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Diplopods Succession Associated to Covered Sus scrofa domesticus (Linnaeus, 1758) *Carrions Exposed in Various Habitats in the Equatorial Forest of Malombo (Center Region of Cameroon, Africa): First Studies*

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Abstract – Most forensic studies are focused on Diptera, Coleoptera and hymenoptera pattern colonization while neglecting other arthropods precisely Diplopods succession on carrions. Little information is available on the postmortem colonization by millipides and the decomposition process they initiate under tropical biogeoclimatic countries. These diplopods have never been mentioned as part of the colonization of arthropods of a dead body and yet they participate actively, and their presence would never be a coincidence. Forensic science needs increased databases detailing the distribution, ecology, and phenology of necrophagous arthropods, including diplopods. From January to November 2018, diplopod successions of covered pig carrion were studied in various habitats in the equatorial forest of Malombo in Cameroon. Six stages of decomposition were recognized: fresh, bloating, advanced bloating, active decomposition, advanced decomposition, and skeletization. A total of 135 diplopods belonging three order (Spirostreptida, Polydesmida and Spirobolida) and 6 species (*Aporodesmus gabonicus*, *Aporodesmus* sp., *Urodesmus cornutus*, *Trinciulus laevicolis*, *Haplothysanus chapellei* and Spirostreptidae gen sp) were collected from covered pig carrions. Highest abundance of millipedes occured in the habitat 2 and the lowest in the habitat 4. *Haplothysanus chapellei* (Odontopygidae) has been the most abundant species with 91,11 % of the community of millipedes. The succession and duration of decay stages, habitat and stage specificity provide key information in field studies and their potential application in forensic science.

Keywords – Forensic science, Diplopods, Forensic Myriapodology, pig covered carrion, Equatorial forest, Malombo, Cameroon.

I. Introduction

The succession of carrion arthropods is a process occurring in the nature and influenced by numerous factors such as seasons, habitats, geographic locations, etc. Decomposition is a necessary phenomenon transforming organic material (dead plants or animals) to mineral matter. Carrions or dead animals represent a temporary and changing food source for various organisms and communities [1, 2]. Specialisation is a consequence of the ephemeral nature and patchy distribution of animal remains [3] and the dietary chemistry of necrophagous animals. In tropical forests, arthropods play diverse roles; they are ecologically important as detritivores, scavengers, herbivores, and participate in astonishing associations [4, 5, 6]. Their abundance and density vary from one biotope to another [7]. Soil and litter arthropods are important components of tropical ecosystems [8] and represent a large proportion of biodiversity [9, 10]. This diverse group of animals encompasses Diplopoda, Arachnida, Maxillopoda, Xiphosura and range of insects (Coleoptera, Diptera, Thysanoura, etc.). Soil arthropods are also an important food source for many predacious invertebrates and vertebrates [11]. Ecologically, a decomposing dead body is a microhabitat for numerous organisms such as bacteria, fungi, plants, and animals. Arthropods are the dominating group of such microhabitat [12]. Thus, understanding the decay process has broad application in ecological, environmental science, and in medico legal entomology when arthropods are collected and interpreted as evidence [13, 14]. The decay process is critical to nutrient cycling and energy in most ecosystems [15, 16]. Arthropods are among the first and more important invertebrates which abundantly colonize a cadaver whether animal or human [17, 18]. Necrophagous invertebrates are responsible of the majority of vertebrate carcass decomposition [19] and many arthropods species consume the carrion organic material directly. Accordingly, a carrion is a food resource which maintains a large and changing fauna as it decays [20]. Each stage of decomposition is associated to a different group of arthropods, especially insects and diplopods. Some are attracted to the carcass for oviposition or feeding, while others are attracted by the aggregation of other arthropods used as food sources or prays [21]. The analysis of the sequence of arthropods visitation at the different stages of a decomposing carrion can help to determinate the postmortem interval (PMI) in criminal cases involving death or murder. Indeed, *Sus scrofa domesticus* carcasses are commonly used in forensic studies to surrogate human decay and to investigate the arthropods succession [22, 23, 24, 25]. The relevance of a database on arthropods succession on carrions depends on the type of experimental model used. In most crime scenes corpses are covered, hense our choice. Many reports have focused on Diptera, Coleoptera and Hymenoptera patterns of colonization [24, 25, 26, 27, 28, 29, 30] and very few on diplopods succession.

The diplopods are an essential link in forest ecosystems. They have a very low dispersal power; consequently, they can develop large populations of many endemic species [31]. As a result, diplopods are present in most decaying environments and contribute generally to humus formation and soil aeration [32, 33]. Myriapod (Myriapoda) groups are very important in tropical ecosystems [6, 7, 31]. Except centipedes that are predators, the vast majority of these taxa (millipedes, pauropods and symphylans) are detritivores, feeding decaying plants [34, 35]. 15000 species or morphospecies of myriapods in 160 families have already been described [35]. Studies on successional patterns of arthropods have been conducted in different climatic areas in the world [36, 37]; indeed carrion invertebrate species composition varies widely amongst geographic regions, climates (seasons, ambient temperature, rainfall, humidity), days, habitats, types of supports and microclimates of the post-mortem site [38, 14, 39]. Diplopods that colonize carrions are substantially subject to the same variability. All these factors play major roles in the determination of the invertebrate assemblages and the rate of carrion decomposition. Thus, understanding the structure of diplopod communities, habitat specificity, and their order of succession in animal carcasses is important for a perfect knowledge of this taxonomic group, its role in decaying micro-habitats. Hitherto and to the best of your knowledge there is no data on the study and implication of diplopods species on forensic science.

This study describes the composition and sequence of local carrion-diplopods succession in equatorial forest habitats in the locality of Malombo, Center region of Cameroon. We also test whether these data could allow to estimate the PMI in an eventual case of accidental human death in the future.

II. Materials and Methods

2-1 Site and Study Period

This study was conducted from January 2018 to November 2018 in four different forest habitats in the village of Malombo located in the borough of Makak, Department of Nyong et Kéllé, Central Region of Cameroon. Malombo is situated in the bimodal rainfall zone with four seasons: a short rainy season from mid-March to June, a short dry season from July to August, a long rainy season from September to mid-November and a long dry season from mid-November to mid-March. The average annual rainfall is 1600 mm and that of temperature varies between 19 °C and 33 °C [40, 41]. The choice of this locality took into account its geographical position in the equatorial forest with a humid natural landscape, the low human activity, lush vegetation, and agricultural or domestic landscape that refers to space cultivated fallows or housing populations. Apart from forest formation on firm soil, there are reduced coverings of swamps along certain streams. Its hydrographic network is dominated by the Nyong River and its numerous tributaries.

Four different forest habitats were selected in Malombo; habitat 1 is a dense humid forest with non-marshy soil and covered canopy (3 ° 32'12"N, 11 ° 06'49"E); habitat 2 is also a dense humid forest with non-marshy soil occupied by a four years old fallow with an open canopy almost 90% colonized by *Chromolaena odorata*, some shrubs and a few *Dacryodes edulis* trees (3 ° 32'12 " N, 11 ° 06'52"E); habitat 3 is a one year fallow with moist soil and less open canopy due to short and large trees higher than 20m (3 ° 32'41"N, 11 ° 06'37"E); at last habitat 4 is a marshy soil with a very dense covered canopy due to numerous shurbs and long trees higher than 20m (3 ° 32'06"N, 11 ° 6'27"E). The distances between two habitats were 100m (habitat 1 to habitat 2), 1700m (habitat 2 to habitat 3), 2300m (habitat 3 to habitat 4) and 1000m (habitat 1 to habitat 4). This spacing was consistent with other carrion entomological studies [42, 43], because decomposition and colonization of a carcass by arhropods are affected by its placement [44].

2-2 Experimental animal

The domestic pig (*Sus scrofa domesticus* L.) was used to surrogate human model mainly for physiological, biochemical, legal, and economic reasons [39, 23, 25, 42, 43, 45, 46, 47, 48], ethics [49, 50, 51], torso weight, skin structure, fat-to-muscle ratio, and hair coverage [52]. Actually the greatest dissimilarity between pig and human is the different microstructure of bones [46, 52].

2-3 Environmental parameters and personal protection

Atmospheric temperature and relative humidity were recorded at each visit of carcass using a Janisa brand thermo-hygrometer. The rainfall was measured using an Oregon brand electronic rain gauge. The geographical coordinates of each habitat were taken with GPS. Data collectors were protected from any pathogens, pollutants or contaminants by wearing special dresses (covers boots, protection coveralls, full facepiece mask respirator and glooves). Signs warning passers-by of potential hazards were installed at all locations, approximately twenty meters from the experimental facility.

2-4 Carrion achievement

A total of four domestic pigs alive, in perfect health, about 6 months old, weighing 63 to 65 kg, and provided by the farm present in the borough of Makak, were used (one per habitat). Each animal was examined, then calmed with a tranquilizer administered by a veterinarian [49, 50, 51]. Few minutes later it was strangulated to prevent any bleeding. Immediately after euthanasia, the pig carrion was packaged in a biodegradable bag (with mesh less than 0.05 mm) to prevent colonization by insects. The covered carcass was deposited on the soil in a quadra (5m x 5m) surrounded by a wire mesh grid (1.70 m high) to prevent the entry of vertebrate carnivores.

2-5 Diplopods sampling protocol

On the field, sampling and observations were done around each pig carcass as function of the stage criteria defined by Anderson & VanLaerhoven [53] and Koffi et al [23], namely: fresh, bloating, active decomposition, advanced decomposition and dryness/remains. Adult diplopods were sampled on covered carrion in each habitat during 31 consecutive days. To quantify the colonization of diplopods, the sampling protocol was adjusted according to each habitat. Sampling was carried out from 8 am to 10 am, 12 pm to 2 pm, 4 pm to 6 pm in habitats 1 and 2 on the one hand, between 8 am and 10 am, 2 pm and 4 pm in habitats 3 and 4 on the other hand, until the carcass reached the skeletonization stage of decomposition. Three sampling methods were used: quadra, hand collection and pitfall trapping [54, 55]. Other diplopods were collected on the litter under the carrion. At each visit, the biodegradable bag was opened rapidly, the carrion was thoroughly examined visually to determine the decomposition stage, photographed and the bag immediately relocked.

2-6 Conservation and Identification of diplopod specimens

The collected diplopods were introduced in bottles containing fresh 70% ethyl alcohol them transferred to the laboratory of Zoology, Department of Animal Biology and Physiology of the University of Yaounde 1 Cameroon. Where specimens were identified at the specific level using dichotomic keys [56, 57, 58, 59, 60, 61, 62] and digital stereo-microscope. After identification, the specimens were replaced in new bottles containing 70% ethyl alcohol then stored in the Laboratory.

2-7 Data analysis

The diplopods collected in the four forest habitats were counted. The relative abundance Ra (%) = (n_i/N) x 100 was calculated for each plot sampled using Excel 2016; n_i is the number of individuals of a given species and N is the total number of individuals of all species combined [63]. The Constancy of species (C) expresses the relationship between the number (p) of surveys containing a given species and the total number of surveys carried out (P); C = (p/P) x 100. The species are categorized as accidental, accessory or constant respectively when: $C < 25\%$, $25\% \leq C \leq 50\%$ and $C > 50\%$. Due to the absence or very low number of many taxa per habitat or decay stage, the similarity between two modalities of both latter parameters was only evaluated based on species richness and description of habitats.

III. RESULTS

3-1 Decomposition stages of covered carrions

During this work, the ranges of climatic data were : ambient temperature 23.0 to 40.8°C, temperature of the substrate in the bag 19.5 to 56.0°C, relative humidity 42 to 92% and rainfall 0 to 51mm. Six different stages of decay were recognised when examining characteristic morphological changes of the *Sus scrofa domesticus* carcass bodies : fresh (no odour with fresh appearance), bloating (initiation of slight inflation of abdomen with moderate odour), advanced bloating (high discoloration and inflation of abdomen, spreading odour, presence of eggs and larva L1 of diptera in the mouth of carrion), active decomposition (release of gases associated with maggots exit outside of body, liquefaction of tissues, strong odour of decay, and continual deflation), advanced decomposition (black putrefaction, decrease of carcass odour, skin separation from bones and bones exposure evident at extremities), and skeletonization (carcass consists of bones, skin and hairs with little odour). The duration of decaying stages varied as a function mainly of decay stage and least bit of habitat. The three early stages were fleeting (1 to 2 days); the active decomposition was short (2 to 4 days) except in habitat 4 where it reached 9 days. Advanced decomposition was relatively long (6 to 22 days). At last, skeletonization was very long; it began early in habitats 2 (from day 11) and 3 (from day 16), and later in habitats 4 (from day 29) and 1 (from day 30).

Table 1 : Duration of the different decomposition stages of covered Sus scrofa domesticus carrions in various forest habitats of Malombo

Cadaveric evolution	**Days postmortem (duration)**			
	Habitat 1	**Habitat 2**	**Habitat 3**	**Habitat 4**
Fresh	Day 1 (1 day)	Day 1 (1 day)	Day 1 (1 day)	Day 1 (1 day)
Bloating	Day 2 to day 3 (2 days)	Day 2 (1 day)	Day 2 to day 3 (2 days))	Day 2 to day 3 (2 days)
Advanced Bloating	Day 4 (1 day)	Day 2 (1 day)	Day 4 (1 day)	Day 4 (1 day)
Active decomposition	Day 5 to day 8 (4 days)	Day 3 to day 4 (2 days)	Day 5 to day 8 (4 days)	Day 5 to day 13 (9 days)
Advanced decomposition	Day 9 to day 30 (22 days)	Day 5 to day 10 (6 days)	Day 9 to day 15 (7 days)	Day 14 to day 28 (15 days)
Skeletonization	Day 30 to day 31 and continuous	Day 11 to day 31 and continuous	Day 16 to day 31 and continuous	Day 29 to day 31 and continuous

3-2 Taxonomic groups of millipedes and community composition

A total of 135 millipedes individuals were collected in the equatorial forest of Malombo; they belonged to three orders (Spirostreptida, Polydesmida and Spirobolida), five families (Odontopygidae, Spirostreptidae, Cryptodesmidae, Pyrgodesmidae and Trigoniulidae), five genera and six species (*Aporodesmus gabonicus*, *Aporodesmus* sp, *Urodesmus cornutus*, *Trinciulus laevicolis*, *Haplothysanus chapellei* and Spirostreptidae gen sp). The order of Spirostreptida was the most diverse (two families: Spitostreptidae and Odontopygidae) and abundant (95.56% of all captured millipedes). It was followed by the Polydesmida (Cryptodesmidae and Pyrgodesmidae ; 3.70%) and the Spirobolida (Trigoniulidae; 0.74%) see table 2.

Table 2 : Diversity and abundance of diplopods species associated to covered pig carrions in Malombo

Order	Families	Species	Abundance (n_i)	Relative abundance (%)
Spirostreptida	Odontopygidae	*Haplothysanus chapellei* Demange, 1957	123	91.11
	Spirostreptidae	Spirostreptidae gen sp	6	4.45
Polydesmida	Cryptodesmidae	*Aporodesmus* sp.	3	2.22
		Aporodesmus gabonicus Lucas, 1858	1	0.74
	Pyrgodesmidae	*Urodesmus cornutus*	1	0.74
Spirobolida	Trigoniulidae	*Thrinciulus laeveicollis* Porat, 1894	1	0.74
Total			135	100

3-3 Diplopod species composition

In the current study, covered fresh carrions were not colonized by diplopods. Three species were attracted by only one decomposition stage; they were *Aporodesmus gabonicus* (active decomposition), *Urodesmus cornutus* (advanced decomposition) and *Thrinciulus laeveicollis* (skeletonization). One species was collected at two decaying stages: *Aporodesmus* sp. (active decomposition and advanced decomposition), another one at three decaying stages: Spirostreptidae gen sp (active decomposition, advanced decomposition and skeletonization). At last, *Haplothysanus chapellei* colonized all the last five decomposition stages (bloating, advanced bloating, active decomposition, advanced decomposition and skeletonization); its relative abundance was highest at skeletonization (47.41%), followed by the advanced decomposition (32.59%) and the active decomposition (5.93%).

A total of 48.89% of millipede individuals were found during the skeletonization, 37.03% during the advanced decomposition. These two last stages were relatively long with 85.92% diplopods harvested. A percentage of 2.22% millipedes was obtained during advanced bloating, 2.97% during bloating and 8.89% during active decomposition. The four first stages were fleeting or relatively short with 14.08% of dioplopods sampled (table 3). Diplopods diversity was highest during the active decomposition with four species (*Aporodesmus gabonicus*, *Aporodesmus* sp., *Haplothysanus chapellei* and Spirostreptidae gen sp) and advanced decomposition also with four species (*Aporodesmus* sp., *Urodesmus cornutus*, *Haplothysanus chapellei* and Spirostreptidae gen sp), followed by skeletonization with three taxa (*Thrinciulus laeveicollis*, *Haplothysanus chapellei* and Spirostreptidae gen sp). The lowest diversity was obtained during bloating and advanced bloating, each with one species (*Haplothysanus chapellei*) see Table 3.

Habitats 1 and 2 had non-marshy soils while in habitats 3 and 4 the soil was moist or marshy. The relative abundance of the diplopod species collected varied as a function of habitats. Habitat 2 was most colonized (54.81% of the whole individuals sampled) followed by habitat 1 (31.85% individuals). Low relative abundances were noticed in habitat 3 (7.41%) and habitat 4 (5.93%). It was also noticed that three species were sampled only in one type of habitat: *U. cornutus* (habitat 2) *A. gabonicus* (habitat 3) and *T. laeveicollis* (habitat 4). *Aporodesmus* sp. was collected in habitats 1 and 2; the undetermined species Spirostreptidae gen sp (female diplopods) in habitats 3 and 4, while *H. chapellei* was found in both four forest habitats with 123 individuals in whole. The greatest abundance of *H. chapellei* was registrered in the habitat 2 (72 individuals), habitat 1 (41 individuals), then habitat 3 (4 individuals) and habitat 4 (6 individuals).

Table 3 : Abundance of diplopod species associated to cadaveric evolution in the various forest habitats of Malombo

Cadaveric evolution associated to Diplopods species harvested	**Habitats 1**	**2**	**3**	**4**	**Abundance**	**Relative abundance %**
Fresh	-	-	-	-	-	-
Bloating						
Haplothysanus chapellei	3	-	1	-	**4**	**2.97**

Advanced Bloating						
Haplothysanus chapellei	3	-	-	-	**3**	**2.22**
Active decomposition						
Aporodesmus gabonicus	-	--	1	-	**1**	**0.74**
Aporodesmus sp.	-	1	-	-	**1**	**0.74**
Haplothysanus chapellei	3	2	2	1	**8**	**5.93**
Spirostreptidae gen sp	-	-	1	1	**2**	**1.48**
Advanced decomposition						
Haplothysanus chapellei	30	9	1	4	**44**	**32.59**
Aporodesmus sp.	2	-	-	-	**2**	**1.48**
Spirostreptidae gen sp	-	-	3	-	**3**	**2.22**
Urodesmus cornutus	-	1	-	-	**1**	**0.74**
Skeletonization						
Haplothysanus chapellei	2	61	-	1	**64**	**47.41**
Spirostreptidae gen sp	-	-	1	-	**1**	**0.74**
Thrinciulus laevicollis	-	-	-	1	**1**	**0.74**
Total	**43**	**74**	**10**	**8**	**135**	**100**

3-4 Constancy of diplopod species

Haplothysanus chapellei revealed as a constant species which strongly colonized habitat 2 (80.65%) and habitat 1 (74.19%), but as accidental in habitats 3 and 4. All the other species sampled were accidental in the type of environment they occupied (Table 4).

Table 4 : Constancy of diplopod species by habitat

Species	Malombo			
	Habitat 1	Habitat 2	Habitat 3	Habitat 4
Haplothysanus chapellei	74.19%	80.65%	12.90%	16.13%
Aporodesmus sp.	6.45%	3.23%	-	-
Urodesmus cornutus	-	3.23%	-	-
Aporodesmus gabonicus	-	-	3.23%	-
Spirostreptidae gen sp	-	-	12.90%	3.23%
Thrinciulus laevicollis	-	-	-	3.23%

IV. Discussion

When diplopods are found on a crime scene, or a body is found in a place where these organisms are present and abundant, evidence should be interpreted with caution. Hitherho their role on the decay process of animal and human carcasses has received less attention. Arthropods that colonize cadavers attract the diplopods; therefore, those who are present in decomposing bodies could be used for estimating of the PMI. The diplopod species identified were present on covered pig carrions. In this respect, it is suggested that the forensic science could benefit from the life cycle study of the most common local species.

In the forest of Malombo, assemblages of millipedes differed among the habitats during the decomposition of pig carcasses. Six stages of decomposition (fresh, bloating, advanced bloating, active decomposition, advanced decomposition and skeletonization) were recorded in each habitat. The six stages recognised in this study differed from observations of Anderson and VanLaerhoven [53] in South Western British Columbia, Merritt et al [64], Dekeirsscheiter et al [22, 28] in Belgium, Tsafouet VII Wouking [65] in Cameroon, Koffi et al [23, 24] and Hassane Dao et al [39, 25] in Côte d'Ivoire. These authors divided decomposition into five stages: fresh, bloating, active decomposition, advanced decomposition and skeletonization. This difference between the number of decaying stages could be due to differences in climatic conditions of the localities of experimentation or to misinterpretation in demarcating the different stages by combining some of them. Indeed, the duration of the cadaveric evolution was fleeting (1 to 2 days) in fresh, bloating and advanced bloating, short in active decomposition (2 to 9 days), relatively long in advanced decomposition (6 to 22 days) and very long in skeletonization because continuous in all habitats. The extension of the duration of a decay stage from active decomposition could explain the relatively high diplopod species richness compared to fleeting stages. It is worth to note that the skeletonization is very long but the experiment was stopped after 31 days. We noticed that diplopods fed on liquids exuding from carcasses and already flaccid tissues. Feugang Youmessi [14] and Tsafouet VII Wouking [65] also reported the presence of diplopods on rat and pig carrions respectively although they didn't give information on their feeding habits. Diplopods are known as macrodetritivores and are involved in the degradation of organic matter [4]; many species are also able to feed on dead animals [65, 66, 67].

As far as the composition of diplopod fauna is concerned, in the curent work, the occurrence *Haplothysanus chapellei* was highest in habitats 1 and 2 characterized by non-marshy soil. The species diversity was respectively higher in habitats 2, 4 and 3 which greatly differed in their environment. Blondel [68] stated that regardless of the site, heterogeneity is the variability of the environments giving rise to adaptive responses allowing the populations specific attributes which depend on the habitats they select. This mosaic structure of this area imposes different selection pressures which favor the colonization of the most favorable biotopes, by species whose distribution is of the rough size type. This was the case of *Aporodesmus* sp. which colonized habitats 1 and 2, *Spirostreptidae gen* sp habitats 3 and 4, and *Haplothysanus chapellei* which represented 91.11% of the total catching and colonized the four habitats. The highest abundance of millipedes occured in habitat 2 and the lowest in habitat 4 with marshy soil. It is suggested that moist or marshy soils are less favorable to diplopods. Moreover habitat 2 was a 4 years old fallow which could enable the settlement of non pioneer taxa [69]. Although in very low numbers, some diplopods seemed habitat specific. It was the case of *Urodesmus cornutus* in habitat 2, *Aporodesmus gabonicus* in habitat 3 with moist soil and *Thrinciulus laeveicollis* in habitat 4 with marshy soil. These three taxa were also attracted by only one decomposition stage : *Aporodesmus gabonicus* (active decomposition), *Urodesmus cornutus* (advanced decomposition) and *Thrinciulus laeveicollis* (skeletonization). They could also be qualified as decay stage specific and roughly determine the PMI.

Three orders of diplopods were identified during this study, the order of Spirostreptida was dominant representing 95.56% of the total catching in Malombo forest. The predominance of *H. chapellei* in all the sampled habitats can be explained by its large size compared to the other diplopods recorded; hence it can easily move, and disperse quickly over great distances and in all directions. This species could therefore be qualified as a permanent resident of these habitats. The family Odontopygidae has already been reported in Tchad Republic and Australia where it was recognized as noxious and detrimental to cultivated fields [70, 71] and in the houses of Yaounde, Cameroon [6]. This study underlies for the first the presence of diplopods and particulary Odontopygidae in covered pig carrions.

The greatest numbers of millipede individuals were observed during skeletonization (48.89%), advanced decomposition (37.03%) and active decomposition (8.89%). In this three stages *Haplothysanus chapellei* predominated at 47.41%, 32.59% and 5.93% respectively. It is suggested in one hand that these three stages and particulary the last two provide more ressources to millipedes, and in the other that better than diplopod species composition, succession and duration of decay stages could provide key information on the PMI. But diplopods need more interest in the forensic sciences despite the fact that no attention to date is brought to them in this field of research.

V. Conclusion

Diplopods constitute a taxonomically and ecologically diverse part of the carrions arthropod communities. The purpose of this study was to identify the diplopod communities colonizing covered pig carrions to gain a clearer idea of their diet that was not sufficiently studied. The species composition of diplopod fauna was influenced by the heterogeinity of the habitat, and dominated by one species *Haplothysanus chapellei*. We noticed that the succession and duration of decay stages, habitat and stage specificity provide key information in field studies and their potential application in forensic science. Science would greatly benefit from further studies of the biology of this taxonomic group in the resolution of criminal cases.

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