Forage Biomass Production under Different Stocking Rates and Stacking Densities on a Namibian Livestock Farm

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Introduction

- Forage biomass production in Namibian savanna rangelands is low and varies in space and time, which calls for flexible, adaptive and responsive grazing strategies.
- Current rangeland management often relies on setting annual stocking rates (SR) to match rangeland carrying capacity (CC).
- More recent reportedly successful grazing strategies rely on flexible adjustment of stocking density (SD) often lack scientific endorsement.
- We therefore studied responses of forage biomass production to increased SR or increased SD

Results:

Terms

Forage biomass = annual and perennial grasses, legumes, forbs
Yield = forage biomass as measured each year in May (t DM/ha)
Output = yield + hypothetically consumed biomass for each year (t DM/ha)
Hypothetically consumed biomass = estimated forage intake in kg DM (3% of LW / d) x avg. stocking rate [kg LW / ha and year] x 365.

1) Forage yield and output

- Changes in biomass production reflected varying precipitation
- Absolute yield was highest following increased SD
- Output following increased SD or SR was higher than in Control (C)
- Relative yield and output shows advantages of increased SD over both, increased SR and C after 3 years of treatment

2) Forage composition

- Under increased SR, the share of perennial grasses was lower while the share of annual grasses was higher
- Increased SD was similar to C
- The share of legumes and forbs was <21%

3) Standing dead and litter accumulation

- Increased SR or SD showed lower absolute accumulation than C
- Relative accumulation of standing dead biomass was lower under increased SD (46%) than under increased SR (150%) and C (143%; 2014 = 100%)

Study location

- Farm Springbockvley: 9,500 ha Namibian Accacia-savanna, Ø 260 mm annual rainfall (peak Dec – Apr)
- About 890 Nguni cattle (Ø 290 kg per head) and 3,700 Damara sheep (Ø 35 kg per head) split into 3 herds
- Organic Standards and Holistic Management

Study design

- 3 treatments were studied at 4 locations (replications)
- 3 herds (cattle and/or sheep) grazed each paddock about once per year with at least 80 days resting between grazing events
- Destructive biomass sampling and then sorting by species, drying and weighing was done each year in May from 2014 (reference) to 2017