Using small ruminants to improve forage availability in Michigan equine pastures

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Introduction

An equine farm and business owner identified the issue of invasive plant species reducing the availability of desirable forage in equine pastures. Investigation of two methods, mechanical and chemical means to control invasive plant species proved to be either too expensive or not well advised due to possible environmental contamination regarding water quality, therefore, leaving biological means of utilizing goats to browse invasive plant species as a remaining option.

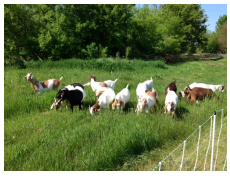
Objective

To investigate the effectiveness of utilizing goats to browse and defoliate invasive plant species to improve forage availability in equine pastures.

Materials and Methods

Fifteen Boer goat cross yearling does (Picture 1) were purchased from a single source. A three phase process was implemented from May 2016 to September 2016 that included an acclimation (9 d), transition (11 d) and reclamation (93 d) phase. The 9 d acclimation period served the purpose to ensure goats, residing equine, farm owner and farm business clientele had the opportunity to adjust to one another. On d 2 of the acclimation phase, individual goat health assessments were conducted by a veterinarian. The transition phase consisted of an 11 d period to assess goat browsing skill and behavior. A 1.21 ha study area was identified for the 93 d reclamation phase.

Picture 1.



Picture 2.

During the 93 d reclamation phase (June 2016 to September 2016) goats were allowed to browse the 1.21 ha study area 12 h per d. Goats were penned in a 58 m^2 area (Picture 2) for the remaining 12 h to protect against predators. During the 12 h housing period goats were fed an average of 0.11 kg of corn and 0.23 kg of grass hay per goat/day.

Materials and Methods, Con't

Goats were individually weighed on a digital livestock platform scale on d 2 after arrival (40.8 kg average) and every 21 d throughout the 113 d three phase period for health assessment and management purposes. Digital documentation of goat browsing progress and defoliation of available browse was recorded at identified plots (n= 18) throughout the study area on d 0, 30, 60 and 90, respectively.

Results

During the 9 d acclimation phase, horse - goat interactions resulted in horses becoming excited (Picture 3). However, by the end of the 113 d three phase period, horses became tolerant of goat presence (Picture 4).

Picture 3.

Picture 4.

Goats maintained weight on available browse Table 1), averaging 41.1 kg on d 1 compared to 41.2 kg on d 93 of the reclamation phase.

Table 1. Average goat weights over 113 days.

Weigh Dates	5 -13	6 – 1	6 – 22	7 – 13	8 – 3	8 – 24	9 - 2
Average weight, kg	40.8	41.1	40.6	40.7	41.1	41.5	41.2

Initial prevalence of invasive plant species (Autumn olive, Buckthorn and Multiflora rose) encompassed 50% of the study area compared to 10% desirable plant species. Various other plant and tree species accounted for the remaining 40%. Digital documentation and visual assessment of plant defoliation at each respective identified plot on d 90 compared to d 0 revealed that 90% of available browse was consumed by goats.

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Pictures 5 – 10 illustrate goat browsing progress at identified plots on d 0 and d 90, respectively.

Picture 5. Plot 1A on d 0

Picture 6. Plot 1A on d 90

Picture 7. Plot tiles on d 0

Picture 8. Plot tiles on d 90

Picture 9. Plot 1B on d 0

Picture 10. Plot 1B on d 90

Conclusion

Small ruminants such as goats are effective at defoliating invasive plant species. Defoliation of underbrush allows for time efficient clean up and clearing work to reclaim a once established equine pasture.

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Arbor Meadow Farm