

The Rawls Course and Urban Lagomorphs: Recommendations to Reduce Wildlife Damage



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Background

In urbanized areas, green spaces provide important refuge for wildlife. In these developed areas, golf courses can provide food, shelter, and water for wildlife, and in turn, wildlife viewing opportunities for golfers. However, wildlife can cause problems, such as turf damage. This creates conflict for grounds superintendents who must balance environmental stewardship with golf course management.

Introduction

The Rawls Course at Texas Tech University (TTU) actively supports their wildlife populations but had problems with jackrabbits and cottontails (lagomorphs; Fig. 3) digging up and eating (denuding) large areas of vegetation during the dry winter months of 2017-18 (Fig. 1 and 2). We partnered with the course to study the problem and recommend strategies to avoid this damage. Specifically, we address how the choice of turf (grass species) and location of vertical hiding cover affect the extent of damage to the turf. We hypothesize that lagomorphs are selecting for certain turf species over others due to differences in palatability to grazers (as assessed by the USDA). We also hypothesize that the amount of damage that lagomorphs cause increases with proximity to cover.

Methods

- Study site: Rawls Course at TTU, 2,120,000 m² (Fig. 1)
- Assessed extent of damage at foraging sites (Fig. 2)
- Ranked turf palatability (USDA plants database) (Table 1)
- Analyzed data using appropriate non-parametric tests (IBM SPSS). Note that:
 1. Natural areas are not included in chi-square tests of habitat selection because of unequal survey effort.
 2. Data for palatability and proximity to cover for 2018 and 2019 were tested separately and then as a single set. As there were no differences in interpretation of results, we present the combined analyses.



Fig. 2: Brice Martin (left) collecting field data on extent and position of damaged turf (middle). J. Young and R. Bermea discussing the damage (right).



Fig. 3: Study species: Cottontail (*Sylvilagus* spp.; left) and Black-tailed Jackrabbit (*Lepus californicus*; right). Photo credits: © U. Fitten 2018.

Results

- More damage during 2017 than 2018 (Table 1)
 - Winter 2017: 507 patches, 11,423 m²
 - Winter 2018: 108 patches, 481 m²
- Damage occurred more often in palatable turf than expected given availability (2017 and 2018 respectively: $\chi^2 = 114.6$, $df = 1$, $p < 0.0005$; $\chi^2 = 22.2$, $df = 1$, $p < 0.0005$; Table 1)
- Size of damaged patches was positively associated with
 - Turf palatability (Kruskal-Wallis = 20.9, $df=2$, $p < 0.0005$; Fig. 4)
 - Proximity to trees (Spearman $r = -0.113$, $p = 0.005$; Fig. 5)

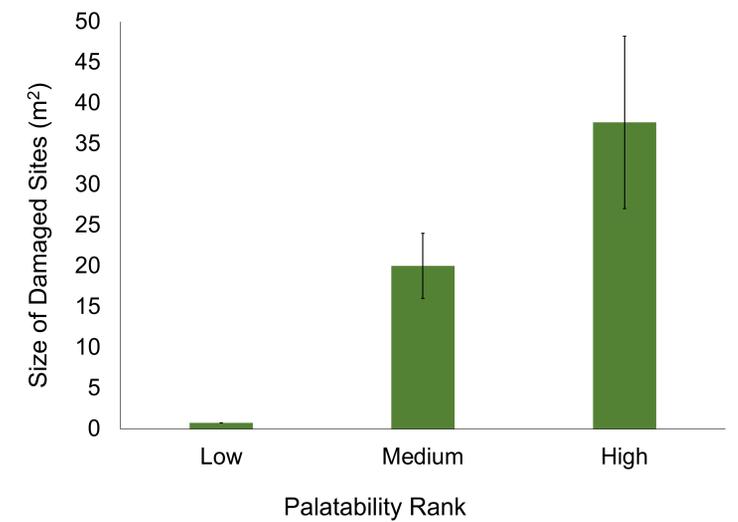


Fig. 4: Grass species that were more palatable had larger areas of damaged turf.

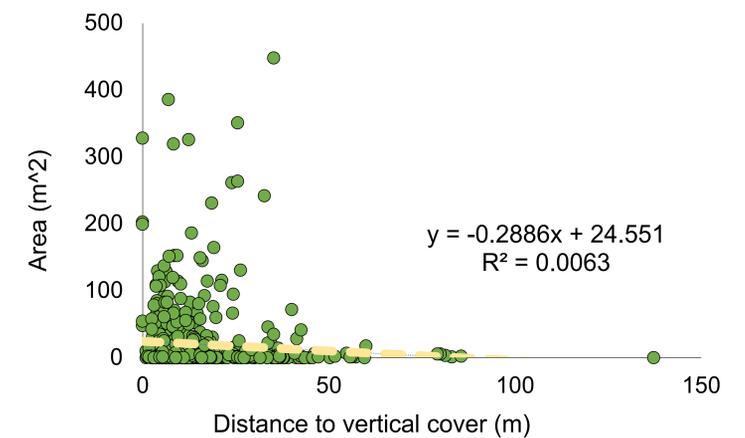


Fig. 5: Larger damaged sites were closer to vertical cover.

Table 1: Golf course turf species, their palatability, and the number of foraging sites denuded of vegetation.

Zone	Total Area m ²	Species	USDA Palatability	2017 Damaged m ² (count)	2018 Damaged m ² (count)
Green	16,200	<i>Agrostis stolonifera</i> , <i>A. palustris</i>	Low	2.28 (3)	0 (0)
Fairway	161,900	<i>Cynodon dactylon</i>	Medium	422 (45)	48.81 (24)
Rough	153,800	<i>Cynodon dactylon</i>	Medium	9,231.35 (399)	284.45 (65)
Tees	32,400	<i>Cynodon dactylon</i>	Medium	558.28 (33)	0.25 (2)
Natural	667,700 *		High	1,209.50 (29)	147.84 (10)

**Cynodon dactylon*, *Paspalum notatum*, *Festuca ovina*, *Bouteloua curtipendula*, *Bouteloua gracilis*, *Schizachyrium scoparium*, *Andropogon gerardii*.



Fig. 1: Study site and evidence of lagomorph foraging visible even with regrowth, Google Earth, May 2018.

Discussion

Rabbits and hares responded positively to food quality and cover when selecting foraging sites. We suggest using less palatable grass species on playing areas and planting vertical cover only in non-playing spaces to reduce damage from grazers. Our suggestions are passive forms of wildlife management that focus on modifying availability of resources such that jackrabbits and cottontails are diverted to areas that are less economically valuable. This approach supports wildlife viewing opportunities for golfers and may reduce the need for more expensive active management, such as spraying chemical deterrents or direct population control, which are currently employed by golf courses.

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