

# Identification of scavenging guilds of forensic importance in southern Quebec (Part 1)

Karelle Séguin<sup>1,2</sup>, Ariane Durand-Guévin<sup>1,2</sup>, Shari L. Forbes<sup>2,3,4</sup>

(1) Département d'Anatomie, Université du Québec à Trois-Rivières (UQTR), (2) Laboratoire de Recherche en Criminalistique  
(3) Département de Chimie, Biochimie et Physique, UQTR, (4) Centre interuniversitaire de criminologie comparée

## INTRODUCTION

Scavenging can affect the rate of human decomposition, and thus the postmortem interval (PMI) estimation, because scavengers contribute to alter human remains. The rate of decomposition is subject to many extrinsic variables in the area that human remains are found and it is crucial to **identify the local scavenging guilds** to consider their potential impacts during forensic investigations [1-3].

Many studies reporting the scavenging activity of mammalian and avian species are reported in the literature, but a **limited number** of these published studies have been carried out in Canada, and none in the province of Quebec. Most published studies were conducted in open environments and regions with warm and stable temperatures, which is **distinctly different to the region** of Quebec.

This study aims to: 1) determine which animal species belong to the scavenging guilds in southern Quebec; 2) assess the intensity of the scavenging; and 3) establish to what extent the remains are displaced from the initial site by scavengers.

## METHODS

- **Five pig carcasses** (≈ 60 kg) were used as analogues for human decomposition. The pigs were killed and placed on June 16, 2020.
- Each carcass was placed ≈ 100 m apart within a **natural maple forest** in the *Parc Industriel et Portuaire de Bécancour* (Quebec). They were placed in open spaces under the forest canopy, directly on the ground **without** any protection or tethering.
- The activity of animals was recorded by **continuous surveillance** (24 h) using two ultra compact trail cameras. Photographs and observations were also taken during daily visits to the site.
- **Data** for the scavenging events were compiled in an Excel file, i.e., the date, time of day, animal species, diet and diurnal period, length of the feeding event, any body movement by the scavengers, etc.

## Decomposition process

- The decomposition proceeded rapidly, and most carcasses had reached the dry remains stage by Day 16 (except pig 2 = Day 18).
- Although the dry remains stage was noted on Day 16 for most of the carcasses, the decomposition process was not complete by the end of the trial (Day 98).
- Most of the decomposition stages were observed first in the head and legs before the rest of the carcass.

## Scavengers

Table 1. Guild of scavengers and visitors by species.

Species	Diet <sup>1</sup>	Events	Average events/day	Percentage of total events/pig
*Turkey vulture	C	37	0.38	4.82
*Coyote	C	22	0.22	2.54
Cat	C	2	0.02	0.24
Rodent	O	219	2.23	21.09
American Robin	O	143	1.46	15.03
Hermit Thrush	O	155	1.58	13.94
Veery	O	84	0.86	12.16
*Crow	O	77	0.79	7.52
Squirrel	O	49	0.50	5.56
Raccoon	O	39	0.40	3.75
Wild turkey	O	23	0.23	2.64
Ovenbird	O	15	0.15	1.45
Blue Jay	O	14	0.14	1.34
Northern flicker	O	11	0.11	1.15
Bicknell's Thrush	O	3	0.03	0.50
Chipmunk	O	3	0.03	0.35
White-breasted nuthatch	O	3	0.03	0.39
Skunk	O	1	0.01	0.12
Deer	H	25	0.26	2.98
Hare	H	19	0.19	1.85
Moose	H	5	0.05	0.68

<sup>1</sup>C stands for carnivore, O stands for omnivore and H stands for herbivore.  
\*Refers to animals that actually fed from the remains.

## RESULTS

### Scavenging intensity

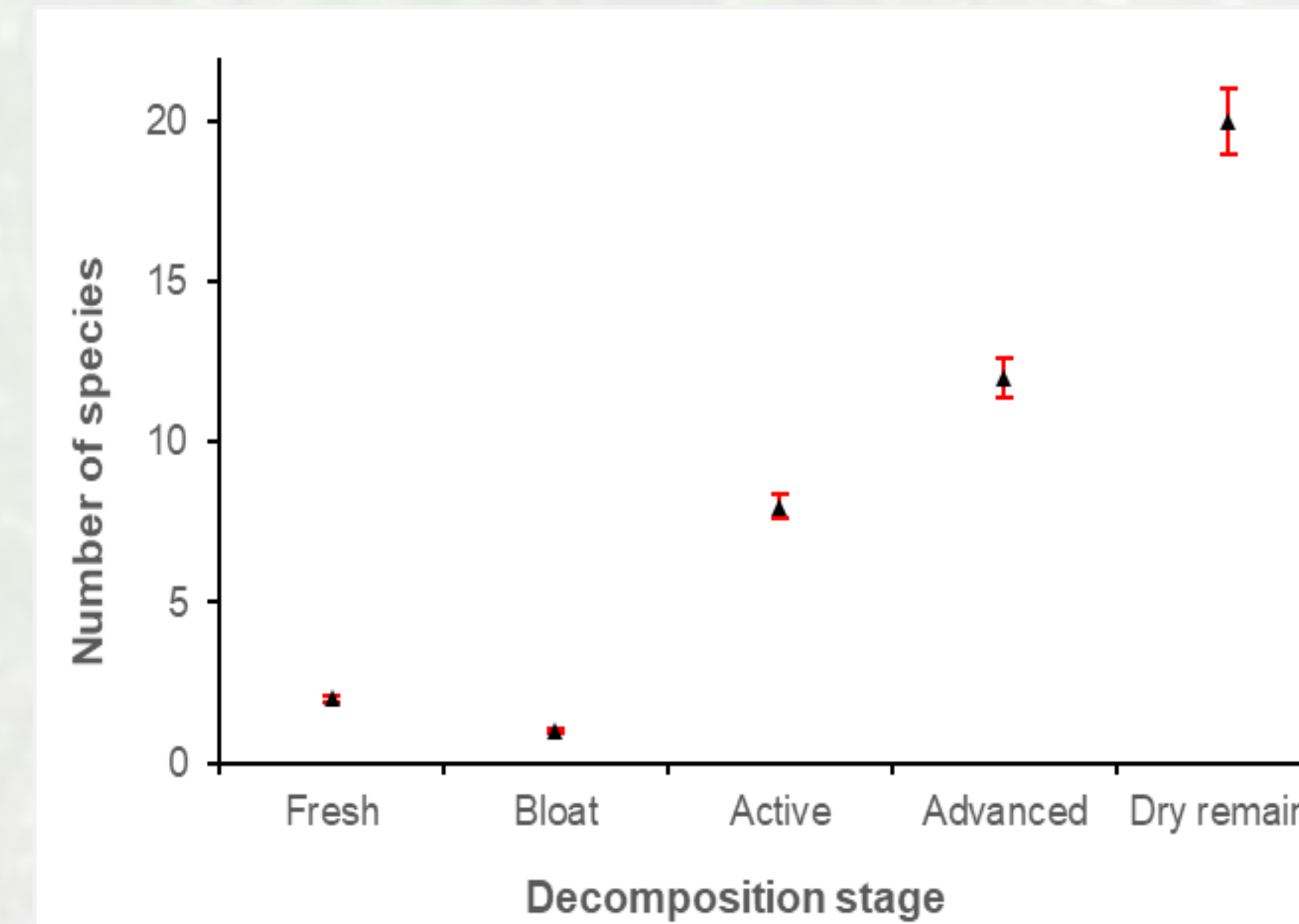


Figure 1. The average number of scavenger species by stage of decomposition.

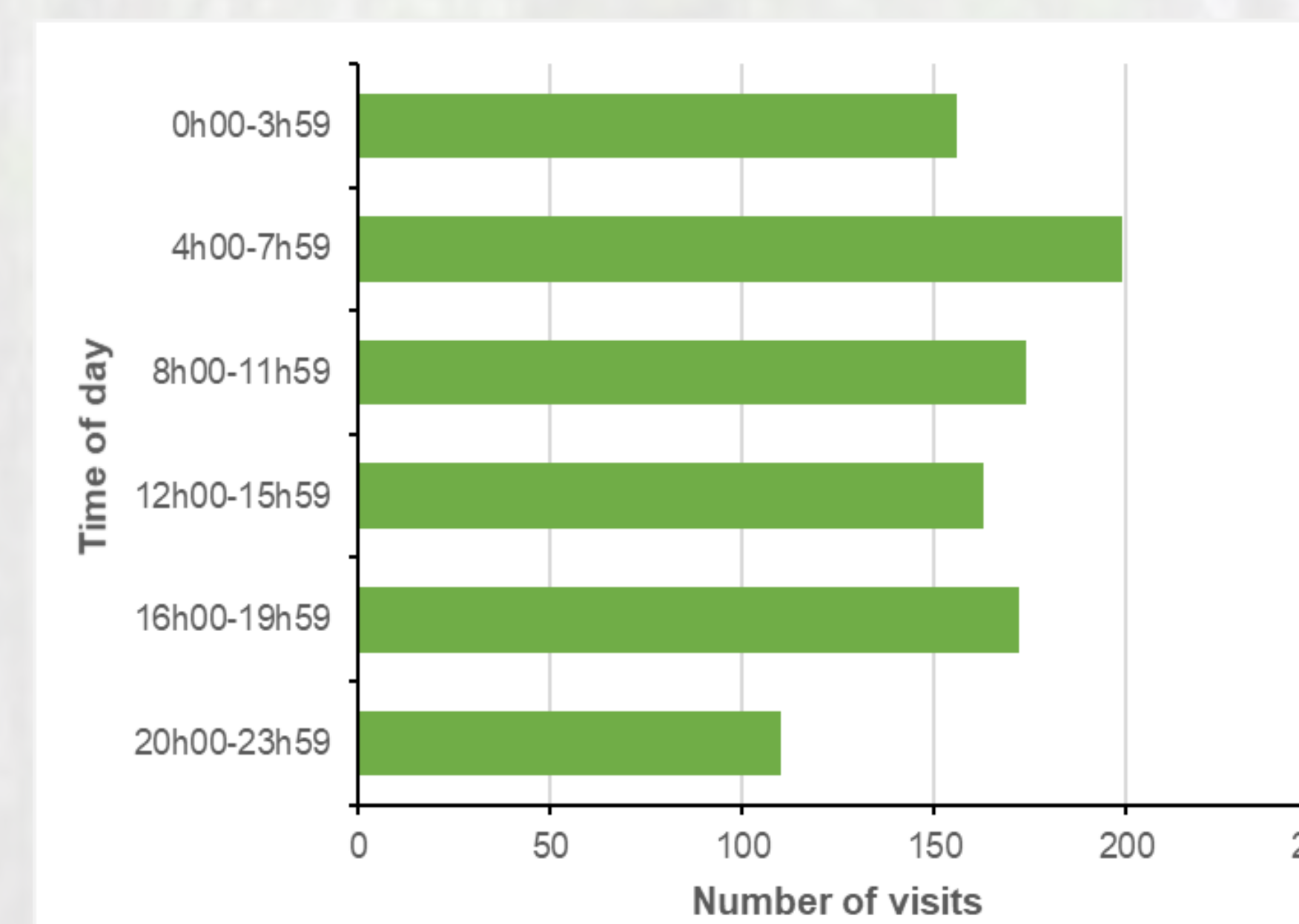


Figure 2. Visiting times to carcasses of all animal species and for all locations.

### Carcass movement



Figure 3 (A-B). Movement of carcass at various decomposition stages.

## DISCUSSION

While the results show that many animals will visit a carcass exposed in a forested environment, the scavenging guild in southern Quebec includes a narrow range of avian and mammalian scavengers.

Scavenging intensity, in general, was distributed randomly over a 24-hour period, however, was more prevalent in the day than in the evening. The activity near the carcasses was more important at the end of decomposition. Scavengers, specifically coyote and turkey vultures, were seen to move remains between 1 – 10 m from the deposition site.

These results could assist police and forensic services by providing a better understanding of the scavenging activity in southern Quebec. Such information can improve the estimate of PMI by considering the impacts of scavenging activity on human remains.

## REFERENCES

1. Haglund W, Reay D, Swindler D. Canid Scavenging/Disarticulation Sequence of Human Remains in the Pacific Northwest. *Journal of Forensic Sciences*. 1989;34(3):587-606.
2. Bright LN. Taphonomic signatures of animal scavenging in northern California: a forensic anthropological analysis: California State University, Chico, 2011.
3. Haynes G. Utilization and Skeletal Disturbances of North American Prey Carcasses. *Arctic*. 1982;35(2):266-81.

## ACKNOWLEDGEMENTS

Dr. **Christopher Watson** for his help with the statistical analysis.

The rest of the team of the Canada 150 Research Chair in Forensic Thanatology who lent a hand (and sweat) to transport the pig carcasses (**Pierre-Louis Arcand, Rushali Dargan, Gabrielle Harvey, Vanessa Moran, Darshil Patel, Emily Pecs, Marc-Antoine Perreault, and Eric Scazzosi**).

The **Canada 150 Research Chair** in Forensic Thanatology for funding this research.