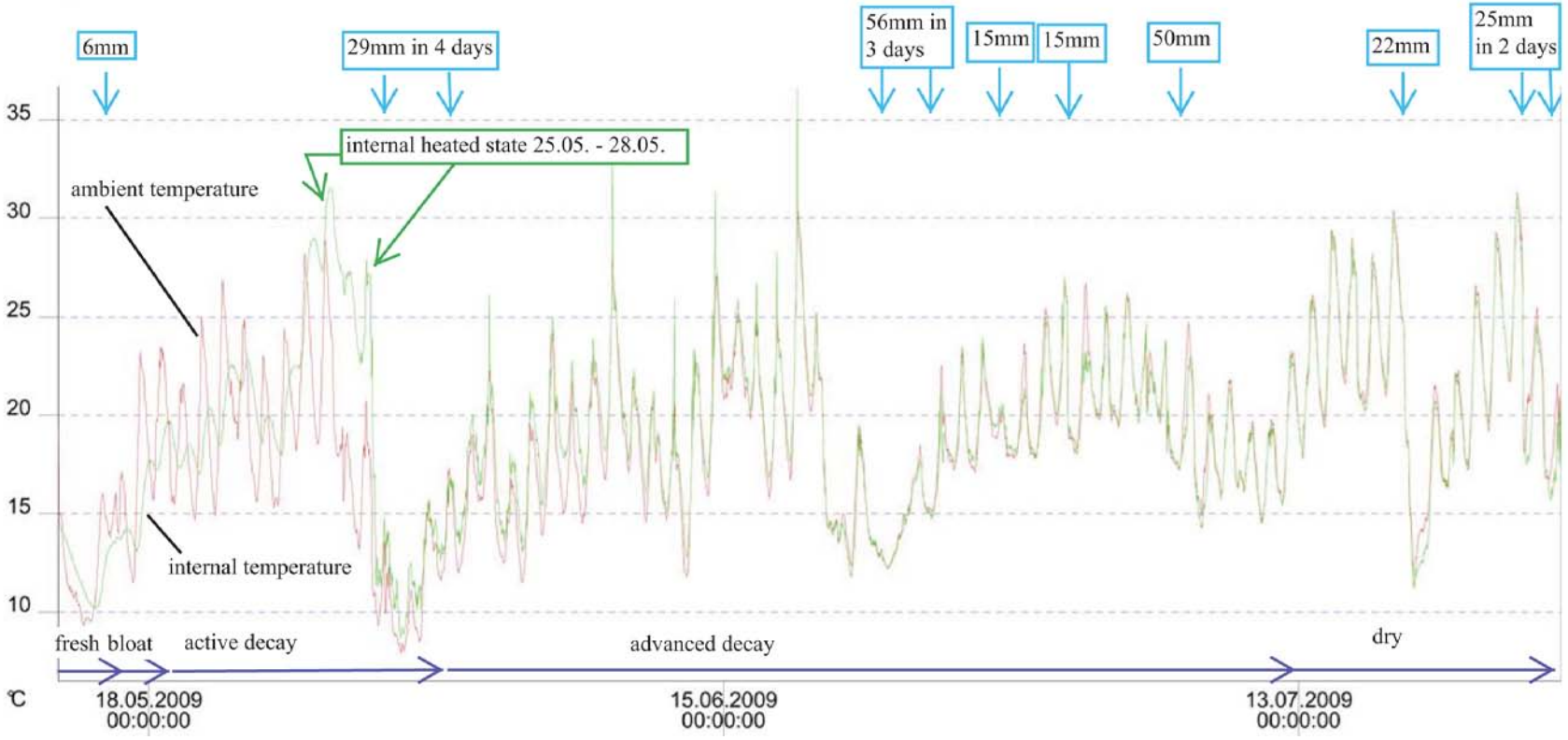
Vitta, A., Pumidonming, W., Tangchaisuriya, U., Poodendean, C. and S. Nateeworanart. 2007. A preliminary study on insect associated with pig (*Sus scrofa*) carcasses in Phitsanulok, northern Thailand. Tropical Biomedicine 24(2): 1-5.

Vogt, H., Spornraft, K., Endrädy-Younga, S., Lohse, G.A., Peez, A.v., & Fürsch, H. (1967). Clavicornia. Die Käfer Mitteleuropas. Freude, H., Harde, K.W., Lohse, G.A. (Hrsg.) Krefeld, Goeck & Evers. 310p.

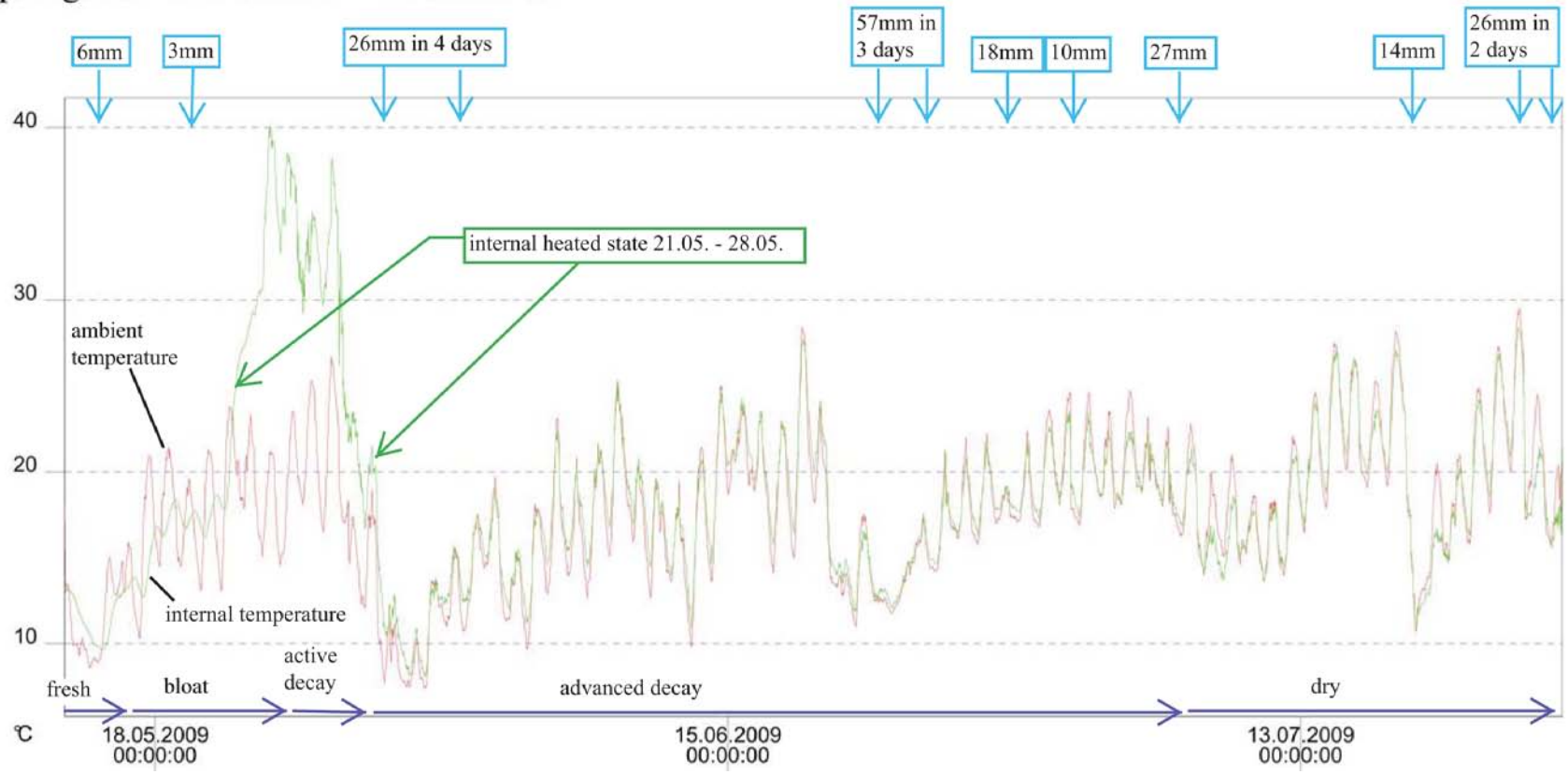
Walter, H. 1999. Vegetation und Klimazonen. Eugen Ulmer GmbH & Co., Stuttgart, Germany

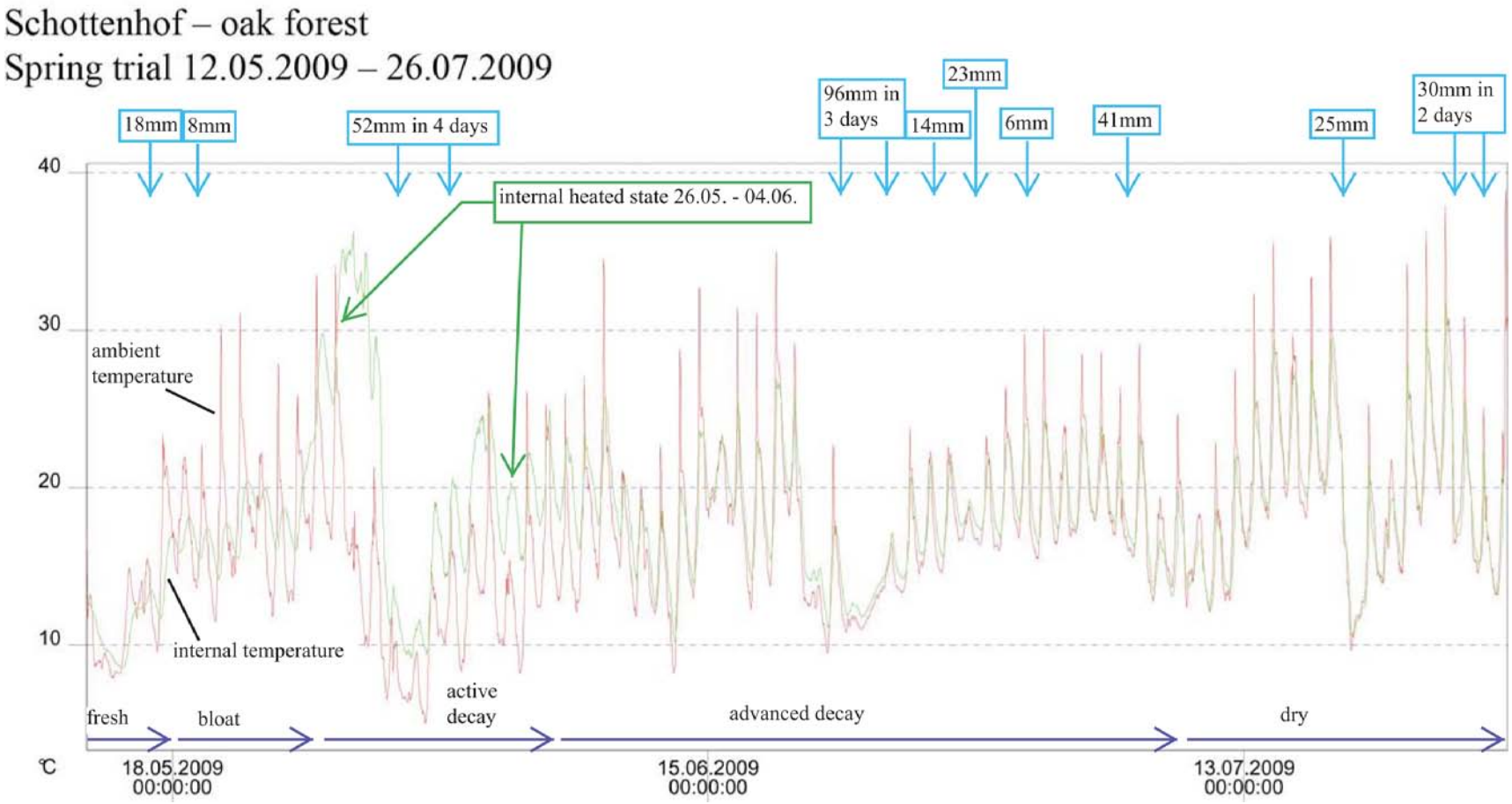
Internet:
http://www.zamg.ac.at/fix/klima/oe71-00/klima2000/klimadaten_oesterreich_1971_frame1.htm

Narrenturm – inner city
Spring trial 12.05.2009 – 25.07.2009

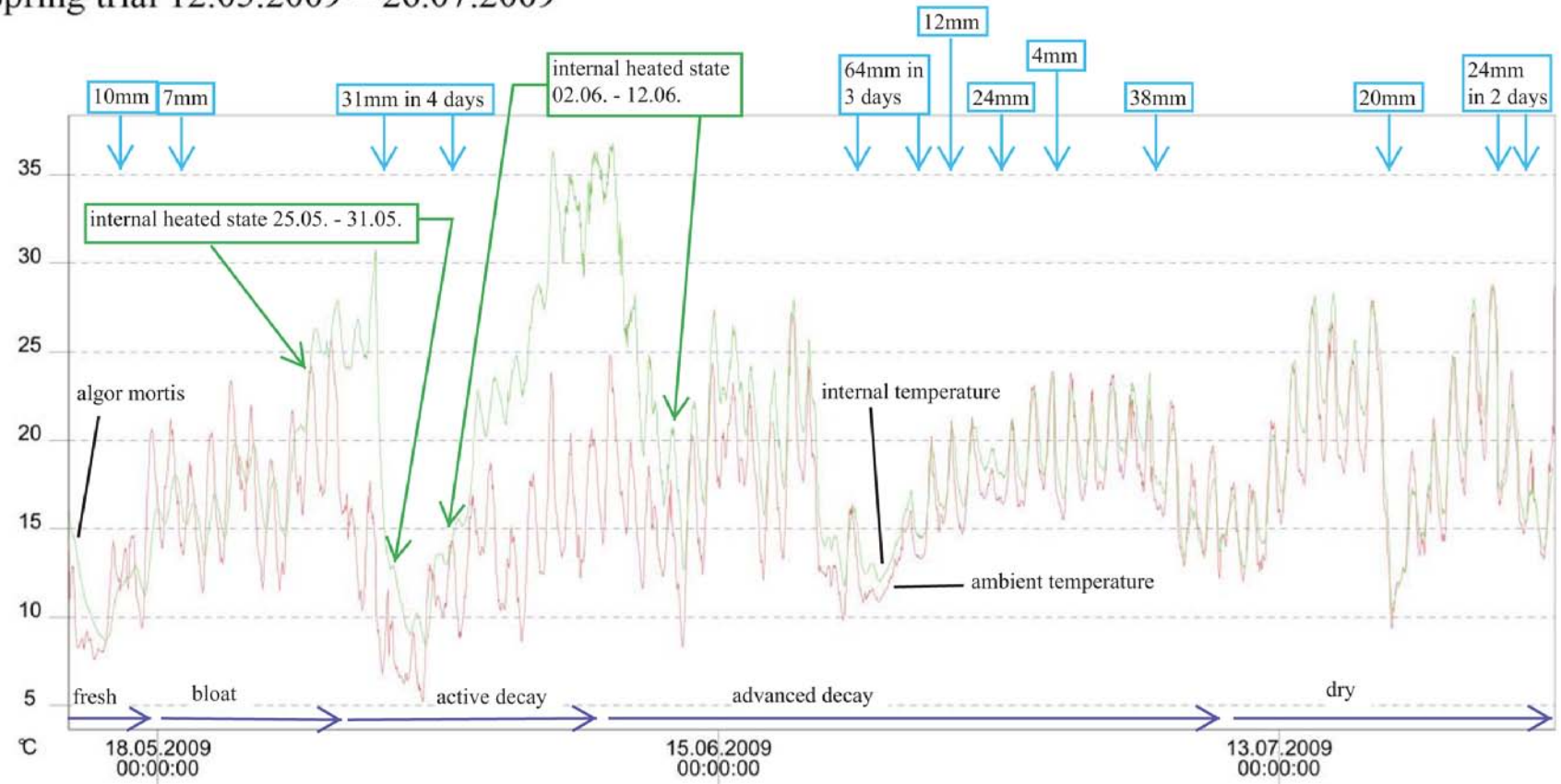


Sternwartepark – suburb
Spring trial 12.05.2009 – 25.07.2009

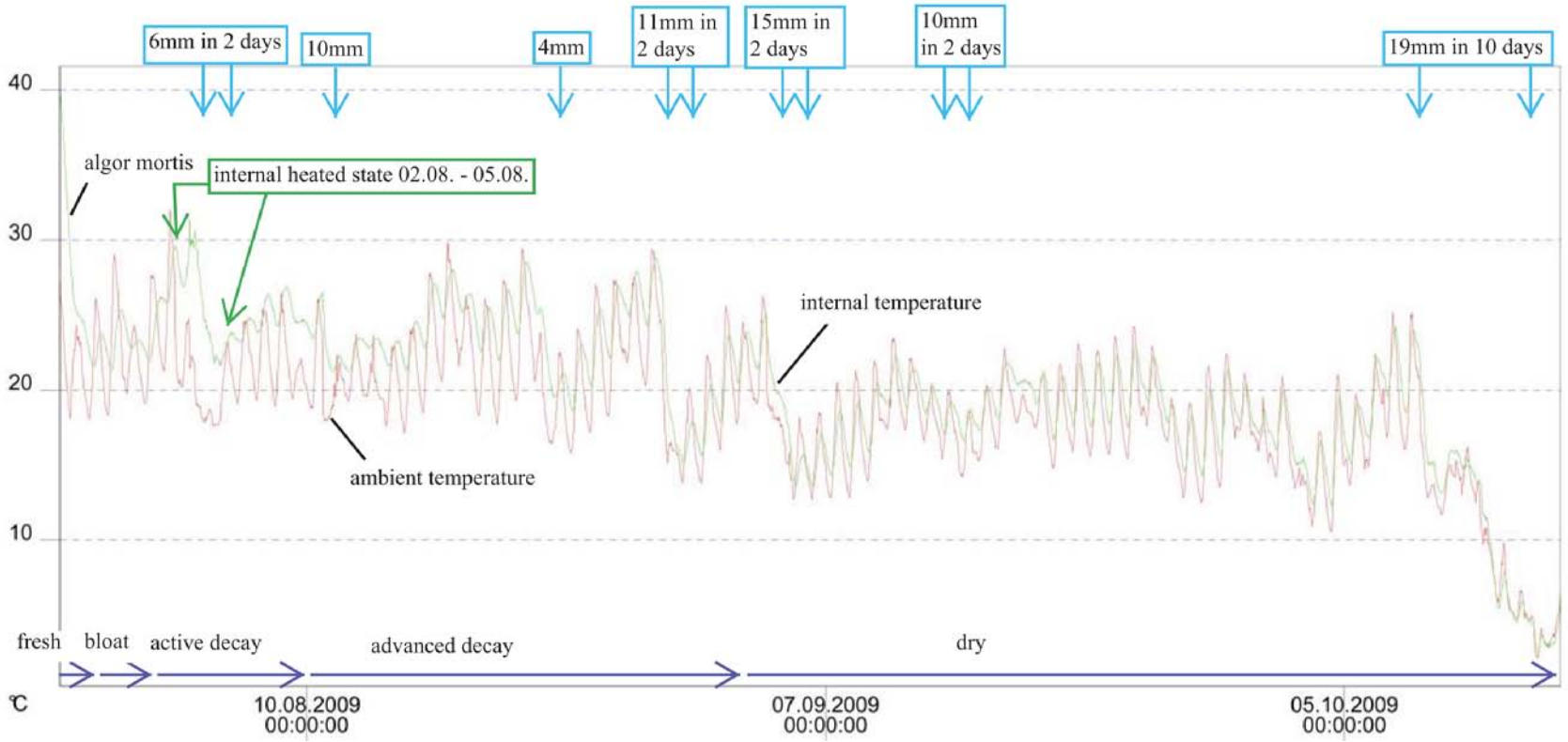



Schottenhof – oak forest
Spring trial 12.05.2009 – 26.07.2009
18mm
8mm
52mm in 4 days
96mm in 3 days
14mm
23mm
6mm
41mm
25mm
30mm in 2 days
internal heated state 26.05. - 04.06.
40
30
20
10
ambient temperature
internal temperature
fresh
bloat
active decay
advanced decay
dry
℃
18.05.2009 00:00:00
15.06.2009 00:00:00
13.07.2009 00:00:00

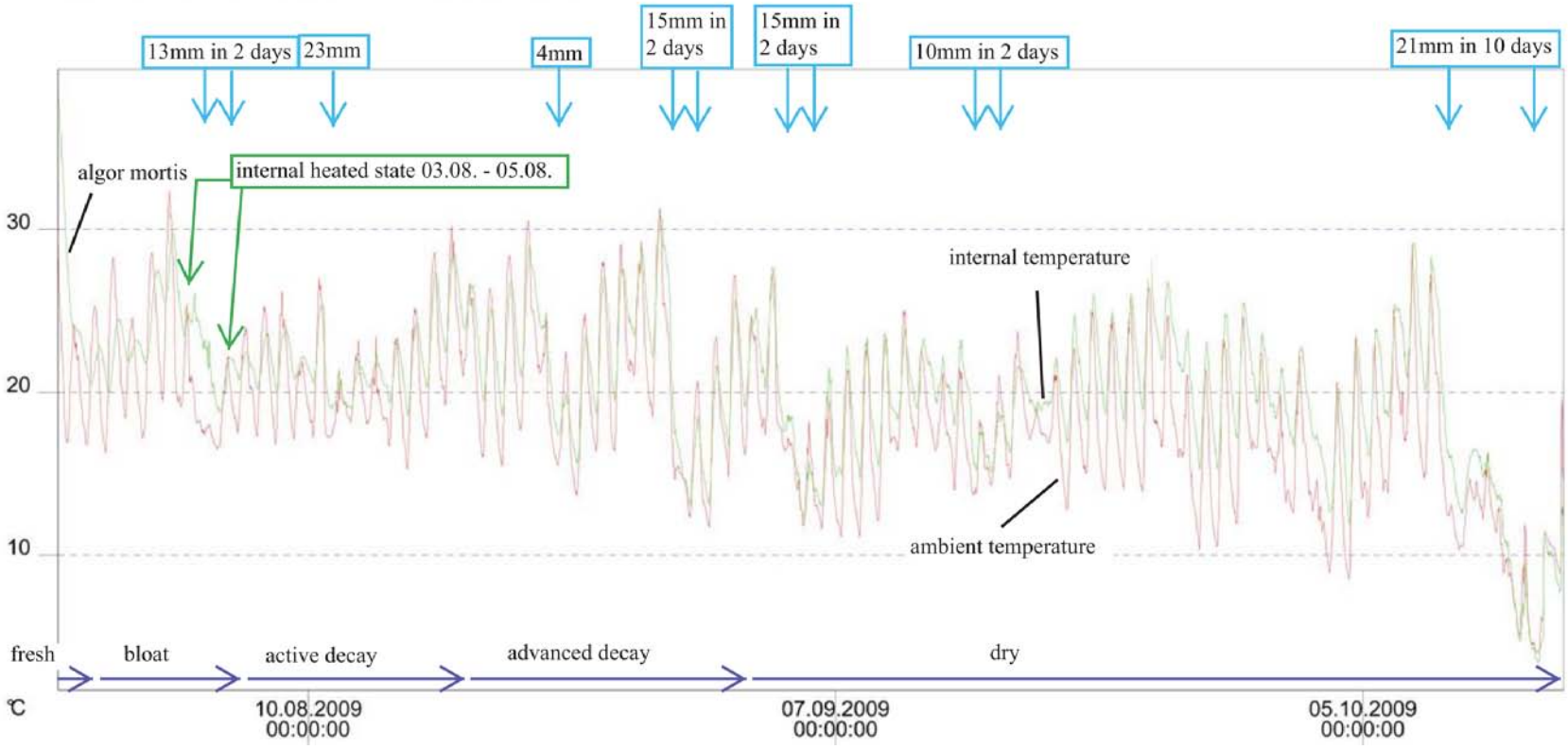
Schottenhof – beech grove
Spring trial 12.05.2009 – 26.07.2009



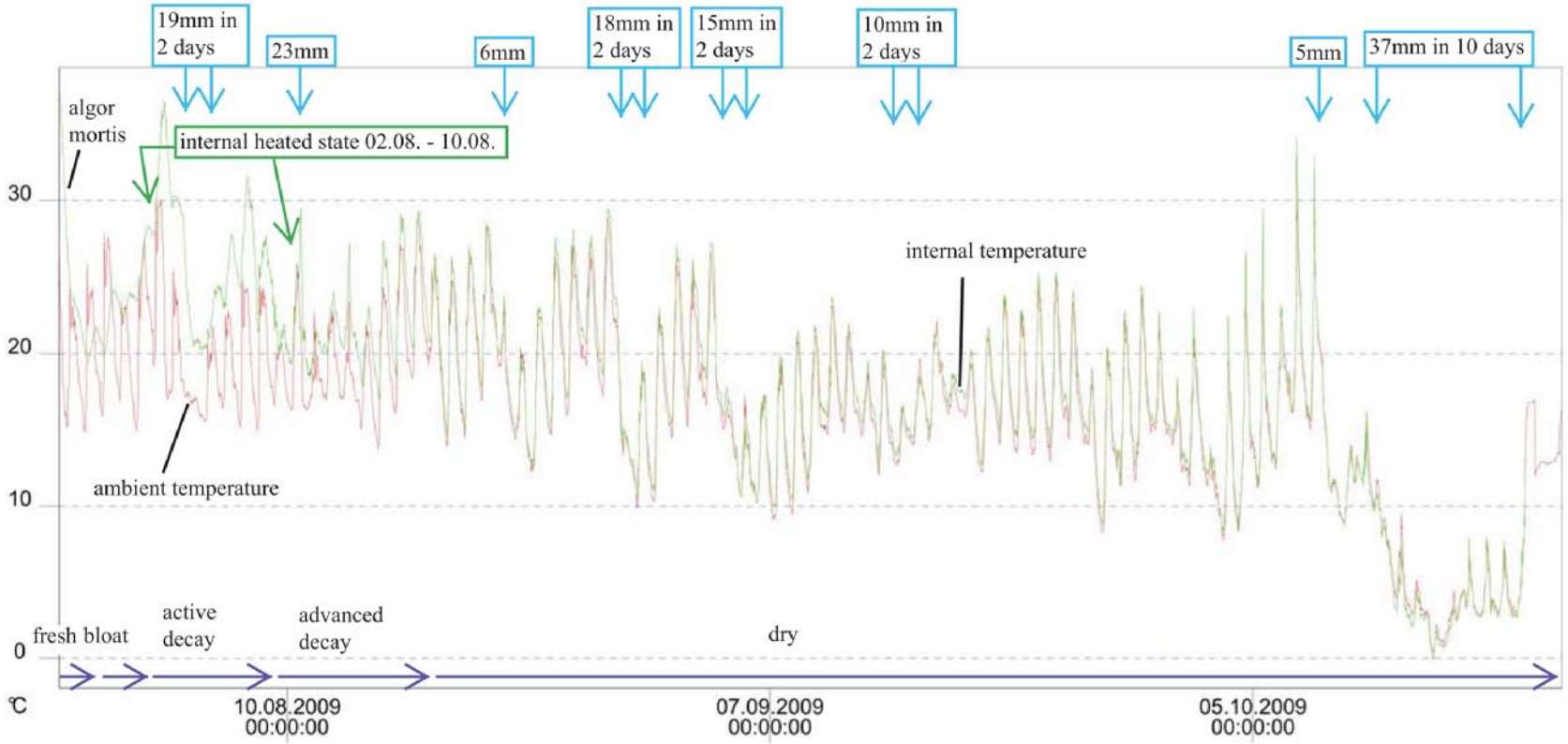
Narrenturm – inner city
Summer trial 27.07.2009 – 16.10.2009



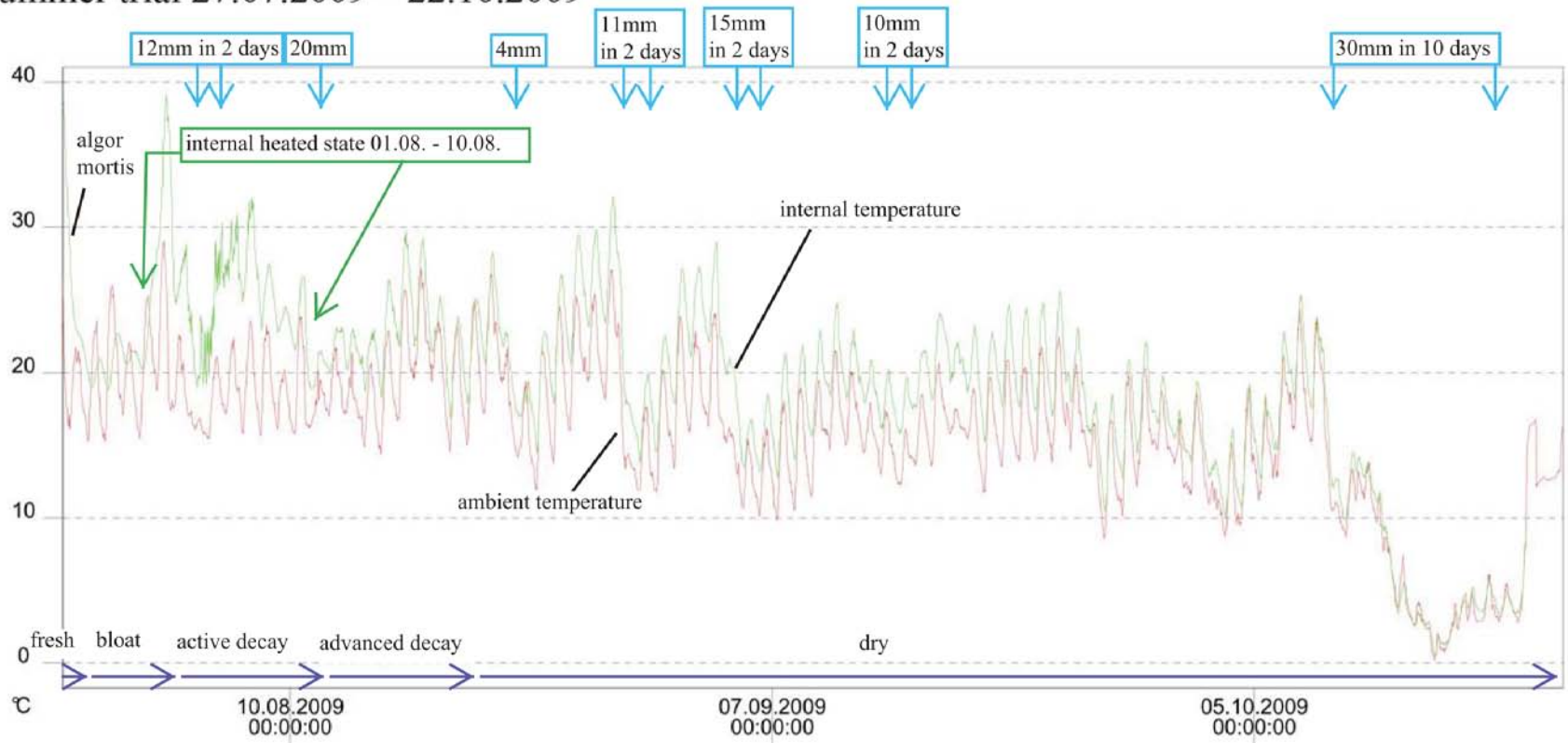
Sternwartepark – suburb
Summer trial 27.07.2009 – 15.10.2009



Schottenhof – oak forest
Summer trial 27.07.2009 – 22.10.2009



Schottenhof – beech grove
Summer trial 27.07.2009 – 22.10.2009



study sites	from	until	form	species	family	male	female	number	trap
Narrenturm	12.05.09	13.05.09						0	PT
Narrenturm	13.05.09	14.05.09						0	PT
Narrenturm	14.05.09	16.05.09						0	PT
Narrenturm	16.05.09	18.05.09						0	PT
Narrenturm	18.05.09	20.05.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae		1	1	PT
Narrenturm	18.05.09	20.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Narrenturm	20.05.09	22.05.09			Carabidae			3	PT
Narrenturm	20.05.09	22.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		2	2	PT
Narrenturm	20.05.09	22.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	20.05.09	22.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	PT
Narrenturm	22.05.09	24.05.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	PT
Narrenturm	22.05.09	24.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2		2	PT
Narrenturm	22.05.09	24.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae	1	1	2	PT
Narrenturm	22.05.09	24.05.09	-		Curculionidae	-	-	1	PT
Narrenturm	24.05.09	26.05.09	-		Staphylinidae	-	-	1	PT
Narrenturm	24.05.09	26.05.09	-	Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	-	2	2	PT
Narrenturm	24.05.09	26.05.09	-	Saprinus semistriatus (Scriba, 1790)	Histeridae	-	-	4	PT
Narrenturm	26.05.09	28.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Narrenturm	26.05.09	28.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	26.05.09	28.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			6	PT
Narrenturm	26.05.09	28.05.09			Staphylinidae			2	PT
Narrenturm	28.05.09	30.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Narrenturm	28.05.09	30.05.09		Dermestinus frischi (Kugelann, 1792)	Dermestidae			1	PT
Narrenturm	28.05.09	30.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	28.05.09	30.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	PT
Narrenturm	30.05.09	01.06.09			Carabidae			1	PT
Narrenturm	30.05.09	01.06.09			Staphylinidae			5	PT
Narrenturm	30.05.09	01.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			3	PT
Narrenturm	01.06.09	03.06.09			Staphylinidae			2	PT
Narrenturm	01.06.09	03.06.09	larvae					2	PT
Narrenturm	01.06.09	03.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	PT
Narrenturm	03.06.09	08.06.09	larvae					2	PT
Narrenturm	03.06.09	08.06.09			Carabidae			2	PT
Narrenturm	03.06.09	08.06.09			Staphylinidae			1	PT
Narrenturm	08.06.09	11.06.09			Staphylinidae			2	PT
Narrenturm	08.06.09	11.06.09	larvae					1	PT
Narrenturm	08.06.09	11.06.09		Saprinus cuspidatus (Ihssen, 1949)	Histeridae			2	PT
Narrenturm	11.06.09	14.06.09			Carabidae			1	PT
Narrenturm	11.06.09	14.06.09			Staphylinidae			1	PT
Narrenturm	14.06.09	15.06.09	larvae					1	PT
Narrenturm	14.06.09	15.06.09			Staphylinidae			2	PT
Narrenturm	15.06.09	17.06.09	larvae					1	PT
Narrenturm	15.06.09	17.06.09			Staphylinidae			4	PT
Narrenturm	15.06.09	17.06.09			Carabidae			1	PT
Narrenturm	17.06.09	22.06.09	larvae					1	PT
Narrenturm	17.06.09	22.06.09			Staphylinidae			1	PT
Narrenturm	22.06.09	25.06.09	larvae					2	PT
Narrenturm	22.06.09	25.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Narrenturm	22.06.09	25.06.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	PT
Narrenturm	22.06.09	25.06.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	PT

study site	from	until	form	species	family	male	female	number	trap
Narrenturm	25.06.09	27.06.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	PT
Narrenturm	25.06.09	27.06.09			Staphylinidae			1	PT
Narrenturm	27.06.09	30.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	27.06.09	30.06.09			Chrysomelidae			1	PT
Narrenturm	30.06.09	03.07.09	larvae					1	PT
Narrenturm	30.06.09	03.07.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	PT
Narrenturm	03.07.09	07.07.09	larvae					3	PT
Narrenturm	03.07.09	07.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Narrenturm	07.07.09	13.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	07.07.09	13.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Narrenturm	13.07.09	20.07.09	larvae					2	PT
Narrenturm	13.07.09	20.07.09			Carabidae			1	PT
Narrenturm	13.07.09	20.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Narrenturm	20.07.09	25.07.09							PT
Sternwarte	18.05.09	20.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	PT
Sternwarte	18.05.09	20.05.09		Necrophorus vespillo (Linné, 1758)	Silphidae			2	PT
Sternwarte	18.05.09	20.05.09		Valgus hemipterus (Linné, 1758)	Scarabaeidae			1	PT
Sternwarte	18.05.09	20.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	PT
Sternwarte	18.05.09	20.05.09		Dorcus parallelopipedus (Linné, 1758)	Lucanidae			1	PT
Sternwarte	20.05.09	22.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	1	3	PT
Sternwarte	20.05.09	22.05.09			Staphylinidae			1	PT
Sternwarte	20.05.09	22.05.09		Dorcus parallelopipedus (Linné, 1758)	Lucanidae			1	PT
Sternwarte	20.05.09	22.05.09			Byturidae			3	PT
Sternwarte	20.05.09	22.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			14	PT
Sternwarte	20.05.09	22.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			10	PT
Sternwarte	20.05.09	22.05.09		Dermestinus murinus (Linné, 1758)	Dermestidae			1	PT
Sternwarte	22.05.09	24.05.09		Byturus aestivus (Linné, 1758)	Byturidae			4	PT
Sternwarte	22.05.09	24.05.09			Staphylinidae			7	PT
Sternwarte	22.05.09	24.05.09		Trox scaber (Linné, 1767)	Trogidae			1	PT
Sternwarte	22.05.09	24.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Sternwarte	22.05.09	24.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	2	3	PT
Sternwarte	22.05.09	24.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	12	14	PT
Sternwarte	22.05.09	24.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			22	PT
Sternwarte	22.05.09	24.05.09		Byturus aestivus (Linné, 1758)	Byturidae			4	PT
Sternwarte	22.05.09	24.05.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Sternwarte	22.05.09	24.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			50	PT
Sternwarte	22.05.09	24.05.09		Saprinus cuspidatus (Ihssen, 1949)	Histeridae			1	PT
Sternwarte	24.05.09	26.05.09			Staphylinidae			17	PT
Sternwarte	24.05.09	26.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	8	9	PT
Sternwarte	24.05.09	26.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Sternwarte	24.05.09	26.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Sternwarte	24.05.09	26.05.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Sternwarte	24.05.09	26.05.09		Byturus aestivus (Linné, 1758)	Byturidae			17	PT
Sternwarte	24.05.09	26.05.09			Curculionidae			3	PT
Sternwarte	24.05.09	26.05.09		Dermestinus murinus (Linné, 1758)	Dermestidae			1	PT
Sternwarte	24.05.09	26.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			22	PT
Sternwarte	24.05.09	26.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			144	PT
Sternwarte	26.05.09	28.05.09	larvae					1	PT
Sternwarte	26.05.09	28.05.09			Carabidae			1	PT
Sternwarte	26.05.09	28.05.09			Staphylinidae			10	PT
Sternwarte	26.05.09	28.05.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT

study site	from	until	form	species	family	male	female	number	trap
Sternwarte	26.05.09	28.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			2	PT
Sternwarte	26.05.09	28.05.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Sternwarte	26.05.09	28.05.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Sternwarte	26.05.09	28.05.09		Byturus aestivus (Linné, 1758)	Byturidae			1	PT
Sternwarte	26.05.09	28.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			3	PT
Sternwarte	26.05.09	28.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			25	PT
Sternwarte	26.05.09	28.05.09		Saprinus cuspidatus (Ihssen, 1949)	Histeridae			1	PT
Sternwarte	28.05.09	30.05.09	larvae					10	PT
Sternwarte	28.05.09	30.05.09			Staphylinidae			2	PT
Sternwarte	30.05.09	01.06.09			Staphylinidae			5	PT
Sternwarte	30.05.09	01.06.09			Carabidae			1	PT
Sternwarte	30.05.09	01.06.09	larvae					51	PT
Sternwarte	01.06.09	03.06.09	larvae					116	PT
Sternwarte	01.06.09	03.06.09			Carabidae			1	PT
Sternwarte	01.06.09	03.06.09			Staphylinidae			1	PT
Sternwarte	01.06.09	03.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Sternwarte	01.06.09	03.06.09		Trox scaber (Linné, 1767)	Trogidae			1	PT
Sternwarte	01.06.09	03.06.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	1		1	PT
Sternwarte	01.06.09	03.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Sternwarte	01.06.09	03.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Sternwarte	03.06.09	05.06.09	larvae					88	PT
Sternwarte	03.06.09	05.06.09			Staphylinidae			3	PT
Sternwarte	03.06.09	05.06.09			Carabidae			1	PT
Sternwarte	03.06.09	05.06.09			Curculionidae			1	PT
Sternwarte	05.06.09	08.06.09	larvae					39	PT
Sternwarte	05.06.09	08.06.09			Staphylinidae			6	PT
Sternwarte	05.06.09	08.06.09			Curculionidae			1	PT
Sternwarte	05.06.09	08.06.09		Trox scaber (Linné, 1767)	Trogidae			2	PT
Sternwarte	05.06.09	08.06.09		Paralister stercorarius (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	05.06.09	08.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	05.06.09	08.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	PT
Sternwarte	08.06.09	09.06.09	larvae					27	PT
Sternwarte	08.06.09	09.06.09			Staphylinidae			2	PT
Sternwarte	08.06.09	09.06.09			Carabidae			1	PT
Sternwarte	08.06.09	09.06.09		Necrobia violacea (Linné, 1758)	Cleridae			3	PT
Sternwarte	08.06.09	09.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Sternwarte	08.06.09	09.06.09		Paralister stercorarius (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	09.06.09	11.06.09	larvae					15	PT
Sternwarte	09.06.09	11.06.09			Staphylinidae			3	PT
Sternwarte	09.06.09	11.06.09		Trox scaber (Linné, 1767)	Trogidae			4	PT
Sternwarte	09.06.09	11.06.09			Curculionidae			1	PT
Sternwarte	09.06.09	11.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Sternwarte	09.06.09	11.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	09.06.09	11.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Sternwarte	11.06.09	14.06.09	larvae					14	PT
Sternwarte	11.06.09	14.06.09			Staphylinidae			6	PT
Sternwarte	11.06.09	14.06.09			Carabidae			1	PT
Sternwarte	11.06.09	14.06.09		Trox scaber (Linné, 1767)	Trogidae			3	PT
Sternwarte	11.06.09	14.06.09			Curculionidae			1	PT
Sternwarte	11.06.09	14.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Sternwarte	11.06.09	14.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT

study site	from	until	form	species	family	male	female	number	trap
Sternwarte	11.06.09	14.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	11.06.09	14.06.09		Paralister stercorarius (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	11.06.09	14.06.09		Decamara philanthus (Fuessly, 1775)	Scarabaeidae			1	PT
Sternwarte	14.06.09	15.06.09	larvae					6	PT
Sternwarte	14.06.09	15.06.09			Staphylinidae			3	PT
Sternwarte	14.06.09	15.06.09			Carabidae			2	PT
Sternwarte	14.06.09	15.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			6	PT
Sternwarte	14.06.09	15.06.09		Omosita colon (Linné, 1758)	Nitidulidae			1	PT
Sternwarte	14.06.09	15.06.09			Curculionidae			2	PT
Sternwarte	14.06.09	15.06.09		Paralister stercorarius (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	15.06.09	17.06.09	larvae					4	PT
Sternwarte	15.06.09	17.06.09			Carabidae			2	PT
Sternwarte	15.06.09	17.06.09			Staphylinidae			18	PT
Sternwarte	15.06.09	17.06.09		Trox scaber (Linné, 1767)	Trogidae			4	PT
Sternwarte	15.06.09	17.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Sternwarte	15.06.09	17.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			4	PT
Sternwarte	15.06.09	17.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	17.06.09	24.06.09	larvae					17	PT
Sternwarte	17.06.09	24.06.09			Staphylinidae			4	PT
Sternwarte	17.06.09	24.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	PT
Sternwarte	17.06.09	24.06.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	1	3	4	PT
Sternwarte	17.06.09	24.06.09			Curculionidae			1	PT
Sternwarte	17.06.09	24.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			16	PT
Sternwarte	17.06.09	24.06.09		Dermestinus undulatus (Brahm, 1790)	Dermestidae			1	PT
Sternwarte	17.06.09	24.06.09		Byturus aestivus (Linné, 1758)	Byturidae			1	PT
Sternwarte	17.06.09	24.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			7	PT
Sternwarte	24.06.09	25.06.09			Staphylinidae			1	PT
Sternwarte	24.06.09	25.06.09		Necrobia violacea (Linné, 1758)	Cleridae			3	PT
Sternwarte	24.06.09	25.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT
Sternwarte	24.06.09	25.06.09		Byturus aestivus (Linné, 1758)	Byturidae			1	PT
Sternwarte	25.06.09	27.06.09	larvae					5	PT
Sternwarte	25.06.09	27.06.09			Carabidae			2	PT
Sternwarte	25.06.09	27.06.09			Staphylinidae			1	PT
Sternwarte	25.06.09	27.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	PT
Sternwarte	27.06.09	30.06.09	larvae					1	PT
Sternwarte	27.06.09	30.06.09			Carabidae			2	PT
Sternwarte	30.06.09	03.07.09	larvae					2	PT
Sternwarte	30.06.09	03.07.09			Carabidae			1	PT
Sternwarte	30.06.09	03.07.09			Staphylinidae			3	PT
Sternwarte	30.06.09	03.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae		1	1	PT
Sternwarte	30.06.09	03.07.09		Byturus aestivus (Linné, 1758)	Byturidae			1	PT
Sternwarte	03.07.09	07.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	2	3	5	PT
Sternwarte	07.07.09	13.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	4	3	7	PT
Sternwarte	07.07.09	13.07.09			Staphylinidae			2	PT
Sternwarte	07.07.09	13.07.09		Dorcus parallelopipedus (Linné, 1758)	Lucanidae			1	PT
Sternwarte	07.07.09	13.07.09		Cryptophagus sp.	Cryptophagidae			1	PT
Sternwarte	07.07.09	13.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Sternwarte	13.07.09	20.07.09			Carabidae			3	PT
Sternwarte	13.07.09	20.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	6	5	11	PT
Sternwarte	13.07.09	20.07.09			Staphylinidae			11	PT
Sternwarte	13.07.09	20.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			4	PT

study site	from	until	form	species	family	male	female	number	trap
Sternwarte	13.07.09	20.07.09			Curculionidae			2	PT
Sternwarte	13.07.09	20.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			3	PT
Sternwarte	20.07.09	25.07.09			Staphylinidae			11	PT
Sternwarte	20.07.09	25.07.09			Carabidae			3	PT
Sternwarte	20.07.09	25.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	10	2	12	PT
Sternwarte	20.07.09	25.07.09			Curculionidae			1	PT
Sternwarte	20.07.09	25.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT
Sternwarte	20.07.09	25.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Beech grove	12.05.09	15.05.09			Carabidae			7	PT
Beech grove	12.05.09	15.05.09			Staphylinidae			2	PT
Beech grove	12.05.09	15.05.09		Bryaxis	Pselapidae			1	PT
Beech grove	15.05.09	17.05.09			Carabidae			11	PT
Beech grove	15.05.09	17.05.09			Staphylinidae			12	PT
Beech grove	15.05.09	17.05.09		Esymus merdarius (Fabricius, 1775)	Scarabaeidae			1	PT
Beech grove	17.05.09	19.05.09			Carabidae			12	PT
Beech grove	17.05.09	19.05.09			Staphylinidae			9	PT
Beech grove	19.05.09	21.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			2	PT
Beech grove	19.05.09	21.05.09			Cerambycidae			1	PT
Beech grove	19.05.09	21.05.09			Curculionidae			1	PT
Beech grove	19.05.09	21.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	PT
Beech grove	19.05.09	21.05.09			Carabidae			24	PT
Beech grove	19.05.09	21.05.09			Staphylinidae			9	PT
Beech grove	19.05.09	21.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			3	PT
Beech grove	19.05.09	21.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Beech grove	21.05.09	23.05.09			Carabidae			13	PT
Beech grove	21.05.09	23.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	PT
Beech grove	21.05.09	23.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			5	PT
Beech grove	21.05.09	23.05.09			Staphylinidae			5	PT
Beech grove	21.05.09	23.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	3	5	PT
Beech grove	21.05.09	23.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		3	3	PT
Beech grove	21.05.09	23.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			6	PT
Beech grove	21.05.09	23.05.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	21.05.09	23.05.09			Cleridae			1	PT
Beech grove	21.05.09	23.05.09			Curculionidae			1	PT
Beech grove	21.05.09	23.05.09			Dermestidae			1	PT
Beech grove	23.05.09	25.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	PT
Beech grove	23.05.09	25.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			7	PT
Beech grove	23.05.09	25.05.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	23.05.09	25.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	9	5	14	PT
Beech grove	23.05.09	25.05.09			Carabidae			14	PT
Beech grove	23.05.09	25.05.09			Staphylinidae			11	PT
Beech grove	23.05.09	25.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			15	PT
Beech grove	23.05.09	25.05.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	23.05.09	25.05.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Beech grove	23.05.09	25.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	20	9	29	PT
Beech grove	23.05.09	25.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			3	PT
Beech grove	25.05.09	27.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	26	21	47	PT
Beech grove	25.05.09	27.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			7	PT
Beech grove	25.05.09	27.05.09			Staphylinidae			17	PT
Beech grove	25.05.09	27.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			10	PT
Beech grove	25.05.09	27.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	34	29	63	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	25.05.09	27.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			6	PT
Beech grove	25.05.09	27.05.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	25.05.09	27.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	PT
Beech grove	25.05.09	27.05.09			Elateridae			1	PT
Beech grove	25.05.09	27.05.09	larvae					1	PT
Beech grove	25.05.09	27.05.09		Phosphuga atrata (Linné, 1758)	Silphidae			1	PT
Beech grove	25.05.09	27.05.09		Onthophagus taurus (Schreber, 1759)	Scarabaeidae		1	1	PT
Beech grove	25.05.09	27.05.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Beech grove	25.05.09	27.05.09		Byturus ochraceus (Scriba, 1790)	Byturidae			1	PT
Beech grove	25.05.09	27.05.09			Nitidulidae			1	PT
Beech grove	25.05.09	27.05.09			Curculionidae			1	PT
Beech grove	27.05.09	29.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			13	PT
Beech grove	27.05.09	29.05.09			Staphylinidae			1	PT
Beech grove	27.05.09	29.05.09			Carabidae			6	PT
Beech grove	27.05.09	29.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			6	PT
Beech grove	27.05.09	29.05.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Beech grove	27.05.09	29.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	13	6	19	PT
Beech grove	27.05.09	29.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			2	PT
Beech grove	27.05.09	29.05.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	27.05.09	29.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			4	PT
Beech grove	27.05.09	29.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	9	28	37	PT
Beech grove	29.05.09	31.05.09			Carabidae			2	PT
Beech grove	29.05.09	31.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			3	PT
Beech grove	29.05.09	31.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			2	PT
Beech grove	29.05.09	31.05.09	larvae					3	PT
Beech grove	29.05.09	31.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Beech grove	29.05.09	31.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	2	4	PT
Beech grove	29.05.09	31.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2		2	PT
Beech grove	29.05.09	31.05.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	31.05.09	02.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			14	PT
Beech grove	31.05.09	02.06.09	larvae					3	PT
Beech grove	31.05.09	02.06.09			Staphylinidae			3	PT
Beech grove	31.05.09	02.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			14	PT
Beech grove	31.05.09	02.06.09			Carabidae			4	PT
Beech grove	31.05.09	02.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Beech grove	31.05.09	02.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Beech grove	31.05.09	02.06.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	31.05.09	02.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	12	5	17	PT
Beech grove	31.05.09	02.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	31.05.09	02.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Beech grove	02.06.09	04.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			29	PT
Beech grove	02.06.09	04.06.09	larvae					20	PT
Beech grove	02.06.09	04.06.09			Staphylinidae			8	PT
Beech grove	02.06.09	04.06.09			Carabidae			17	PT
Beech grove	02.06.09	04.06.09		Onthophagus verticicornis (Laicharting, 1781)	Scarabaeidae	1		1	PT
Beech grove	02.06.09	04.06.09		Catops longulus (Kellner, 1846)	Leiodidae			2	PT
Beech grove	02.06.09	04.06.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Beech grove	02.06.09	04.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	10	4	14	PT
Beech grove	02.06.09	04.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	7	9	16	PT
Beech grove	02.06.09	04.06.09		Hister striola (Sahlberg, 1819)	Histeridae			5	PT
Beech grove	04.06.09	06.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			13	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	04.06.09	06.06.09			Staphylinidae			10	PT
Beech grove	04.06.09	06.06.09			Carabidae			4	PT
Beech grove	04.06.09	06.06.09	larvae					12	PT
Beech grove	04.06.09	06.06.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Beech grove	04.06.09	06.06.09			Dermestidae			1	PT
Beech grove	04.06.09	06.06.09		Dacne notata (Gmelin, 1788)	Erotylidae			1	PT
Beech grove	04.06.09	06.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			5	PT
Beech grove	04.06.09	06.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	7	3	10	PT
Beech grove	04.06.09	06.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	15	9	24	PT
Beech grove	04.06.09	06.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	06.06.09	08.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Beech grove	06.06.09	08.06.09			Carabidae			5	PT
Beech grove	06.06.09	08.06.09			Staphylinidae			12	PT
Beech grove	06.06.09	08.06.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	1	1	2	PT
Beech grove	06.06.09	08.06.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Beech grove	06.06.09	08.06.09	larvae					17	PT
Beech grove	06.06.09	08.06.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Beech grove	06.06.09	08.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	9	10	19	PT
Beech grove	06.06.09	08.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			2	PT
Beech grove	06.06.09	08.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	23	76	99	PT
Beech grove	06.06.09	08.06.09		Hister striola (Sahlberg, 1819)	Histeridae			11	PT
Beech grove	06.06.09	08.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			4	PT
Beech grove	06.06.09	08.06.09		Sphaeridium marginatum (Fabricius, 1787)	Hydrophilidae			1	PT
Beech grove	08.06.09	10.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			21	PT
Beech grove	08.06.09	10.06.09			Carabidae			1	PT
Beech grove	08.06.09	10.06.09			Staphylinidae			15	PT
Beech grove	08.06.09	10.06.09	larvae					88	PT
Beech grove	08.06.09	10.06.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	PT
Beech grove	08.06.09	10.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	4	2	6	PT
Beech grove	08.06.09	10.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			6	PT
Beech grove	08.06.09	10.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	08.06.09	10.06.09			Histeridae			1	PT
Beech grove	08.06.09	10.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			21	PT
Beech grove	08.06.09	10.06.09		Hister striola (Sahlberg, 1819)	Histeridae			11	PT
Beech grove	08.06.09	10.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Beech grove	08.06.09	10.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	11	23	34	PT
Beech grove	10.06.09	12.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			30	PT
Beech grove	10.06.09	12.06.09			Carabidae			3	PT
Beech grove	10.06.09	12.06.09			Staphylinidae			10	PT
Beech grove	10.06.09	12.06.09	larvae					88	PT
Beech grove	10.06.09	12.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			3	PT
Beech grove	10.06.09	12.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2		2	PT
Beech grove	10.06.09	12.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			30	PT
Beech grove	10.06.09	12.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	10.06.09	12.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	10.06.09	12.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	10.06.09	12.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Beech grove	12.06.09	14.06.09			Carabidae			2	PT
Beech grove	12.06.09	14.06.09			Staphylinidae			8	PT
Beech grove	12.06.09	14.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Beech grove	12.06.09	14.06.09	larvae					60	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	12.06.09	14.06.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Beech grove	12.06.09	14.06.09		Cercyon unipunctatus (Linné, 1758)	Hydrophilidae			2	PT
Beech grove	12.06.09	14.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			3	PT
Beech grove	12.06.09	14.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			5	PT
Beech grove	12.06.09	14.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	1	2	PT
Beech grove	12.06.09	14.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Beech grove	12.06.09	14.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	12.06.09	14.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	5	5	10	PT
Beech grove	14.06.09	16.06.09			Carabidae			3	PT
Beech grove	14.06.09	16.06.09			Staphylinidae			14	PT
Beech grove	14.06.09	16.06.09	larvae					55	PT
Beech grove	14.06.09	16.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Beech grove	14.06.09	16.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Beech grove	14.06.09	16.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Beech grove	14.06.09	16.06.09		Phosphuga atrata (Linné, 1758)	Silphidae			1	PT
Beech grove	14.06.09	16.06.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Beech grove	14.06.09	16.06.09			Curculionidae			2	PT
Beech grove	14.06.09	16.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	14.06.09	16.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	14.06.09	16.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	4	2	6	PT
Beech grove	16.06.09	18.06.09	larvae					40	PT
Beech grove	16.06.09	18.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Beech grove	16.06.09	18.06.09			Carabidae			7	PT
Beech grove	16.06.09	18.06.09			Staphylinidae			19	PT
Beech grove	16.06.09	18.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Beech grove	16.06.09	18.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		2	2	PT
Beech grove	16.06.09	18.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Beech grove	16.06.09	18.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT
Beech grove	16.06.09	18.06.09		Omosita colon (Linné, 1758)	Nitidulidae			1	PT
Beech grove	16.06.09	18.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	18.06.09	21.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			11	PT
Beech grove	18.06.09	21.06.09	larvae					25	PT
Beech grove	18.06.09	21.06.09			Carabidae			8	PT
Beech grove	18.06.09	21.06.09			Staphylinidae			20	PT
Beech grove	18.06.09	21.06.09			Curculionidae			1	PT
Beech grove	18.06.09	21.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Beech grove	18.06.09	21.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Beech grove	18.06.09	21.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	18.06.09	21.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	21.06.09	24.06.09	larvae					17	PT
Beech grove	21.06.09	24.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	PT
Beech grove	21.06.09	24.06.09			Staphylinidae			11	PT
Beech grove	21.06.09	24.06.09			Carabidae			1	PT
Beech grove	21.06.09	24.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Beech grove	24.06.09	26.06.09	larvae					6	PT
Beech grove	24.06.09	26.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	PT
Beech grove	24.06.09	26.06.09			Staphylinidae			3	PT
Beech grove	24.06.09	26.06.09			Carabidae			6	PT
Beech grove	24.06.09	26.06.09		Necrobia violacea (Linné, 1758)	Cleridae			3	PT
Beech grove	24.06.09	26.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Beech grove	24.06.09	26.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	24.06.09	26.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	24.06.09	26.06.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Beech grove	26.06.09	30.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			15	PT
Beech grove	26.06.09	30.06.09			Carabidae			23	PT
Beech grove	26.06.09	30.06.09			Staphylinidae			15	PT
Beech grove	26.06.09	30.06.09		Cercyon unipunctatus (Linné, 1758)	Hydrophilidae			1	PT
Beech grove	26.06.09	30.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			2	PT
Beech grove	26.06.09	30.06.09	larvae					1	PT
Beech grove	26.06.09	30.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	26.06.09	30.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	30.06.09	02.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Beech grove	30.06.09	02.07.09			Staphylinidae			3	PT
Beech grove	30.06.09	02.07.09			Carabidae			12	PT
Beech grove	30.06.09	02.07.09			Elateridae			1	PT
Beech grove	30.06.09	02.07.09	larvae					3	PT
Beech grove	30.06.09	02.07.09			Curculionidae			1	PT
Beech grove	30.06.09	02.07.09		Omosita depressa (Linné, 1758)	Nitidulidae			2	PT
Beech grove	30.06.09	02.07.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	30.06.09	02.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	02.07.09	05.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Beech grove	02.07.09	05.07.09			Carabidae			21	PT
Beech grove	02.07.09	05.07.09			Staphylinidae			16	PT
Beech grove	02.07.09	05.07.09	larvae					4	PT
Beech grove	02.07.09	05.07.09		Cercyon unipunctatus (Linné, 1758)	Hydrophilidae			1	PT
Beech grove	02.07.09	05.07.09			Nitidulidae			1	PT
Beech grove	02.07.09	05.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	05.07.09	09.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	PT
Beech grove	05.07.09	09.07.09			Carabidae			8	PT
Beech grove	05.07.09	09.07.09			Staphylinidae			8	PT
Beech grove	05.07.09	09.07.09	larvae					5	PT
Beech grove	09.07.09	14.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			18	PT
Beech grove	09.07.09	14.07.09			Carabidae			17	PT
Beech grove	09.07.09	14.07.09			Staphylinidae			16	PT
Beech grove	09.07.09	14.07.09	larvae					2	PT
Beech grove	09.07.09	14.07.09			Elateridae			1	PT
Beech grove	09.07.09	14.07.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Beech grove	09.07.09	14.07.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	09.07.09	14.07.09		Gnathoncus nannetensis (Marseul, 1862)	Histeridae			1	PT
Beech grove	14.07.09	26.07.09			Staphylinidae			13	PT
Beech grove	14.07.09	26.07.09			Carabidae			19	PT
Beech grove	14.07.09	26.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	PT
Beech grove	14.07.09	26.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	14.07.09	26.07.09		Necrophorus vespillo (Linné, 1758)	Silphidae			1	PT
Beech grove	14.07.09	26.07.09		Necrophorus humator (Olivier, 1790)	Silphidae			9	PT
Beech grove	14.07.09	26.07.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Beech grove	14.07.09	26.07.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Beech grove	14.07.09	26.07.09	larvae					2	PT
Oak forest	12.05.09	17.05.09			Staphylinidae			1	PT
Oak forest	12.05.09	17.05.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	PT
Oak forest	17.05.09	19.05.09			Elateridae			1	PT
Oak forest	17.05.09	19.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	17.05.09	19.05.09			Carabidae			1	PT
Oak forest	19.05.09	21.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	PT
Oak forest	19.05.09	21.05.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Oak forest	19.05.09	21.05.09			Carabidae			2	PT
Oak forest	19.05.09	21.05.09			Staphylinidae			5	PT
Oak forest	21.05.09	23.05.09			Anobiidae			1	PT
Oak forest	21.05.09	23.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Oak forest	21.05.09	23.05.09			Staphylinidae			12	PT
Oak forest	21.05.09	23.05.09		Onthophagus taurus (Schreber, 1759)	Scarabaeidae		1	1	PT
Oak forest	21.05.09	23.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			2	PT
Oak forest	21.05.09	23.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	23.05.09	25.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	PT
Oak forest	23.05.09	25.05.09			Curculionidae			1	PT
Oak forest	23.05.09	25.05.09			Staphylinidae			22	PT
Oak forest	23.05.09	25.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	6	12	18	PT
Oak forest	23.05.09	25.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	3		3	PT
Oak forest	23.05.09	25.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Oak forest	23.05.09	25.05.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	23.05.09	25.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	23.05.09	25.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	6	6	12	PT
Oak forest	25.05.09	27.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	7	20	27	PT
Oak forest	25.05.09	27.05.09			Carabidae			2	PT
Oak forest	25.05.09	27.05.09			Staphylinidae			30	PT
Oak forest	25.05.09	27.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	PT
Oak forest	25.05.09	27.05.09	larvae					1	PT
Oak forest	25.05.09	27.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			3	PT
Oak forest	25.05.09	27.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			5	PT
Oak forest	25.05.09	27.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	4	6	PT
Oak forest	25.05.09	27.05.09		Necrophorus sepultor (Charpentier)	Silphidae			1	PT
Oak forest	25.05.09	27.05.09		Catops longulus (Kellner, 1846)	Leiodidae			3	PT
Oak forest	25.05.09	27.05.09		Hister striola (Sahlberg, 1819)	Histeridae			4	PT
Oak forest	25.05.09	27.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	14	16	30	PT
Oak forest	25.05.09	27.05.09			Melyridae			1	PT
Oak forest	27.05.09	29.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			8	PT
Oak forest	27.05.09	29.05.09			Staphylinidae			10	PT
Oak forest	27.05.09	29.05.09	larvae					2	PT
Oak forest	27.05.09	29.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	3	4	PT
Oak forest	27.05.09	29.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Oak forest	27.05.09	29.05.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Oak forest	27.05.09	29.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	3	4	PT
Oak forest	29.05.09	31.05.09			Carabidae			1	PT
Oak forest	29.05.09	31.05.09			Staphylinidae			2	PT
Oak forest	29.05.09	31.05.09	larvae					1	PT
Oak forest	29.05.09	31.05.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Oak forest	29.05.09	31.05.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Oak forest	31.05.09	02.06.09	larvae					9	PT
Oak forest	31.05.09	02.06.09			Staphylinidae			7	PT
Oak forest	31.05.09	02.06.09		Necrodes littoralis (Linné, 1758)	Silphidae		2	2	PT
Oak forest	31.05.09	02.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Oak forest	31.05.09	02.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	3	4	PT
Oak forest	31.05.09	02.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			3	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	31.05.09	02.06.09			Leiodidae			1	PT
Oak forest	31.05.09	02.06.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Oak forest	31.05.09	02.06.09			Cleridae			1	PT
Oak forest	02.06.09	04.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			8	PT
Oak forest	02.06.09	04.06.09			Carabidae			1	PT
Oak forest	02.06.09	04.06.09			Staphylinidae			20	PT
Oak forest	02.06.09	04.06.09	larvae					20	PT
Oak forest	02.06.09	04.06.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Oak forest	02.06.09	04.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Oak forest	02.06.09	04.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	4	5	PT
Oak forest	04.06.09	06.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			9	PT
Oak forest	04.06.09	06.06.09			Carabidae			2	PT
Oak forest	04.06.09	06.06.09			Staphylinidae			13	PT
Oak forest	04.06.09	06.06.09	larvae					21	PT
Oak forest	04.06.09	06.06.09		Necrodes littoralis (Linné, 1758)	Silphidae		3	3	PT
Oak forest	04.06.09	06.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Oak forest	04.06.09	06.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			3	PT
Oak forest	04.06.09	06.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	3	5	PT
Oak forest	04.06.09	06.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Oak forest	06.06.09	08.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			16	PT
Oak forest	06.06.09	08.06.09	larvae					67	PT
Oak forest	06.06.09	08.06.09			Carabidae			2	PT
Oak forest	06.06.09	08.06.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			3	PT
Oak forest	06.06.09	08.06.09			Staphylinidae			21	PT
Oak forest	06.06.09	08.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			4	PT
Oak forest	06.06.09	08.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Oak forest	06.06.09	08.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	2	4	PT
Oak forest	06.06.09	08.06.09		Hister striola (Sahlberg, 1819)	Histeridae			4	PT
Oak forest	08.06.09	10.06.09	larvae					1000	PT
Oak forest	08.06.09	10.06.09			Carabidae			2	PT
Oak forest	08.06.09	10.06.09			Staphylinidae			26	PT
Oak forest	08.06.09	10.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			15	PT
Oak forest	08.06.09	10.06.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			2	PT
Oak forest	08.06.09	10.06.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	PT
Oak forest	08.06.09	10.06.09			Curculionidae			1	PT
Oak forest	08.06.09	10.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			2	PT
Oak forest	08.06.09	10.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Oak forest	08.06.09	10.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	3	1	4	PT
Oak forest	08.06.09	10.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			9	PT
Oak forest	08.06.09	10.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Oak forest	08.06.09	10.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	08.06.09	10.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		4	4	PT
Oak forest	10.06.09	12.06.09	larvae					1000	PT
Oak forest	10.06.09	12.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			16	PT
Oak forest	10.06.09	12.06.09			Carabidae			4	PT
Oak forest	10.06.09	12.06.09			Staphylinidae			10	PT
Oak forest	10.06.09	12.06.09			Elateridae			1	PT
Oak forest	10.06.09	12.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			3	PT
Oak forest	10.06.09	12.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Oak forest	10.06.09	12.06.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Oak forest	10.06.09	12.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	12.06.09	14.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Oak forest	12.06.09	14.06.09			Staphylinidae			30	PT
Oak forest	12.06.09	14.06.09	larvae				1	123	PT
Oak forest	12.06.09	14.06.09		Onthophagus taurus (Schreber, 1759)	Scarabaeidae		1	1	PT
Oak forest	12.06.09	14.06.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae			1	PT
Oak forest	12.06.09	14.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	PT
Oak forest	12.06.09	14.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Oak forest	12.06.09	14.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Oak forest	14.06.09	16.06.09	larvae					45	PT
Oak forest	14.06.09	16.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Oak forest	14.06.09	16.06.09			Staphylinidae			35	PT
Oak forest	14.06.09	16.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Oak forest	14.06.09	16.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Oak forest	14.06.09	16.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Oak forest	14.06.09	16.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Oak forest	14.06.09	16.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	3	1	4	PT
Oak forest	16.06.09	18.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	PT
Oak forest	16.06.09	18.06.09	larvae					14	PT
Oak forest	16.06.09	18.06.09			Staphylinidae			27	PT
Oak forest	16.06.09	18.06.09			Carabidae			1	PT
Oak forest	16.06.09	18.06.09		Onthophagus taurus (Schreber, 1759)	Scarabaeidae		1	1	PT
Oak forest	16.06.09	18.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Oak forest	16.06.09	18.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Oak forest	16.06.09	18.06.09		Hister striola (Sahlberg, 1819)	Histeridae			7	PT
Oak forest	18.06.09	21.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Oak forest	18.06.09	21.06.09	larvae					8	PT
Oak forest	18.06.09	21.06.09			Staphylinidae			19	PT
Oak forest	18.06.09	21.06.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Oak forest	18.06.09	21.06.09		Catops nigrita (Erichson, 1837)	Leiodidae			1	PT
Oak forest	18.06.09	21.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT
Oak forest	18.06.09	21.06.09		Cryptopleurum minutum (Fabricius, 1775)	Hydrophilidae			1	PT
Oak forest	18.06.09	21.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Oak forest	21.06.09	24.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			3	PT
Oak forest	21.06.09	24.06.09	larvae					8	PT
Oak forest	21.06.09	24.06.09			Staphylinidae			4	PT
Oak forest	21.06.09	24.06.09			Carabidae			1	PT
Oak forest	21.06.09	24.06.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	PT
Oak forest	24.06.09	26.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	PT
Oak forest	24.06.09	26.06.09			Staphylinidae			14	PT
Oak forest	24.06.09	26.06.09			Carabidae			3	PT
Oak forest	24.06.09	26.06.09		Nitidula rufipes (Linné, 1767)	Nitidulidae			1	PT
Oak forest	24.06.09	26.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Oak forest	26.06.09	30.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			12	PT
Oak forest	26.06.09	30.06.09			Staphylinidae			12	PT
Oak forest	26.06.09	30.06.09	larvae					1	PT
Oak forest	26.06.09	30.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Oak forest	26.06.09	30.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Oak forest	30.06.09	02.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Oak forest	30.06.09	02.07.09			Staphylinidae			24	PT
Oak forest	30.06.09	02.07.09	larvae					2	PT
Oak forest	30.06.09	02.07.09		Choleva cisteloides (Frölich, 1799)	Leiodidae			2	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	30.06.09	02.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Oak forest	30.06.09	02.07.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Oak forest	02.07.09	05.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	PT
Oak forest	02.07.09	05.07.09			Staphylinidae			39	PT
Oak forest	02.07.09	05.07.09			Carabidae			1	PT
Oak forest	02.07.09	05.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae		1	1	PT
Oak forest	02.07.09	05.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			4	PT
Oak forest	02.07.09	05.07.09		Catops longulus (Kellner, 1846)	Leiodidae			1	PT
Oak forest	02.07.09	05.07.09		Choleva cisteloides (Frölich, 1799)	Leiodidae			1	PT
Oak forest	02.07.09	05.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	05.07.09	09.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	PT
Oak forest	05.07.09	09.07.09			Carabidae			1	PT
Oak forest	05.07.09	09.07.09			Staphylinidae			14	PT
Oak forest	05.07.09	09.07.09	larvae					3	PT
Oak forest	05.07.09	09.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	09.07.09	14.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	PT
Oak forest	09.07.09	14.07.09			Carabidae			5	PT
Oak forest	09.07.09	14.07.09			Staphylinidae			17	PT
Oak forest	09.07.09	14.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae			1	PT
Oak forest	09.07.09	14.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	PT
Oak forest	09.07.09	14.07.09		Ptinus sp	Ptinidae			1	PT
Oak forest	09.07.09	14.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	14.07.09	26.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			3	PT
Oak forest	14.07.09	26.07.09			Carabidae			7	PT
Oak forest	14.07.09	26.07.09			Staphylinidae			17	PT
Oak forest	14.07.09	26.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae	2	1	3	PT
Oak forest	14.07.09	26.07.09	larvae					2	PT
Oak forest	14.07.09	26.07.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	14.07.09	26.07.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Narrenturm	12.05.09	26.05.09			Staphylinidae			3	RMT
Narrenturm	12.05.09	26.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			4	RMT
Narrenturm	26.05.09	28.05.09	larvae					3	RMT
Narrenturm	28.05.09	05.06.09			Staphylinidae			1	RMT
Narrenturm	28.05.09	05.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			3	RMT
Narrenturm	05.06.09	22.06.09	larvae					11	RMT
Narrenturm	05.06.09	22.06.09			Staphylinidae			4	RMT
Narrenturm	05.06.09	22.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	RMT
Narrenturm	05.06.09	22.06.09		Saprinus tenuistrius (Marseul, 1855)	Histeridae			1	RMT
Narrenturm	05.06.09	22.06.09		Carcinops pumilio (Erichson, 1834)	Histeridae			1	RMT
Narrenturm	05.06.09	22.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Narrenturm	22.06.09	30.06.09	larvae					4	RMT
Narrenturm	22.06.09	30.06.09			Staphylinidae			1	RMT
Narrenturm	22.06.09	30.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	RMT
Narrenturm	22.06.09	30.06.09		Dermestes haemorrhoidalis (Küster, 1852)	Dermestidae			1	RMT
Narrenturm	30.06.09	03.07.09	larvae					1	RMT
Narrenturm	30.06.09	03.07.09			Staphylinidae			1	RMT
Narrenturm	03.07.09	13.07.09	larvae					5	RMT
Narrenturm	03.07.09	13.07.09			Staphylinidae			7	RMT
Narrenturm	03.07.09	13.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Narrenturm	13.07.09	20.07.09	larvae					20	RMT
Narrenturm	13.07.09	20.07.09			Staphylinidae			5	RMT

study site	from	until	form	species	family	male	female	number	trap
Narrenturm	13.07.09	20.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Sternwarte	12.05.09	26.05.09			Staphylinidae			14	RMT
Sternwarte	12.05.09	26.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	2	4	RMT
Sternwarte	12.05.09	26.05.09		Trox scaber (Linné, 1767)	Trogidae			1	RMT
Sternwarte	12.05.09	26.05.09		Onthophagus vacca (Linné, 1767)	Scarabidae		1	1	RMT
Sternwarte	12.05.09	26.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			4	RMT
Sternwarte	12.05.09	26.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			8	RMT
Sternwarte	26.05.09	28.05.09	larvae					1	RMT
Sternwarte	26.05.09	28.05.09			Staphylinidae			2	RMT
Sternwarte	26.05.09	28.05.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Sternwarte	28.05.09	03.06.09	larvae					15	RMT
Sternwarte	28.05.09	03.06.09			Staphylinidae			3	RMT
Sternwarte	28.05.09	03.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	RMT
Sternwarte	28.05.09	03.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	03.06.09	08.06.09	larvae					3	RMT
Sternwarte	03.06.09	08.06.09			Staphylinidae			1	RMT
Sternwarte	03.06.09	08.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	08.06.09	11.06.09	larvae					20	RMT
Sternwarte	08.06.09	11.06.09			Staphylinidae			2	RMT
Sternwarte	08.06.09	11.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	11.06.09	17.06.09	larvae					29	RMT
Sternwarte	11.06.09	17.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			8	RMT
Sternwarte	11.06.09	17.06.09		Trox scaber (Linné, 1767)	Trogidae			1	RMT
Sternwarte	11.06.09	17.06.09			Staphylinidae			1	RMT
Sternwarte	11.06.09	17.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Sternwarte	11.06.09	17.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	17.06.09	24.06.09	larvae					38	RMT
Sternwarte	17.06.09	24.06.09		Trox scaber (Linné, 1767)	Trogidae			1	RMT
Sternwarte	17.06.09	24.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			5	RMT
Sternwarte	17.06.09	24.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	24.06.09	30.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			4	RMT
Sternwarte	24.06.09	30.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	24.06.09	30.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	30.06.09	13.07.09	larvae					4	RMT
Sternwarte	30.06.09	13.07.09			Staphylinidae			2	RMT
Sternwarte	30.06.09	13.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			5	RMT
Sternwarte	30.06.09	13.07.09		Atomaria sp.	Cryptophagidae			1	RMT
Sternwarte	30.06.09	13.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	13.07.09	20.07.09	larvae					2	RMT
Sternwarte	13.07.09	20.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			7	RMT
Sternwarte	13.07.09	20.07.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Sternwarte	20.07.09	25.07.09	larvae					1	RMT
Sternwarte	20.07.09	25.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			5	RMT
Oak forest	12.05.09	25.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	RMT
Oak forest	12.05.09	25.05.09			Staphylinidae			10	RMT
Oak forest	12.05.09	25.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	1	3	RMT
Oak forest	12.05.09	25.05.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	12.05.09	25.05.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Oak forest	12.05.09	25.05.09		Hister striola (Sahlberg, 1819)	Histeridae			7	RMT
Oak forest	12.05.09	25.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	RMT
Oak forest	12.05.09	25.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	5	3	8	RMT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	25.05.09	27.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			13	RMT
Oak forest	25.05.09	27.05.09			Staphylinidae			14	RMT
Oak forest	25.05.09	27.05.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Oak forest	25.05.09	27.05.09			Leiodidae			1	RMT
Oak forest	25.05.09	27.05.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	3	4	RMT
Oak forest	25.05.09	27.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			13	RMT
Oak forest	25.05.09	27.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	5	11	16	RMT
Oak forest	27.05.09	29.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	27.05.09	29.05.09			Staphylinidae			5	RMT
Oak forest	27.05.09	29.05.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Oak forest	27.05.09	29.05.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	27.05.09	29.05.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Oak forest	27.05.09	29.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	RMT
Oak forest	27.05.09	29.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	1	2	RMT
Oak forest	29.05.09	04.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	RMT
Oak forest	29.05.09	04.06.09	larvae					4	RMT
Oak forest	29.05.09	04.06.09			Staphylinidae			14	RMT
Oak forest	29.05.09	04.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	4	6	RMT
Oak forest	29.05.09	04.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Oak forest	04.06.09	08.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	RMT
Oak forest	04.06.09	08.06.09	larvae					10	RMT
Oak forest	04.06.09	08.06.09			Staphylinidae			1	RMT
Oak forest	04.06.09	08.06.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	1	2	RMT
Oak forest	04.06.09	08.06.09		Necrophorus humator (Olivier, 1790)	Silphidae			2	RMT
Oak forest	04.06.09	08.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	RMT
Oak forest	04.06.09	08.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		3	3	RMT
Oak forest	04.06.09	08.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	RMT
Oak forest	04.06.09	08.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	RMT
Oak forest	08.06.09	10.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	08.06.09	10.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			3	RMT
Oak forest	08.06.09	10.06.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Oak forest	08.06.09	10.06.09	larvae					70	RMT
Oak forest	08.06.09	10.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Oak forest	10.06.09	12.06.09	larvae					1000	RMT
Oak forest	10.06.09	12.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Oak forest	10.06.09	12.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			2	RMT
Oak forest	12.06.09	14.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Oak forest	12.06.09	14.06.09	larvae					31	RMT
Oak forest	12.06.09	14.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Oak forest	12.06.09	14.06.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Oak forest	14.06.09	16.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	RMT
Oak forest	14.06.09	16.06.09	larvae					18	RMT
Oak forest	14.06.09	16.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Oak forest	16.06.09	18.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	16.06.09	18.06.09	larvae					7	RMT
Oak forest	16.06.09	18.06.09			Staphylinidae			1	RMT
Oak forest	16.06.09	18.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Oak forest	16.06.09	18.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	RMT
Oak forest	18.06.09	21.06.09	larvae					11	RMT
Oak forest	18.06.09	21.06.09			Staphylinidae			2	RMT
Oak forest	18.06.09	21.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	RMT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	21.06.09	30.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Oak forest	21.06.09	30.06.09			Staphylinidae			8	RMT
Oak forest	21.06.09	30.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Oak forest	21.06.09	30.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Oak forest	21.06.09	30.06.09	larvae					4	RMT
Oak forest	21.06.09	30.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Oak forest	21.06.09	30.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	RMT
Oak forest	30.06.09	05.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Oak forest	30.06.09	05.07.09	larvae					1	RMT
Oak forest	30.06.09	05.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			6	RMT
Oak forest	30.06.09	05.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Oak forest	05.07.09	09.07.09	larvae					4	RMT
Oak forest	05.07.09	09.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	05.07.09	09.07.09			Staphylinidae			1	RMT
Oak forest	05.07.09	09.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Oak forest	09.07.09	14.07.09	larvae					1	RMT
Oak forest	09.07.09	14.07.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae		1	1	RMT
Oak forest	14.07.09	26.07.09	larvae					8	RMT
Oak forest	14.07.09	26.07.09			Staphylinidae			3	RMT
Oak forest	14.07.09	26.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Oak forest	14.07.09	26.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Beech grove	12.05.09	25.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	12.05.09	25.05.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Beech grove	12.05.09	25.05.09			Staphylinidae			6	RMT
Beech grove	12.05.09	25.05.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			5	RMT
Beech grove	12.05.09	25.05.09		Hister striola (Sahlberg, 1819)	Histeridae			8	RMT
Beech grove	12.05.09	25.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	2	3	RMT
Beech grove	25.05.09	27.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			15	RMT
Beech grove	25.05.09	27.05.09			Staphylinidae			8	RMT
Beech grove	25.05.09	27.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2		2	RMT
Beech grove	25.05.09	27.05.09		Hister striola (Sahlberg, 1819)	Histeridae			8	RMT
Beech grove	25.05.09	27.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	7	17	24	RMT
Beech grove	27.05.09	29.05.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			5	RMT
Beech grove	27.05.09	29.05.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	RMT
Beech grove	27.05.09	29.05.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	1	2	RMT
Beech grove	27.05.09	29.05.09		Grammostethus ruficornis (Grimm., 1852)	Histeridae			1	RMT
Beech grove	27.05.09	29.05.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Beech grove	27.05.09	29.05.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Beech grove	29.05.09	04.06.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	RMT
Beech grove	29.05.09	04.06.09			Staphylinidae			10	RMT
Beech grove	29.05.09	04.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	RMT
Beech grove	29.05.09	04.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2		2	RMT
Beech grove	29.05.09	04.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	2	3	RMT
Beech grove	29.05.09	04.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Beech grove	04.06.09	08.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			14	RMT
Beech grove	04.06.09	08.06.09			Staphylinidae			3	RMT
Beech grove	04.06.09	08.06.09	larvae					2	RMT
Beech grove	04.06.09	08.06.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Beech grove	04.06.09	08.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	RMT
Beech grove	04.06.09	08.06.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	RMT
Beech grove	04.06.09	08.06.09		Hister merdarius (Hoffmann, 1803)	Histeridae			1	RMT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	04.06.09	08.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	RMT
Beech grove	04.06.09	08.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	6	8	14	RMT
Beech grove	08.06.09	10.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	RMT
Beech grove	08.06.09	10.06.09	larvae					3	RMT
Beech grove	08.06.09	10.06.09			Staphylinidae			4	RMT
Beech grove	08.06.09	10.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT
Beech grove	08.06.09	10.06.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	RMT
Beech grove	08.06.09	10.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			4	RMT
Beech grove	08.06.09	10.06.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Beech grove	08.06.09	10.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	4	7	11	RMT
Beech grove	10.06.09	12.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Beech grove	10.06.09	12.06.09	larvae					9	RMT
Beech grove	10.06.09	12.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Beech grove	10.06.09	12.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	10.06.09	12.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Beech grove	12.06.09	14.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	12.06.09	14.06.09	larvae					5	RMT
Beech grove	12.06.09	14.06.09			Staphylinidae			2	RMT
Beech grove	12.06.09	14.06.09			Nitidulidae			6	RMT
Beech grove	12.06.09	14.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Beech grove	12.06.09	14.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	14.06.09	16.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	14.06.09	16.06.09	larvae					5	RMT
Beech grove	14.06.09	16.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			5	RMT
Beech grove	14.06.09	16.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	14.06.09	16.06.09		Omosita colon (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	14.06.09	16.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Beech grove	14.06.09	16.06.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT
Beech grove	14.06.09	16.06.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Beech grove	14.06.09	16.06.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Beech grove	16.06.09	18.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	16.06.09	18.06.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	16.06.09	18.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			7	RMT
Beech grove	16.06.09	18.06.09		Omosita colon (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	16.06.09	18.06.09			Carabidae			1	RMT
Beech grove	16.06.09	18.06.09			Staphylinidae			4	RMT
Beech grove	16.06.09	18.06.09	larvae					3	RMT
Beech grove	16.06.09	18.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Beech grove	16.06.09	18.06.09		Kissister minima (Aubé, 1850)	Histeridae			1	RMT
Beech grove	18.06.09	21.06.09	larvae					6	RMT
Beech grove	18.06.09	21.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			3	RMT
Beech grove	18.06.09	21.06.09			Staphylinidae			1	RMT
Beech grove	18.06.09	21.06.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Beech grove	18.06.09	21.06.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Beech grove	18.06.09	21.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	RMT
Beech grove	18.06.09	21.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	21.06.09	30.06.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	21.06.09	30.06.09	larvae					6	RMT
Beech grove	21.06.09	30.06.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Beech grove	21.06.09	30.06.09		Omosita colon (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	21.06.09	30.06.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	21.06.09	30.06.09			Staphylinidae			4	RMT
Beech grove	21.06.09	30.06.09		Hister striola (Sahlberg, 1819)	Histeridae			3	RMT
Beech grove	21.06.09	30.06.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	30.06.09	05.07.09	larvae					1	RMT
Beech grove	30.06.09	05.07.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	30.06.09	05.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Beech grove	30.06.09	05.07.09			Staphylinidae			3	RMT
Beech grove	30.06.09	05.07.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Beech grove	30.06.09	05.07.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Beech grove	30.06.09	05.07.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Beech grove	05.07.09	09.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	05.07.09	09.07.09	larvae					7	RMT
Beech grove	05.07.09	09.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			1	RMT
Beech grove	05.07.09	09.07.09		Hister striola (Sahlberg, 1819)	Histeridae			4	RMT
Beech grove	09.07.09	14.07.09	larvae					6	RMT
Beech grove	09.07.09	14.07.09			Staphylinidae			9	RMT
Beech grove	09.07.09	14.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			3	RMT
Beech grove	09.07.09	14.07.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	RMT
Beech grove	09.07.09	14.07.09		Necrobia violacea (Linné, 1758)	Cleridae			4	RMT
Beech grove	09.07.09	14.07.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Beech grove	14.07.09	26.07.09	larvae					19	RMT
Beech grove	14.07.09	26.07.09			Staphylinidae			11	RMT
Beech grove	14.07.09	26.07.09		Omosita discoidea (Fabricius, 1775)	Nitidulidae			16	RMT
Beech grove	14.07.09	26.07.09			Carabidae			1	RMT
Beech grove	14.07.09	26.07.09		Necrobia violacea (Linné, 1758)	Cleridae			7	RMT
Beech grove	14.07.09	26.07.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Beech grove	14.07.09	26.07.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT
Beech grove	14.07.09	26.07.09		Hister striola (Sahlberg, 1819)	Histeridae			8	RMT
Beech grove	14.07.09	26.07.09		Grammostethus ruficornis (Grimm., 1852)	Histeridae			1	RMT
Beech grove	14.07.09	26.07.09		Cercyon unipunctatus (Linné, 1758)	Hydrophilidae			1	RMT

study site	from	until	form	species	family	male	female	number	trap
Narrenturm	27.07.09	29.07.09			Staphylinidae			1	PT
Narrenturm	29.07.09	05.08.09			Staphylinidae			1	PT
Narrenturm	29.07.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	9	10	PT
Narrenturm	29.07.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Narrenturm	29.07.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Narrenturm	05.08.09	06.08.09			Staphylinidae			2	PT
Narrenturm	05.08.09	06.08.09			Carabidae			1	PT
Narrenturm	06.08.09	09.08.09	larvae					5	PT
Narrenturm	06.08.09	09.08.09			Staphylinidae			5	PT
Narrenturm	06.08.09	09.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	6	11	17	PT
Narrenturm	06.08.09	09.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Narrenturm	06.08.09	09.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Narrenturm	09.08.09	10.08.09	larvae					1	PT
Narrenturm	09.08.09	10.08.09			Staphylinidae			1	PT
Narrenturm	10.08.09	12.08.09	larvae					3	PT
Narrenturm	10.08.09	12.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	1	2	PT
Narrenturm	12.08.09	18.08.09	larvae					2	PT
Narrenturm	18.08.09	20.08.09	larvae					1	PT
Narrenturm	18.08.09	20.08.09		Omosita colon (Linné, 1758)	Nitidulidae			1	PT
Narrenturm	18.08.09	20.08.09			Staphylinidae			1	PT
Narrenturm	20.08.09	26.08.09	larvae					2	PT
Narrenturm	20.08.09	26.08.09		Chaetocnema hortensis (Geoffroy, 1785)	Chrysomelidae			1	PT
Narrenturm	20.08.09	26.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Narrenturm	26.08.09	02.09.09	larvae					3	PT
Narrenturm	02.09.09	16.10.09	larvae					1	PT
Narrenturm	02.09.09	16.10.09			Staphylinidae			6	PT
Oak forest	27.07.09	30.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	PT
Oak forest	27.07.09	30.07.09			Staphylinidae			3	PT
Oak forest	27.07.09	30.07.09			Carabidae			1	PT
Oak forest	27.07.09	30.07.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Oak forest	30.07.09	02.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			3	PT
Oak forest	30.07.09	02.08.09			Carabidae			2	PT
Oak forest	30.07.09	02.08.09			Staphylinidae			4	PT
Oak forest	30.07.09	02.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	7	15	22	PT
Oak forest	30.07.09	02.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	5	7	PT
Oak forest	02.08.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	7	20	27	PT
Oak forest	02.08.09	05.08.09			Carabidae			1	PT
Oak forest	02.08.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Oak forest	02.08.09	05.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	PT
Oak forest	02.08.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Oak forest	05.08.09	07.08.09	larvae					200	PT
Oak forest	05.08.09	07.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			3	PT
Oak forest	05.08.09	07.08.09			Carabidae			1	PT
Oak forest	05.08.09	07.08.09			Staphylinidae			11	PT
Oak forest	05.08.09	07.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	13	15	PT
Oak forest	05.08.09	07.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Oak forest	05.08.09	07.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Oak forest	05.08.09	07.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	3	4	PT
Oak forest	07.08.09	09.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			13	PT
Oak forest	07.08.09	09.08.09			Staphylinidae			8	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	07.08.09	09.08.09			Carabidae			4	PT
Oak forest	07.08.09	09.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	14	15	PT
Oak forest	07.08.09	09.08.09	larvae					1000	PT
Oak forest	07.08.09	09.08.09		Thanatophilus rugosus (Linné, 1758)	Silphidae			1	PT
Oak forest	07.08.09	09.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	5	6	PT
Oak forest	07.08.09	09.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	PT
Oak forest	07.08.09	09.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	PT
Oak forest	07.08.09	09.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	6	7	PT
Oak forest	09.08.09	11.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	PT
Oak forest	09.08.09	11.08.09			Carabidae			1	PT
Oak forest	09.08.09	11.08.09		Trox cadaverinus (Illiger, 1801)	Trogidae			1	PT
Oak forest	09.08.09	11.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	6	8	PT
Oak forest	09.08.09	11.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	PT
Oak forest	09.08.09	11.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	9	10	PT
Oak forest	09.08.09	11.08.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Oak forest	09.08.09	11.08.09	larvae					1000	PT
Oak forest	09.08.09	11.08.09		Hister distinctus (Erichson, 1834)	Histeridae			1	PT
Oak forest	09.08.09	11.08.09		Hister merdarius (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	09.08.09	11.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	7	25	32	PT
Oak forest	11.08.09	14.08.09			Staphylinidae			20	PT
Oak forest	11.08.09	14.08.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Oak forest	11.08.09	14.08.09	larvae					1000	PT
Oak forest	11.08.09	14.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			3	PT
Oak forest	11.08.09	14.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	11	12	PT
Oak forest	11.08.09	14.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	11	12	PT
Oak forest	11.08.09	14.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	11.08.09	14.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			7	PT
Oak forest	14.08.09	16.08.09	larvae					50	PT
Oak forest	14.08.09	16.08.09			Staphylinidae			17	PT
Oak forest	14.08.09	16.08.09		Oiceoptoma thoracica (Linné, 1758)	Silphidae			1	PT
Oak forest	14.08.09	16.08.09		Catops nigrita (Erichson, 1837)	Leiodidae			1	PT
Oak forest	14.08.09	16.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Oak forest	14.08.09	16.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Oak forest	14.08.09	16.08.09			Carabidae			1	PT
Oak forest	14.08.09	16.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	1	2	PT
Oak forest	14.08.09	16.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	14.08.09	16.08.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Oak forest	14.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	1	2	PT
Oak forest	16.08.09	18.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			11	PT
Oak forest	16.08.09	18.08.09			Staphylinidae			24	PT
Oak forest	16.08.09	18.08.09			Carabidae			2	PT
Oak forest	16.08.09	18.08.09	larvae					35	PT
Oak forest	16.08.09	18.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	PT
Oak forest	16.08.09	18.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Oak forest	16.08.09	18.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Oak forest	16.08.09	18.08.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Oak forest	16.08.09	18.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Oak forest	18.08.09	20.08.09	larvae					8	PT
Oak forest	18.08.09	20.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			12	PT
Oak forest	18.08.09	20.08.09			Staphylinidae			17	PT
Oak forest	18.08.09	20.08.09			Carabidae			3	PT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	18.08.09	20.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			2	PT
Oak forest	18.08.09	20.08.09			Leiodidae			2	PT
Oak forest	18.08.09	20.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Oak forest	18.08.09	20.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Oak forest	20.08.09	23.08.09	larvae					3	PT
Oak forest	20.08.09	23.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			11	PT
Oak forest	20.08.09	23.08.09			Staphylinidae			12	PT
Oak forest	20.08.09	23.08.09			Carabidae			4	PT
Oak forest	20.08.09	23.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Oak forest	20.08.09	23.08.09			Histeridae			1	PT
Oak forest	20.08.09	23.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Oak forest	20.08.09	23.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Oak forest	20.08.09	23.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Oak forest	23.08.09	30.08.09			Staphylinidae			30	PT
Oak forest	23.08.09	30.08.09			Carabidae			8	PT
Oak forest	23.08.09	30.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			87	PT
Oak forest	23.08.09	30.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	PT
Oak forest	23.08.09	30.08.09		Sciodrepoides fumatus (Spence, 1815)	Leiodidae			1	PT
Oak forest	23.08.09	30.08.09	larvae					1	PT
Oak forest	23.08.09	30.08.09		Hister unicolor (Linné, 1758)	Histeridae			1	PT
Oak forest	30.08.09	20.10.09			Carabidae			7	PT
Oak forest	30.08.09	20.10.09			Staphylinidae			19	PT
Oak forest	30.08.09	20.10.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			146	PT
Oak forest	30.08.09	20.10.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Oak forest	30.08.09	20.10.09		Onthophagus vacca (Linné, 1767)	Scarabaeidae		1	1	PT
Oak forest	30.08.09	20.10.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Sternwarte	27.07.09	29.07.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	PT
Sternwarte	29.07.09	31.07.09			Staphylinidae			1	PT
Sternwarte	29.07.09	31.07.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Sternwarte	02.08.09	05.08.09	larvae					2	PT
Sternwarte	02.08.09	05.08.09			Staphylinidae			12	PT
Sternwarte	02.08.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	10	8	18	PT
Sternwarte	02.08.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	1	3	PT
Sternwarte	02.08.09	05.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	05.08.09	06.08.09	larvae					20	PT
Sternwarte	05.08.09	06.08.09			Staphylinidae			6	PT
Sternwarte	05.08.09	06.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	4	2	6	PT
Sternwarte	05.08.09	06.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Sternwarte	05.08.09	06.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	3	5	8	PT
Sternwarte	06.08.09	09.08.09	larvae					12	PT
Sternwarte	06.08.09	09.08.09			Staphylinidae			22	PT
Sternwarte	06.08.09	09.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	12	7	19	PT
Sternwarte	06.08.09	09.08.09			Carabidae			1	PT
Sternwarte	06.08.09	09.08.09		Dermestinus undulatus (Brahm, 1790)	Dermestidae			1	PT
Sternwarte	06.08.09	09.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	9	6	15	PT
Sternwarte	06.08.09	09.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Sternwarte	06.08.09	09.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Sternwarte	09.08.09	10.08.09	larvae					2	PT
Sternwarte	09.08.09	10.08.09			Carabidae			1	PT
Sternwarte	09.08.09	10.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	4	6	PT
Sternwarte	09.08.09	10.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT

study site	from	until	form	species	family	male	female	number	trap
Sternwarte	10.08.09	12.08.09	larvae					10	PT
Sternwarte	10.08.09	12.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Sternwarte	10.08.09	12.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	PT
Sternwarte	10.08.09	12.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Sternwarte	12.08.09	16.08.09	larvae					20	PT
Sternwarte	12.08.09	16.08.09			Staphylinidae			2	PT
Sternwarte	12.08.09	16.08.09			Carabidae			1	PT
Sternwarte	12.08.09	16.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	PT
Sternwarte	12.08.09	16.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Sternwarte	12.08.09	16.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			4	PT
Sternwarte	12.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Sternwarte	12.08.09	16.08.09			Staphylinidae			2	PT
Sternwarte	16.08.09	18.08.09	larvae					21	PT
Sternwarte	16.08.09	18.08.09			Curculionidae			1	PT
Sternwarte	16.08.09	18.08.09			Staphylinidae			8	PT
Sternwarte	18.08.09	20.08.09	larvae					4	PT
Sternwarte	18.08.09	20.08.09			Staphylinidae			4	PT
Sternwarte	18.08.09	20.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Sternwarte	20.08.09	26.08.09	larvae					6	PT
Sternwarte	20.08.09	26.08.09			Staphylinidae			7	PT
Sternwarte	20.08.09	26.08.09			Carabidae			2	PT
Sternwarte	20.08.09	26.08.09		Ptomaphagus subvillosus (Goeze, 1777)	Leiodidae			1	PT
Sternwarte	20.08.09	26.08.09			Curculionidae			1	PT
Sternwarte	20.08.09	26.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Sternwarte	20.08.09	26.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Sternwarte	20.08.09	26.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Sternwarte	26.08.09	02.09.09			Carabidae			1	PT
Sternwarte	26.08.09	02.09.09			Staphylinidae			9	PT
Sternwarte	26.08.09	02.09.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Sternwarte	02.09.09	14.10.09	larvae					1	PT
Sternwarte	02.09.09	14.10.09			Staphylinidae			11	PT
Sternwarte	02.09.09	14.10.09		Omosita colon (Linné, 1758)	Nitidulidae			1	PT
Sternwarte	02.09.09	14.10.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Sternwarte	02.09.09	14.10.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	28.07.09	30.07.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			6	PT
Beech grove	28.07.09	30.07.09			Carabidae			10	PT
Beech grove	28.07.09	30.07.09			Staphylinidae			2	PT
Beech grove	30.07.09	03.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	15	20	35	PT
Beech grove	30.07.09	03.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			7	PT
Beech grove	30.07.09	03.08.09			Carabidae			3	PT
Beech grove	30.07.09	03.08.09			Staphylinidae			13	PT
Beech grove	30.07.09	03.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	PT
Beech grove	30.07.09	03.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	9	22	31	PT
Beech grove	03.08.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	48	75	123	PT
Beech grove	03.08.09	05.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			14	PT
Beech grove	03.08.09	05.08.09			Carabidae			1	PT
Beech grove	03.08.09	05.08.09			Staphylinidae			16	PT
Beech grove	03.08.09	05.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			7	PT
Beech grove	03.08.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	3	2	5	PT
Beech grove	03.08.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	3	39	42	PT
Beech grove	03.08.09	05.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	03.08.09	05.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	05.08.09	07.08.09	larvae					14	PT
Beech grove	05.08.09	07.08.09			Carabidae			1	PT
Beech grove	05.08.09	07.08.09			Staphylinidae			11	PT
Beech grove	05.08.09	07.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	05.08.09	07.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	3	11	14	PT
Beech grove	05.08.09	07.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	17	18	PT
Beech grove	05.08.09	07.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Beech grove	05.08.09	07.08.09		Necrodes littoralis (Linné, 1758)	Silphidae			107	PT
Beech grove	05.08.09	07.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	05.08.09	07.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			2	PT
Beech grove	05.08.09	07.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	PT
Beech grove	05.08.09	07.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Beech grove	07.08.09	09.08.09	larvae					200	PT
Beech grove	07.08.09	09.08.09			Staphylinidae			14	PT
Beech grove	07.08.09	09.08.09			Carabidae			1	PT
Beech grove	07.08.09	09.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	07.08.09	09.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Beech grove	07.08.09	09.08.09		Necrodes littoralis (Linné, 1758)	Silphidae			51	PT
Beech grove	07.08.09	09.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
Beech grove	07.08.09	09.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1	3	4	PT
Beech grove	07.08.09	09.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	4	5	PT
Beech grove	09.08.09	11.08.09			Staphylinidae			3	PT
Beech grove	09.08.09	11.08.09			Carabidae			2	PT
Beech grove	09.08.09	11.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			19	PT
Beech grove	09.08.09	11.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	11	12	23	PT
Beech grove	09.08.09	11.08.09	larvae					1000	PT
Beech grove	09.08.09	11.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	4	8	12	PT
Beech grove	09.08.09	11.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	09.08.09	11.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			3	PT
Beech grove	11.08.09	14.08.09			Carabidae			9	PT
Beech grove	11.08.09	14.08.09			Staphylinidae			6	PT
Beech grove	11.08.09	14.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	11.08.09	14.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			3	PT
Beech grove	11.08.09	14.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			75	PT
Beech grove	11.08.09	14.08.09		Omosita depressa (Linné, 1758)	Nitidulidae			1	PT
Beech grove	11.08.09	14.08.09	larvae					700	PT
Beech grove	11.08.09	14.08.09		Necrodes littoralis (Linné, 1758)	Silphidae			17	PT
Beech grove	11.08.09	14.08.09		Sciodrepoides alpestris (Jeannel, 1934)	Leiodidae			1	PT
Beech grove	11.08.09	14.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	PT
Beech grove	11.08.09	14.08.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	14.08.09	16.08.09			Staphylinidae			8	PT
Beech grove	14.08.09	16.08.09		Dermestinus murinus (Linné, 1758)	Dermestidae			1	PT
Beech grove	14.08.09	16.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	PT
Beech grove	14.08.09	16.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	1	3	PT
Beech grove	14.08.09	16.08.09	larvae					400	PT
Beech grove	14.08.09	16.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			65	PT
Beech grove	14.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	3		3	PT
Beech grove	14.08.09	16.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	PT
Beech grove	14.08.09	16.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	16.08.09	18.08.09	larvae					81	PT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	16.08.09	18.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			44	PT
Beech grove	16.08.09	18.08.09			Staphylinidae			24	PT
Beech grove	16.08.09	18.08.09			Carabidae			13	PT
Beech grove	16.08.09	18.08.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	16.08.09	18.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	PT
Beech grove	16.08.09	18.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	PT
Beech grove	18.08.09	20.08.09	larvae					31	PT
Beech grove	18.08.09	20.08.09			Staphylinidae			12	PT
Beech grove	18.08.09	20.08.09			Carabidae			5	PT
Beech grove	18.08.09	20.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	PT
Beech grove	18.08.09	20.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			49	PT
Beech grove	18.08.09	20.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Beech grove	18.08.09	20.08.09		Hister striola (Sahlberg, 1819)	Histeridae			3	PT
Beech grove	20.08.09	23.08.09	larvae					8	PT
Beech grove	20.08.09	23.08.09			Staphylinidae			17	PT
Beech grove	20.08.09	23.08.09			Carabidae			9	PT
Beech grove	20.08.09	23.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
Beech grove	20.08.09	23.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	PT
Beech grove	20.08.09	23.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	1	2	PT
Beech grove	20.08.09	23.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			56	PT
Beech grove	20.08.09	23.08.09		Hister striola (Sahlberg, 1819)	Histeridae			2	PT
Beech grove	23.08.09	30.08.09	larvae					2	PT
Beech grove	23.08.09	30.08.09			Staphylinidae			19	PT
Beech grove	23.08.09	30.08.09			Carabidae			9	PT
Beech grove	23.08.09	30.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	PT
Beech grove	23.08.09	30.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			121	PT
Beech grove	23.08.09	30.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
Beech grove	23.08.09	30.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			121	PT
Beech grove	30.08.09	20.10.09			Staphylinidae			90	PT
Beech grove	30.08.09	20.10.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			187	PT
Beech grove	30.08.09	20.10.09			Carabidae			10	PT
Beech grove	30.08.09	20.10.09	larvae					4	PT
Beech grove	30.08.09	20.10.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	PT
?	30.07.09	02.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			26	PT
?	30.07.09	02.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	18	12	30	PT
?	30.07.09	02.08.09			Staphylinidae			13	PT
?	30.07.09	02.08.09			Carabidae			4	PT
?	30.07.09	02.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	PT
?	30.07.09	02.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	PT
?	30.07.09	02.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	PT
?	30.07.09	02.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2		2	PT
?	30.07.09	02.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	3	4	PT
?	30.07.09	02.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	PT
Narrenturm	27.07.09	05.08.09			Staphylinidae			10	RMT
Narrenturm	27.07.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Narrenturm	27.07.09	05.08.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Narrenturm	27.07.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			6	RMT
Narrenturm	05.08.09	10.08.09	larvae					2	RMT
Narrenturm	05.08.09	10.08.09			Staphylinidae			2	RMT
Narrenturm	05.08.09	10.08.09		Dermestes haemorrhoidalis (Küster, 1852)	Dermestidae			1	RMT
Narrenturm	05.08.09	10.08.09		Necrobia violacea (Linné, 1758)	Cleridae			6	RMT

study site	from	until	form	species	family	male	female	number	trap
Narrenturm	05.08.09	10.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			2	RMT
Narrenturm	10.08.09	12.08.09	larvae					1	RMT
Narrenturm	10.08.09	12.08.09			Staphylinidae			1	RMT
Narrenturm	10.08.09	12.08.09		Omosita colon (Linné, 1758)	Nitidulidae			1	RMT
Narrenturm	12.08.09	16.08.09			Staphylinidae			4	RMT
Narrenturm	12.08.09	16.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	RMT
Narrenturm	12.08.09	16.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	RMT
Narrenturm	12.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			1	RMT
Narrenturm	16.08.09	18.08.09	larvae					6	RMT
Narrenturm	16.08.09	18.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	2	3	RMT
Narrenturm	16.08.09	18.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Narrenturm	16.08.09	18.08.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	RMT
Narrenturm	16.08.09	18.08.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	RMT
Narrenturm	16.08.09	18.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Narrenturm	16.08.09	18.08.09		Saprinus Species	Histeridae			1	RMT
Narrenturm	18.08.09	20.08.09	larvae					9	RMT
Narrenturm	18.08.09	20.08.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	RMT
Narrenturm	18.08.09	20.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Narrenturm	20.08.09	26.08.09	larvae					13	RMT
Narrenturm	20.08.09	26.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Narrenturm	20.08.09	26.08.09			Staphylinidae			4	RMT
Narrenturm	20.08.09	26.08.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Narrenturm	20.08.09	26.08.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	RMT
Narrenturm	26.08.09	02.09.09	larvae					15	RMT
Narrenturm	26.08.09	02.09.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Narrenturm	26.08.09	02.09.09			Staphylinidae			1	RMT
Narrenturm	26.08.09	02.09.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Narrenturm	26.08.09	02.09.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			1	RMT
Narrenturm	02.09.09	16.10.09	larvae					10	RMT
Narrenturm	02.09.09	16.10.09			Staphylinidae			12	RMT
Narrenturm	02.09.09	16.10.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	3	4	RMT
Narrenturm	02.09.09	16.10.09		Necrobia ruficollis (Fabricius, 1775)	Cleridae			4	RMT
Oak forest	27.07.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	10	43	53	RMT
Oak forest	27.07.09	05.08.09			Staphylinidae			23	RMT
Oak forest	27.07.09	05.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			8	RMT
Oak forest	27.07.09	05.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			3	RMT
Oak forest	27.07.09	05.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	RMT
Oak forest	27.07.09	05.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			10	RMT
Oak forest	27.07.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	9	5	14	RMT
Oak forest	27.07.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	10	42	52	RMT
Oak forest	27.07.09	05.08.09		Dermestinus undulatus (Brahm, 1790)	Dermestidae			1	RMT
Oak forest	05.08.09	07.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	9	16	25	RMT
Oak forest	05.08.09	07.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	05.08.09	07.08.09	larvae					1	RMT
Oak forest	05.08.09	07.08.09			Staphylinidae			4	RMT
Oak forest	05.08.09	07.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	05.08.09	07.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Oak forest	05.08.09	07.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	2	4	RMT
Oak forest	05.08.09	07.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		2	2	RMT
Oak forest	05.08.09	07.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			2	RMT
Oak forest	05.08.09	07.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT

study site	from	until	form	species	family	male	female	number	trap
Oak forest	07.08.09	11.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	31	33	RMT
Oak forest	07.08.09	11.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	RMT
Oak forest	07.08.09	11.08.09			Staphylinidae			5	RMT
Oak forest	07.08.09	11.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	07.08.09	11.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	3	2	5	RMT
Oak forest	07.08.09	11.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Oak forest	07.08.09	11.08.09	larvae					1000	RMT
Oak forest	07.08.09	11.08.09		Dermestinus undulatus (Brahm, 1790)	Dermestidae			1	RMT
Oak forest	07.08.09	11.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Oak forest	07.08.09	11.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1	2	3	RMT
Oak forest	07.08.09	11.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			10	RMT
Oak forest	07.08.09	11.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT
Oak forest	11.08.09	14.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	11.08.09	14.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	14	8	22	RMT
Oak forest	11.08.09	14.08.09	larvae					1000	RMT
Oak forest	11.08.09	14.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			2	RMT
Oak forest	11.08.09	14.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Oak forest	14.08.09	16.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Oak forest	14.08.09	16.08.09	larvae					1000	RMT
Oak forest	14.08.09	16.08.09			Staphylinidae			5	RMT
Oak forest	14.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Oak forest	14.08.09	16.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	3	4	7	RMT
Oak forest	16.08.09	18.08.09	larvae					60	RMT
Oak forest	16.08.09	18.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	16.08.09	18.08.09			Staphylinidae			2	RMT
Oak forest	16.08.09	18.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	16.08.09	18.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Oak forest	16.08.09	18.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	1	3	RMT
Oak forest	18.08.09	20.08.09	larvae					13	RMT
Oak forest	18.08.09	20.08.09			Staphylinidae			2	RMT
Oak forest	18.08.09	20.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	RMT
Oak forest	20.08.09	23.08.09	larvae					12	RMT
Oak forest	20.08.09	23.08.09			Staphylinidae			3	RMT
Oak forest	20.08.09	23.08.09		Sciodrepoides watsoni (Spence, 1815)	Leiodidae			1	RMT
Oak forest	23.08.09	30.08.09	larvae					8	RMT
Oak forest	23.08.09	30.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Oak forest	23.08.09	30.08.09			Staphylinidae			7	RMT
Oak forest	23.08.09	30.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Oak forest	30.08.09	20.10.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Oak forest	30.08.09	20.10.09			Curculionidae			1	RMT
Oak forest	30.08.09	20.10.09	larvae					3	RMT
Oak forest	30.08.09	20.10.09			Staphylinidae			31	RMT
Oak forest	30.08.09	20.10.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	2	3	RMT
Oak forest	30.08.09	20.10.09		Hister unicolor (Linné, 1758)	Histeridae			1	RMT
Oak forest	30.08.09	20.10.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Oak forest	30.08.09	20.10.09		Cartodere nodifer (Westwood, 1839)	Latridiidae			4	RMT
Beech grove	27.07.09	05.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			4	RMT
Beech grove	27.07.09	05.08.09			Staphylinidae			14	RMT
Beech grove	27.07.09	05.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Beech grove	27.07.09	05.08.09	larvae					1	RMT
Beech grove	27.07.09	05.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			8	RMT

study site	from	until	form	species	family	male	female	number	trap
Beech grove	27.07.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	2	3	RMT
Beech grove	27.07.09	05.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Beech grove	27.07.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	RMT
Beech grove	27.07.09	05.08.09		Hister unicolor (Linné, 1758)	Histeridae			1	RMT
Beech grove	27.07.09	05.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	27.07.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	2	23	25	RMT
Beech grove	05.08.09	07.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			1	RMT
Beech grove	05.08.09	07.08.09	larvae					2	RMT
Beech grove	05.08.09	07.08.09			Staphylinidae			1	RMT
Beech grove	05.08.09	07.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		1	1	RMT
Beech grove	05.08.09	07.08.09		Necrophorus humator (Olivier, 1790)	Silphidae			1	RMT
Beech grove	05.08.09	07.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Beech grove	05.08.09	07.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		2	2	RMT
Beech grove	07.08.09	11.08.09		Geotrupes stercorarius (Linné, 1758)	Scarabaeidae			2	RMT
Beech grove	07.08.09	11.08.09	larvae					11	RMT
Beech grove	07.08.09	11.08.09			Staphylinidae			10	RMT
Beech grove	07.08.09	11.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	2	3	5	RMT
Beech grove	07.08.09	11.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	1		1	RMT
Beech grove	07.08.09	11.08.09		Necrophorus vespilloides (Herbst, 1784)	Silphidae			1	RMT
Beech grove	07.08.09	11.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			2	RMT
Beech grove	11.08.09	14.08.09	larvae					15	RMT
Beech grove	11.08.09	14.08.09			Staphylinidae			4	RMT
Beech grove	11.08.09	14.08.09		Necrobia violacea (Linné, 1758)	Cleridae			2	RMT
Beech grove	11.08.09	14.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	1	2	RMT
Beech grove	16.08.09	18.08.09	larvae					8	RMT
Beech grove	16.08.09	18.08.09			Staphylinidae			2	RMT
Beech grove	16.08.09	18.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Beech grove	16.08.09	18.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Beech grove	16.08.09	18.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT
Beech grove	18.08.09	20.08.09	larvae					13	RMT
Beech grove	20.08.09	23.08.09	larvae					4	RMT
Beech grove	20.08.09	23.08.09			Staphylinidae			1	RMT
Beech grove	20.08.09	23.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Beech grove	23.08.09	30.08.09	larvae					10	RMT
Beech grove	23.08.09	30.08.09			Staphylinidae			2	RMT
Beech grove	23.08.09	30.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	RMT
Beech grove	30.08.09	20.10.09			Staphylinidae			10	RMT
Beech grove	30.08.09	20.10.09		Cartodere nodifer (Westwood, 1839)	Latridiidae			2	RMT
Beech grove	30.08.09	20.10.09		Hister merdarius (Hoffmann, 1803)	Histeridae			1	RMT
Sternwarte	27.07.09	05.08.09		Dermestes haemorrhoidalis (Küster, 1852)	Dermestidae			1	RMT
Sternwarte	27.07.09	05.08.09			Staphylinidae			19	RMT
Sternwarte	27.07.09	05.08.09		Necrodes littoralis (Linné, 1758)	Silphidae		5	5	RMT
Sternwarte	27.07.09	05.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae	2	1	3	RMT
Sternwarte	27.07.09	05.08.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Sternwarte	27.07.09	05.08.09		Necrobia violacea (Linné, 1758)	Cleridae			3	RMT
Sternwarte	27.07.09	05.08.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			2	RMT
Sternwarte	27.07.09	05.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae			34	RMT
Sternwarte	05.08.09	10.08.09			Staphylinidae			11	RMT
Sternwarte	05.08.09	10.08.09		Omosita colon (Linné, 1758)	Nitidulidae			3	RMT
Sternwarte	05.08.09	10.08.09	larvae					4	RMT
Sternwarte	05.08.09	10.08.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	RMT

study site	from	until	form	species	family	male	female	number	trap
Sternwarte	05.08.09	10.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1	4	5	RMT
Sternwarte	05.08.09	10.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	3	1	4	RMT
Sternwarte	10.08.09	12.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	RMT
Sternwarte	10.08.09	12.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	10.08.09	12.08.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	RMT
Sternwarte	10.08.09	12.08.09			Staphylinidae			2	RMT
Sternwarte	12.08.09	16.08.09			Staphylinidae			4	RMT
Sternwarte	12.08.09	16.08.09	larvae					4	RMT
Sternwarte	12.08.09	16.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	12.08.09	16.08.09		Saprinus semistriatus (Scriba, 1790)	Histeridae		1	1	RMT
Sternwarte	16.08.09	18.08.09	larvae					10	RMT
Sternwarte	16.08.09	18.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	18.08.09	20.08.09	larvae					7	RMT
Sternwarte	18.08.09	20.08.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			1	RMT
Sternwarte	18.08.09	20.08.09			Histeridae			1	RMT
Sternwarte	18.08.09	20.08.09		Hister striola (Sahlberg, 1819)	Histeridae			1	RMT
Sternwarte	20.08.09	26.08.09	larvae					13	RMT
Sternwarte	20.08.09	26.08.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	RMT
Sternwarte	20.08.09	26.08.09		Thanatophilus sinuatus (Fabricius, 1775)	Silphidae		1	1	RMT
Sternwarte	20.08.09	26.08.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	20.08.09	26.08.09		Saprinus rugifer (Paykull, 1809)	Histeridae			1	RMT
Sternwarte	26.08.09	02.09.09	larvae					7	RMT
Sternwarte	26.08.09	02.09.09			Staphylinidae			1	RMT
Sternwarte	26.08.09	02.09.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	26.08.09	02.09.09		Necrodes littoralis (Linné, 1758)	Silphidae	1		1	RMT
Sternwarte	26.08.09	02.09.09		Saprinus semistriatus (Scriba, 1790)	Histeridae	1		1	RMT
Sternwarte	26.08.09	02.09.09		Carcinops pumilio (Erichson, 1834)	Histeridae			1	RMT
Sternwarte	26.08.09	02.09.09		Necrophorus fossor (Erichson, 1837)	Silphidae			1	RMT
Sternwarte	02.09.09	14.10.09	larvae					9	RMT
Sternwarte	02.09.09	14.10.09			Staphylinidae			6	RMT
Sternwarte	02.09.09	14.10.09		Necrobia rufipes (DeGeer, 1775)	Cleridae			4	RMT
Sternwarte	02.09.09	14.10.09		Necrobia violacea (Linné, 1758)	Cleridae			1	RMT
Sternwarte	02.09.09	14.10.09		Hister striola (Sahlberg, 1819)	Histeridae			2	RMT
Sternwarte	02.09.09	14.10.09		Hister cadaverinus (Hoffmann, 1803)	Histeridae			1	RMT

Lebenslauf

Persönliche Daten

Familienname:	Patzak
Vorname:	Anatole Johannes
Geburtstag:	20.09.1982
Geburtsort:	New York, USA
Eltern:	Roswitha Patzak, geb. Heinzmann
	Dr. Heinz Patzak
Familenstand:	ledig, keine Kinder
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Ausbildungsweg

1989 – 1993	Grundschule - Deutsche Schule Paris
1993 – 1995	Orientierungsstufe - Deutsche Schule Paris
1995 – 2002	Gymnasium - Deutsche Schule Paris
2002	Abitur
2002 – 2005	Diplomstudium Biologie an der Universität Wien
2005 – 2010	Studienzweig Ökologie an der Universität Wien
2009 – 2011	Diplomarbeit

Berufserfahrung

seit 2003	diverse Tätigkeiten (Bibliotheksarbeit, Führungen in Deutsch, Englisch und Französisch, Verkauf, Organisation der Führungen, technischer Assistent, Catering) im Pathologisch-anatomischen Bundesmuseum (Narrenturm)
2005	Ferialpraktikum bei Octapharma – Mikrobiologie
2006	Ferialpraktikum bei Octapharma – Techniktransfer

CV

Personal information

Last name:	Patzak
First names:	Anatole Johannes
Date of birth:	September 20, 1982
Place of birth:	New York, USA
Parents:	Roswitha Patzak, born Heinzmann
	Dr. Heinz Patzak
Family status:	unmarried, no children
Contact:	elotana@gmx.at

Education

1989 – 1993	Elementary school – German School of Paris
1993 – 1995	Orientation stage - German School of Paris
1995 – 2002	Academic high-school - German School of Paris
2002	High-school diploma
2002 – 2005	Studies in biology at the University of Vienna
2005 – 2010	Studies in ecology at the University of Vienna
2009 – 2011	Diploma thesis

Employment history

since 2003	diverse work experience in the Federal Pathologic-anatomical Museum of Vienna (library, guided tours in English, German and French, sale, organization of guided tours, technical assistant, catering)
2005	Internship at Octapharma – Microbiology
2006	Internship at Octapharma – Transfer of technics