IDENTIFICATION OF SCAVENGING GUILDS OF FORENSIC IMPORTANCE IN SOUTHERN QUEBEC

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INTRODUCTION

Scavengers are organisms that predominantly consume decaying tissue. They can alter the rate of decomposition, thus impacting the estimation of the postmortem interval (PMI). It is crucial to determine the scavenging guilds of a region to more accurately estimate the PMI and to understand their taphonomic impact on a body in operational investigations [1-3].

While there are numerous studies on scavenging guilds in a forensic context, most studies are carried out in open environments and in regions with warmer temperatures. However, in Canada there are very few published studies and no studies have been conducted in Quebec. Our extreme temperature variations throughout the year differentiate us from current studies, highlighting the need for a study in Quebec.

OBJECTIVES

This study aims to:

1) Determine which animal species belong to the scavenging guilds in southern Quebec during summer and fall, in a closed (forest) and open (grassland) environment, respectively;
2) Evaluate the intensity of the scavenging in both seasons; and
3) Establish any movement of the remains from their initial deposition site by scavengers.

METHODS

- Two trials were carried out from June to August (summer) and September to November (fall) 2020, in a closed and open environment.
- In both trials, five pig carcasses weighing ≈ 60 kg each, were used as analogues for human decomposition. The pigs were killed and placed on June 16 for the summer trial and September 15 for the fall trial.
- Each carcass was placed ≈ 100 m apart within rural land in the *Industrial Park and Port of Becancour* (Quebec). They were placed in open spaces, directly on the ground without any protection or tethering.
- The scavenging activity was recorded by continuous surveillance using ultra compact trail cameras. Photographs and observations were also taken during daily visits to the sites.
- 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.

RESULTS

Scavengers

Table 1. Guilds of scavengers and visitors by species and by trial.

Species	Diet[1]	Events	Average events/day	Percentage of total events/pig
Summer trial				
***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
Fall trial				
***Turkey valture**	C	171	1,70	25,55
Coyote	C	3	0,05	0,72
Weasel	C	2	0,03	0,32
Cat	C	1	0,02	0,16
***Crow**	**O**	**249**	**3,77**	**40,64**
***Skunk**	**O**	**42**	**0,64**	**16,02**
Black-capped chickadee	O	10	0,15	2,13
Wild turkey	O	6	0,09	1,42
Rodent	O	5	0,08	0,80
Deer	H	51	0,77	8,70
Hare	H	5	0,08	2,04
Moose	H	2	0,03	0,28

[1]C stands for carnivore, O stands for omnivore and H stands for herbivore.
*Refers to animals that actually fed from the remains.

Decomposition process

- The summer trial lasted 98 days and the fall trial lasted 66 days.
- The final stage of decomposition was noted on Day 16 (summer) and Day 27 (fall) for most carcasses, however the decomposition process was not complete by the end of both trials.
- Overall, decomposition proceeded more quickly in summer than in fall. Most of the decomposition stages were observed first in the head and legs before occurring in the rest of the body.

Summer vs Fall

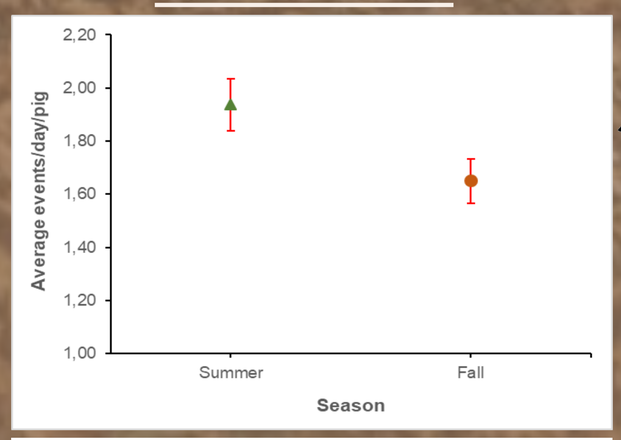

Figure 1. Mean intensity (events/day/pig) of scavenging for all scavenged carcasses during the summer and fall trials.

Scavenging intensity

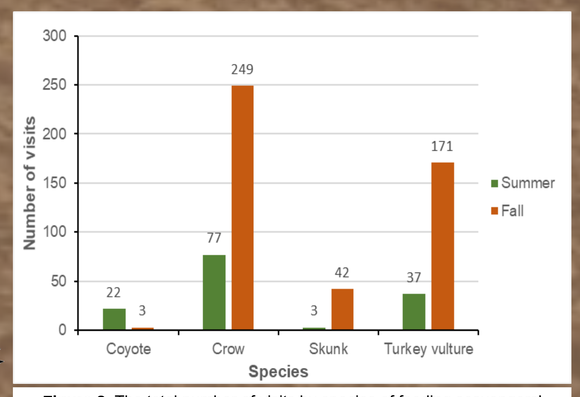

Figure 2. The total number of visits by species of feeding scavengers' (coyote, crow, skunk, and turkey vulture) and by trial.

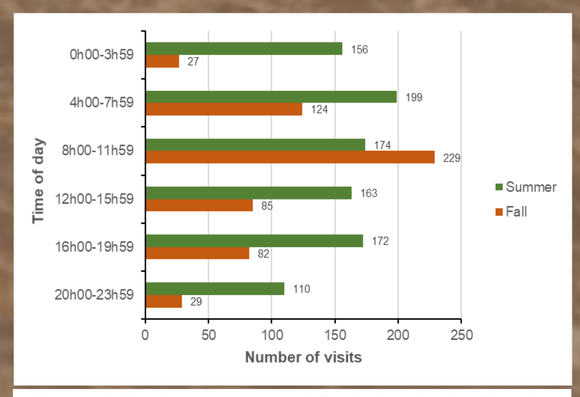

Figure 3. Visiting times to carcasses of all animal species, for all locations during summer and fall.

DISCUSSION

The results show that many animals will visit a carcass exposed in an open and closed environment. More species visited in summer, but both trials had the same number of species that fed on the remains or the associated insects.

Overall, the scavenging intensity was more predominant in summer than in fall. The crow and turkey vulture were the most active scavengers in both trials (more predominant in fall). The intensity of scavenging was distributed randomly over a 24-hour period, but more prevalent during the day for both trials. During the summer, coyote and turkey vulture moved the remains between 1-10 m from the initial site. However, there was no movement of remains during the fall trial.

These results could help police and forensic services by providing information about the scavenging activity in southern Quebec. It could improve the estimation of PMI by considering the taphonomic impacts of scavengers on human remains.

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