Dung Beetle (Coleoptera: Scarabaeidae) Abundance and Diversity in Alpaca Pastures in SE Virginia

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INTRODUCTION

- Dung beetles improve soil properties and enhance nutrient cycling (Nichols, 2008)
- Climate and dung type impact community composition
- No dung beetle surveys exist for Virginia
- Recent surveys in the mid-Atlantic focused on cattle (Bertone, 2004)

OBJECTIVE

To describe and document the dung beetle community in alpaca pastures

MATERIALS AND METHODS

- Study was conducted at Virginia State University, Petersburg, VA from May through August in 2010 and 2011
- Traps were baited with alpaca dung and collected after 24 hours
- Beetles were identified to species
- Relative abundance[1] and Shannon's Diversity Index[2] were used to describe the dung beetle community

$$^{2}H' = \sum_{i=1}^{S} (p_i \ln p_i)$$

H' = Diversity index
S = Number of species (species richness)
p_i = [1]Relative abundance (n_i / N) of species *i*
n_i = Abundance of species *i*
N = Total number of individuals collected

Figure 1. Pitfall trap baited with alpaca dung (left) and captured beetles being transferred into Ziploc bag for later identification (right).

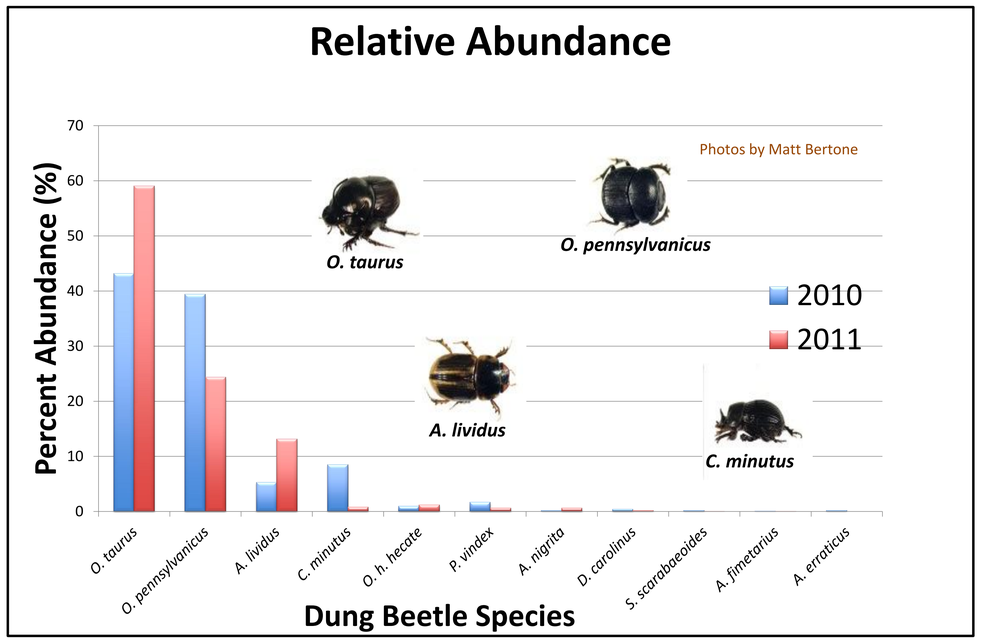

Figure 2. Relative abundance of dung beetle species collected in 2010 and 2011.

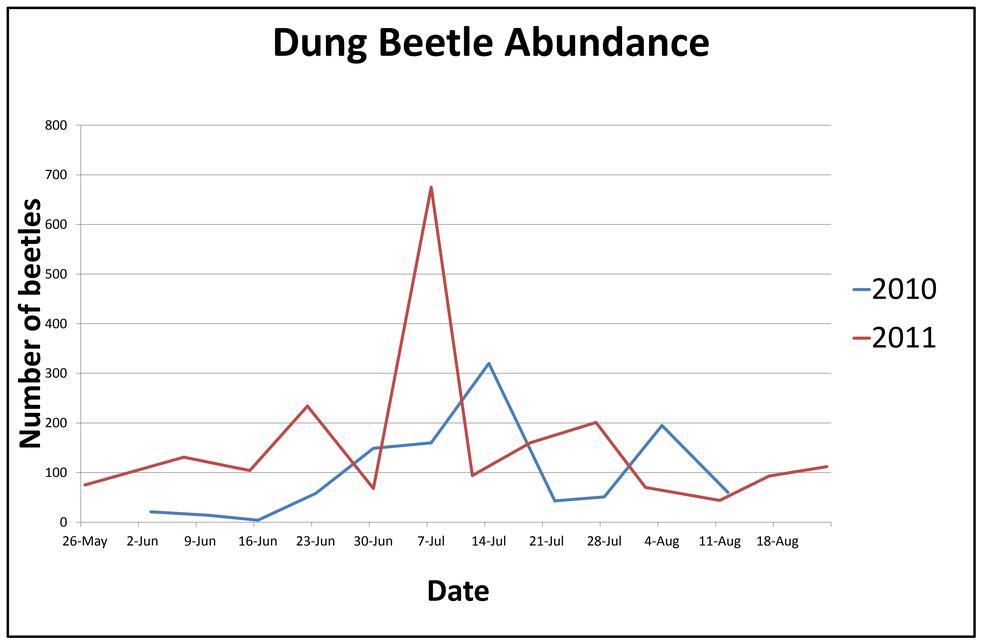

Figure 3. Number of dung beetles collected weekly in 2010 and 2011.

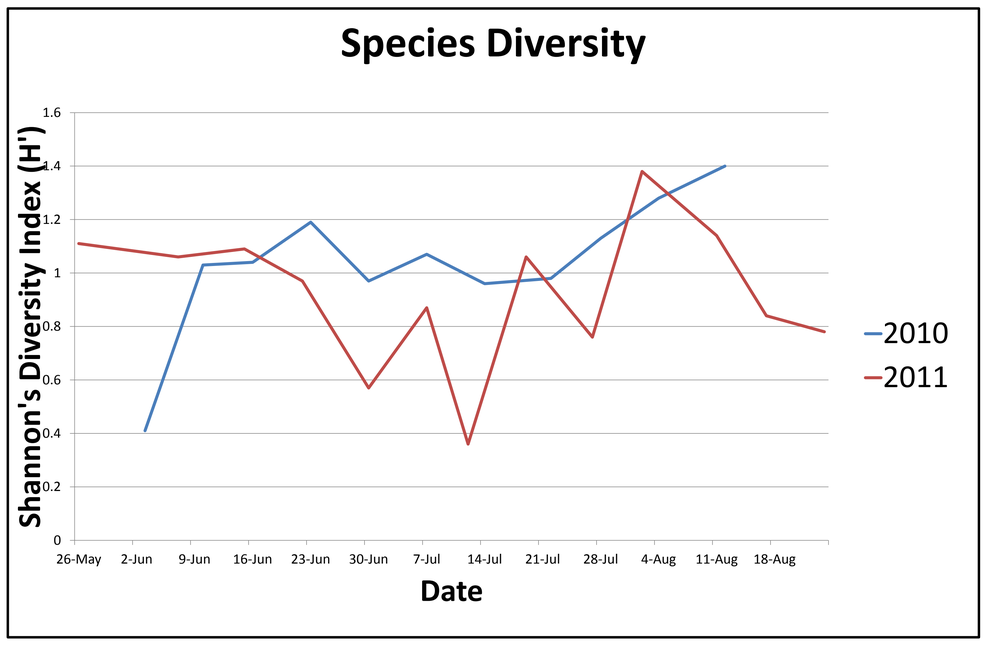

Figure 4. Diversity of the dung beetle community in 2010 and 2011.

Table 1. Dung beetle species collected, by origin and nesting type.

Species	Origin		Nesting Guild	
	Native	Exotic	Dwellers	Tunnelers
A. erraticus		Europe	X	
A. fimetarius		Europe	X	
A. lividus		Europe	X	
A. nigrita		Europe	X	
C. minutus	X			X
D. carolinus	X			X
O. h. hecate	X			X
O. pennsylvanicus	X			X
O. taurus		Europe, Asia		X
P. vindex	X			X
S. scarabaeoides		Europe	X	

SUMMARY

- Diverse and abundant dung beetle populations exist in alpaca pastures in southeastern Virginia
- Exotic dung beetle species do not appear to be detrimental to native populations
- Dung beetles are just one of many components of a healthy grassland ecosystem that must be managed simultaneously

Literature Cited

Bertone, M.A. 2004. Dung beetles (Coleoptera: Scarabaeidae and Geotrupidae) of North Carolina cattle pastures and their implications for pasture improvement. PhD Dissertation. North Carolina State Univ., Raleigh, North Carolina.

Nichols, E., S. Spector, J. Louzada, T. Larsen, S. Amezquita, M.E. Favila. 2008. Ecological functions and ecosystem services provided by Scarabaeinae dung beetles. Bio. Cons. 141: 1461-1474.

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