

Effect of stocking rate on performance, diet selection and apparent total-tract digestibility among heifers grazing cover crops

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Land Usage Change

- U.S. Northern Great Plains
 - 1,096,000 ha loss 2008 to 2012
- Iowa – 9,029 ha
- Minnesota – 5,042
- North Dakota – 4,012
- South Dakota – 10,983
 - **Total – 33,686 ha of new cropland (2011 to 2012)**

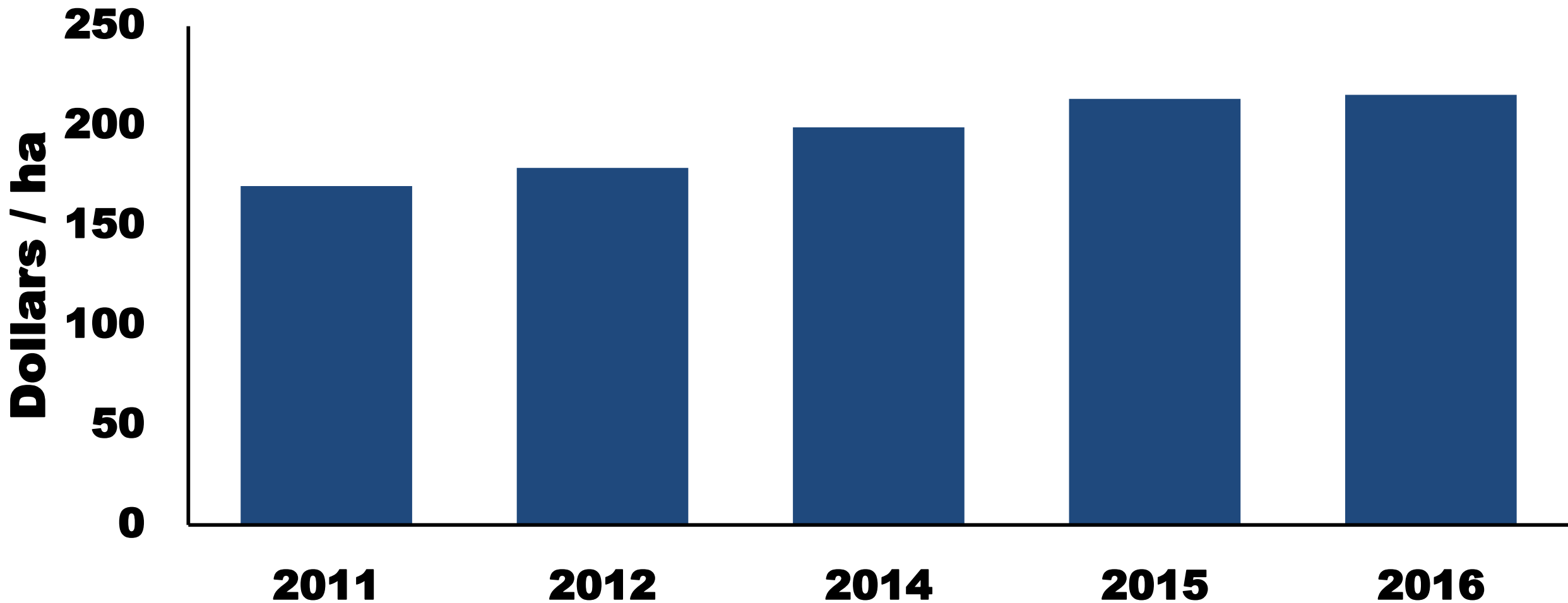


Why The Change?

- Prices
 - 2012
 - Cattle- February Feeder USD \$86.59 / kg
 - **Corn- August USD \$7.63 / bu**
 - 2014
 - Cattle- October Feeder USD \$128.91 / kg
 - Corn- April USD \$4.71 / bu
 - Current
 - Cattle- November Feeder Cattle USD \$57.26 / kg
 - Corn- July USD \$3.53 / bu



Pasture Rent

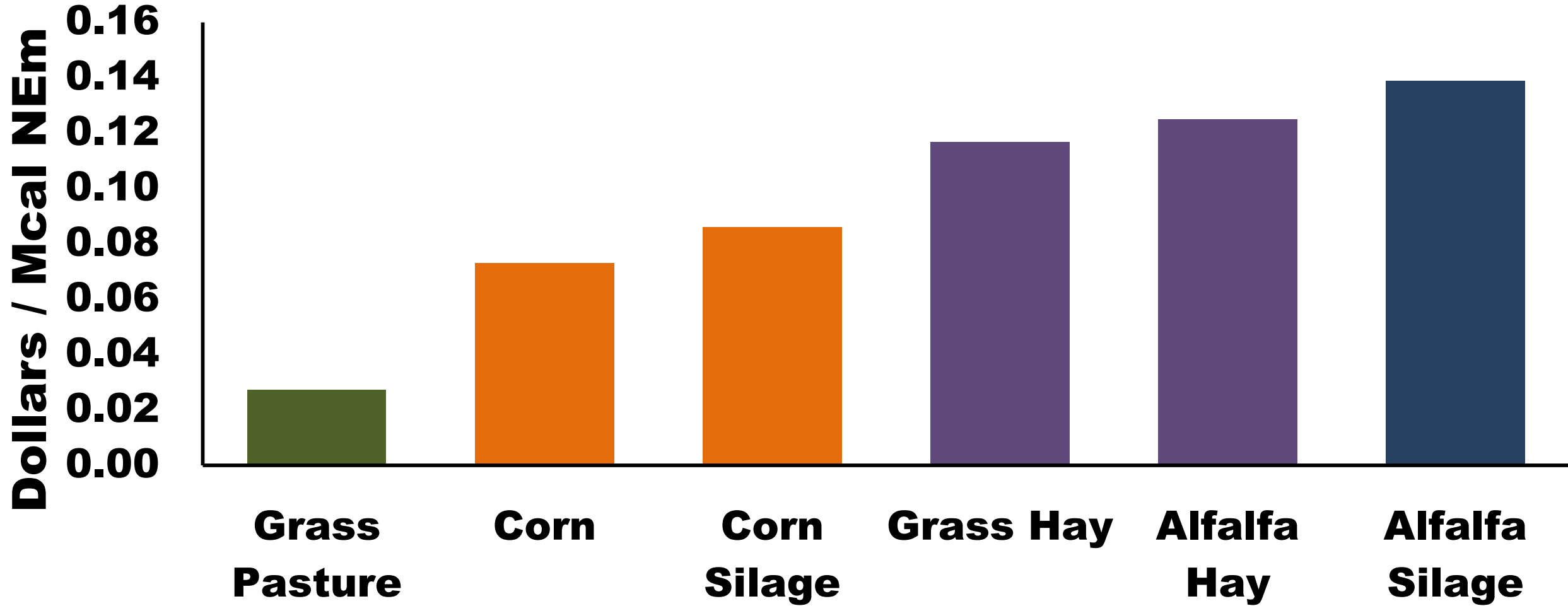


Impact on the cow-calf industry

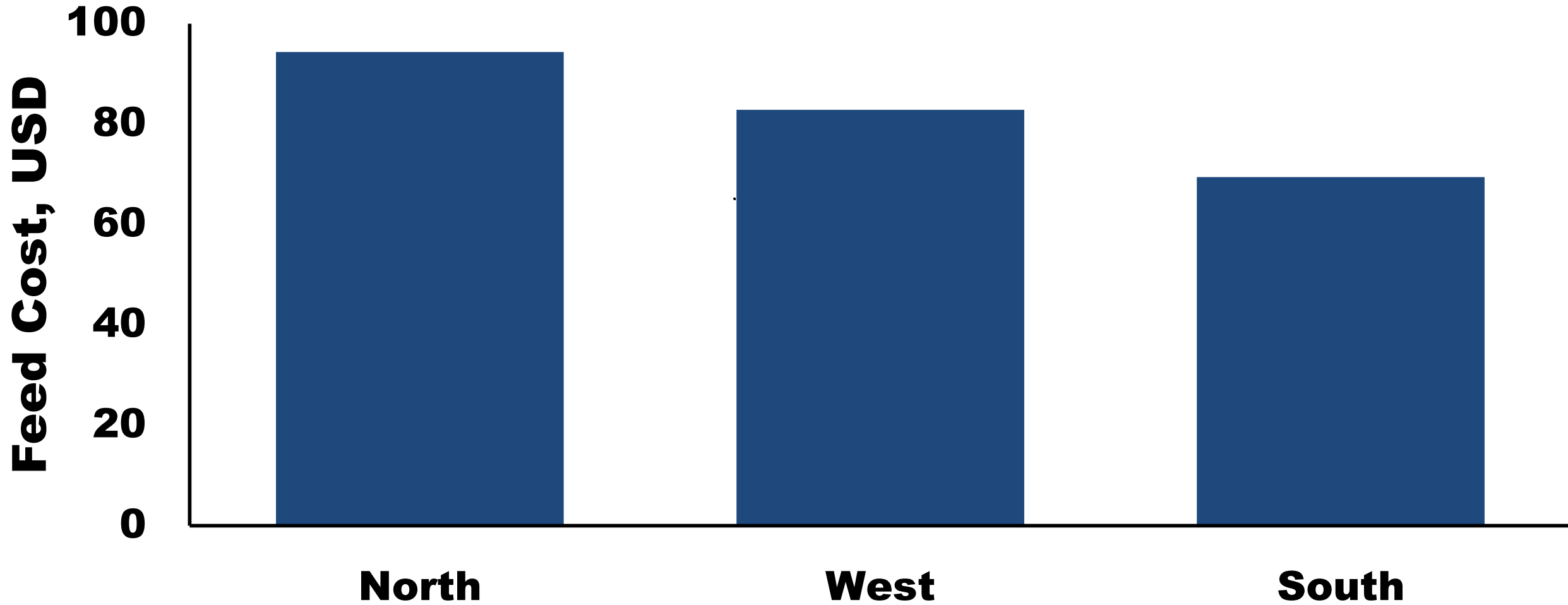
- Segmented production of cattle and row crops.
- Could limit national cattle carrying capacity
- Increase Cow-calf production costs



Grazed vs Harvested Resources



U.S. Cow Feed Costs By Region

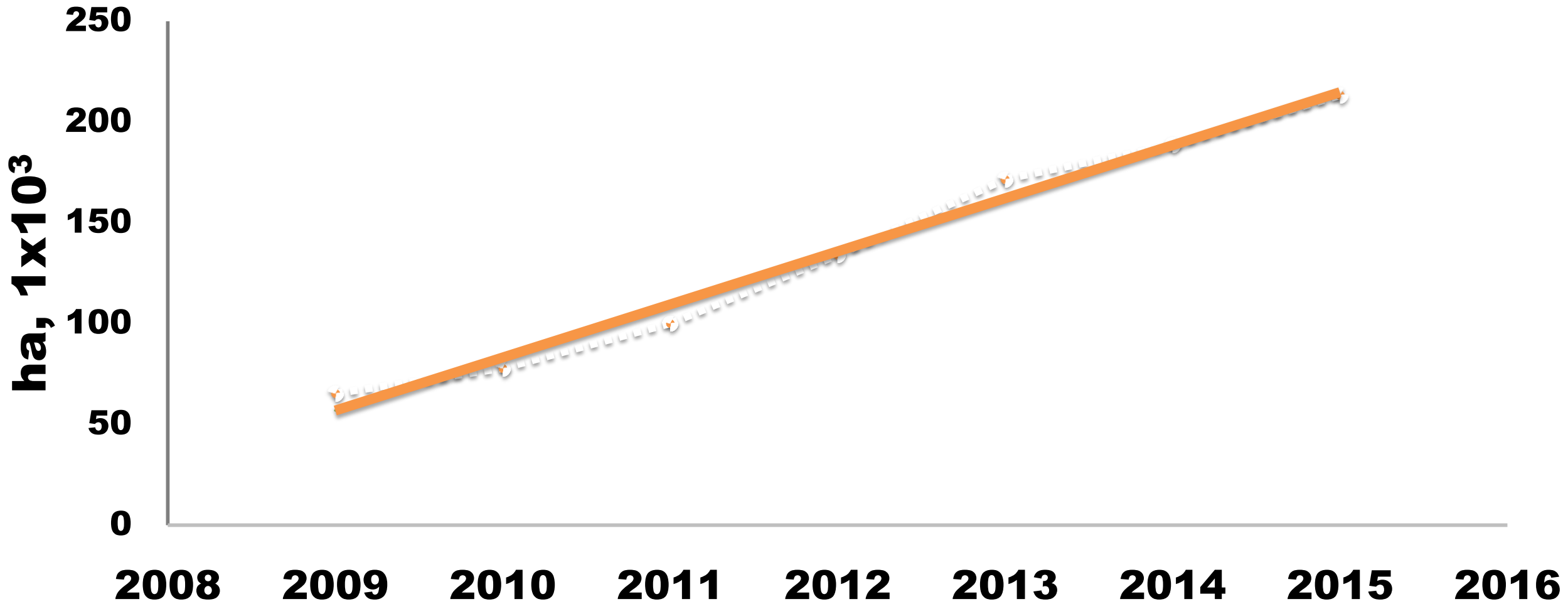


How To Extend The Grazing Season?

- Graze crop residue
- Graze cover crops
 - U. S. Department of Ag says...
 - *A cover crop is a crop generally recognized by agricultural experts as agronomically sound for the area for erosion control or other purposes related to conservation or soil improvement.*



Increase in U.S. Cover Crops



Where



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Adapted from Watts, SARE, 2015

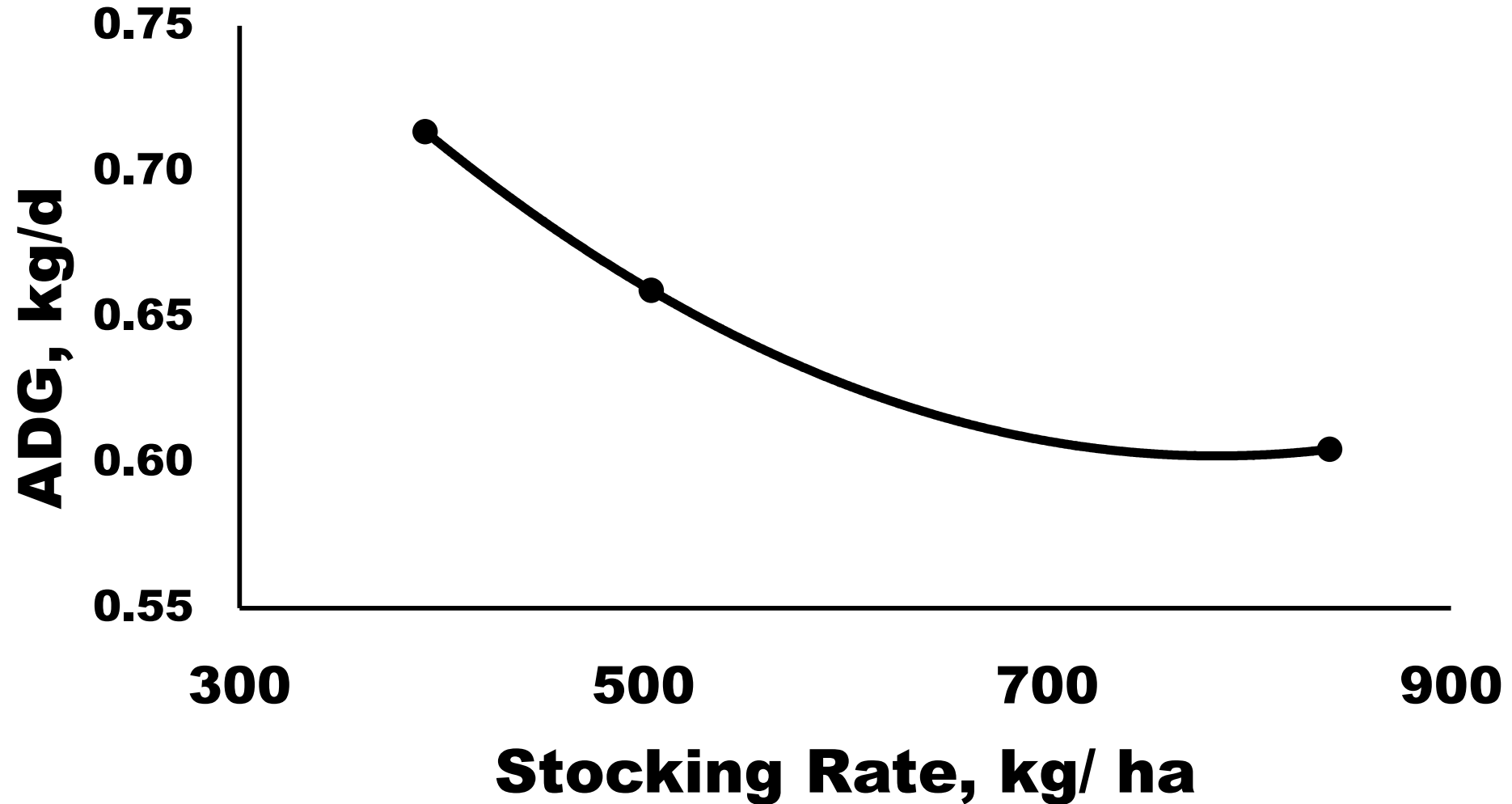
North American Wheat Production



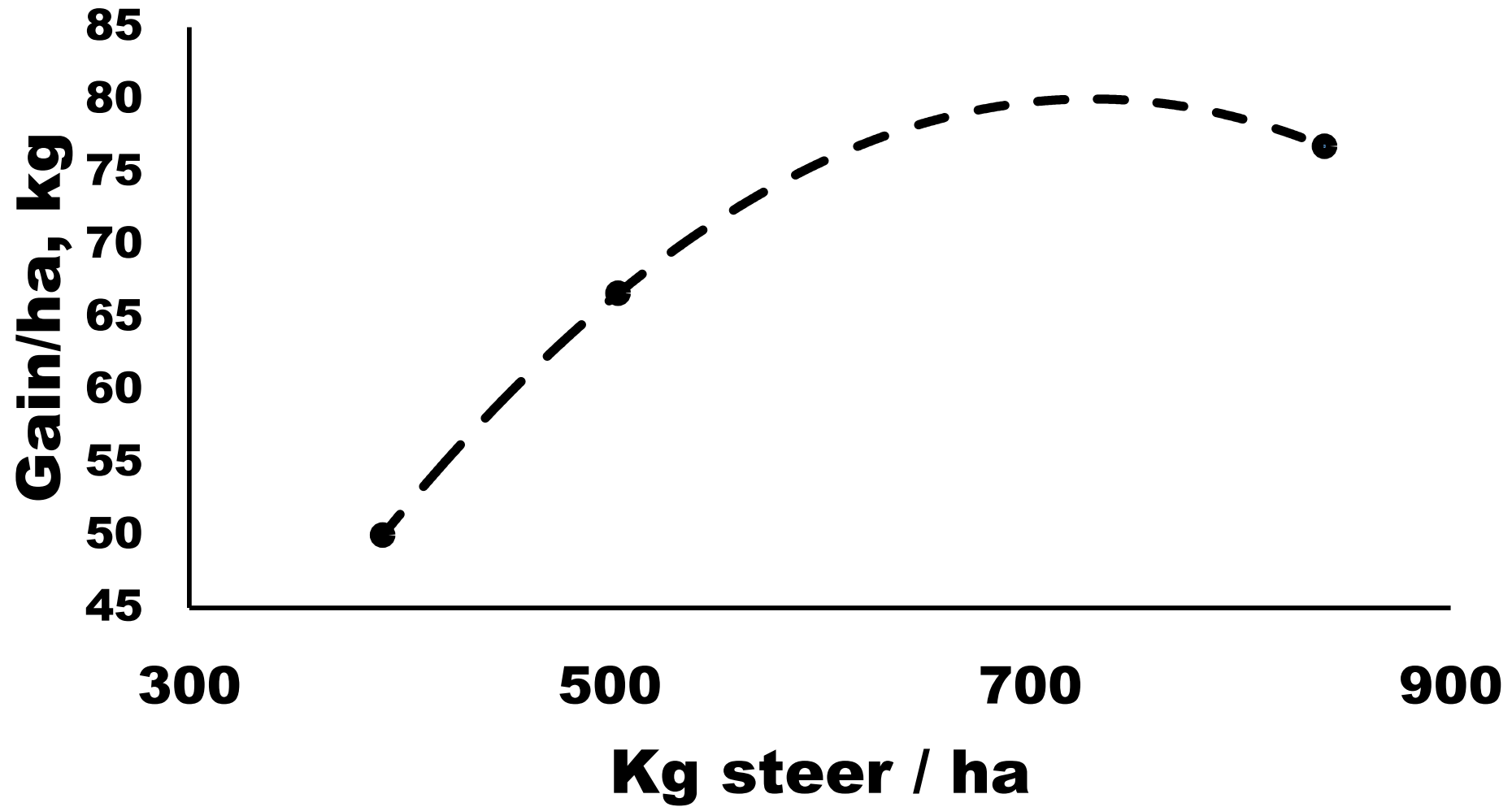
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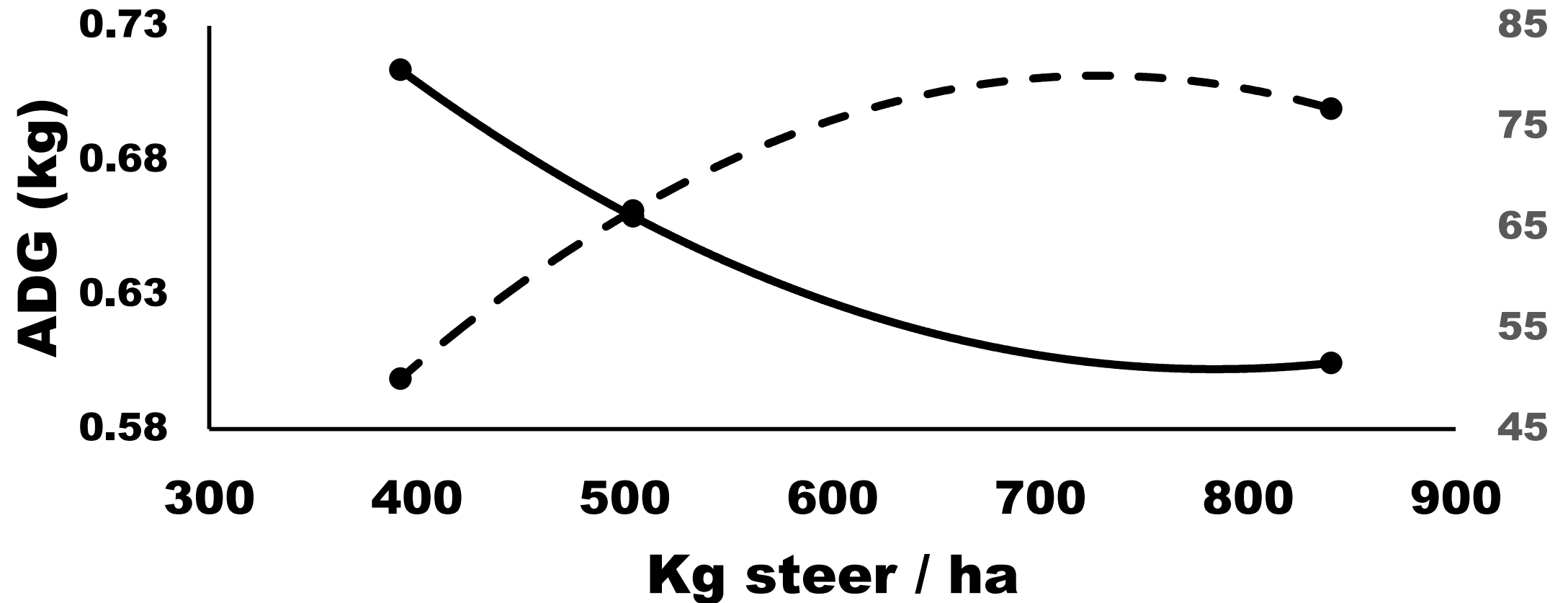
Stocking Rate and Performance



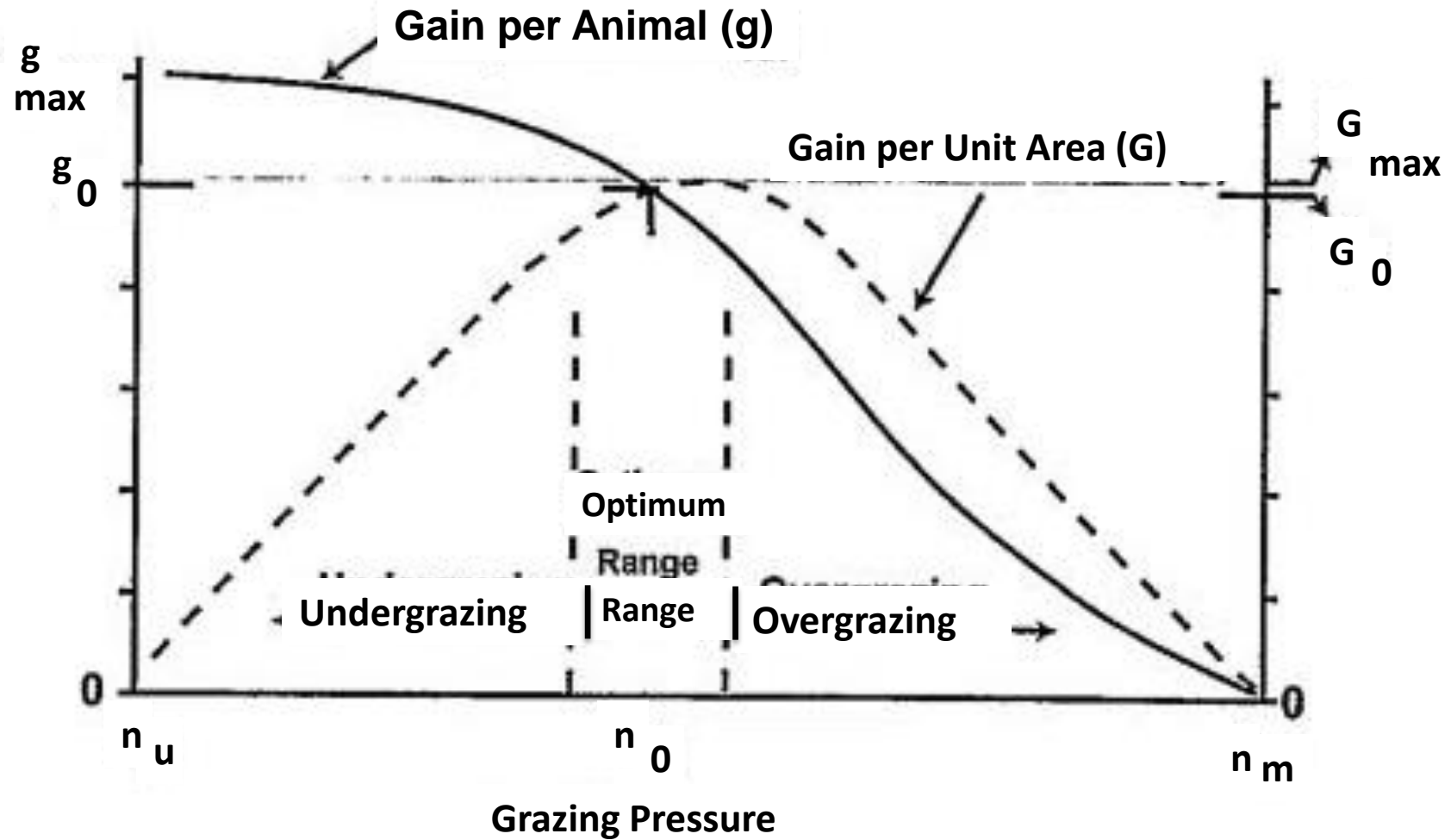
Stocking Rate and Performance



Stocking Rate and Performance



Stocking Rate



Objective

- Determine effect of stocking rate among heifers grazing a cover crop mix
 - Diet selection
 - Diet digestibility
 - Performance



Experimental Design

- 48 weaned heifers
- 67% Annual Ryegrass, 20% Radish, 13% Turnip
 - 48d
- 3, 4 or 5 heifers
 - 1.7, 2.3, 2.9 AUM/ha

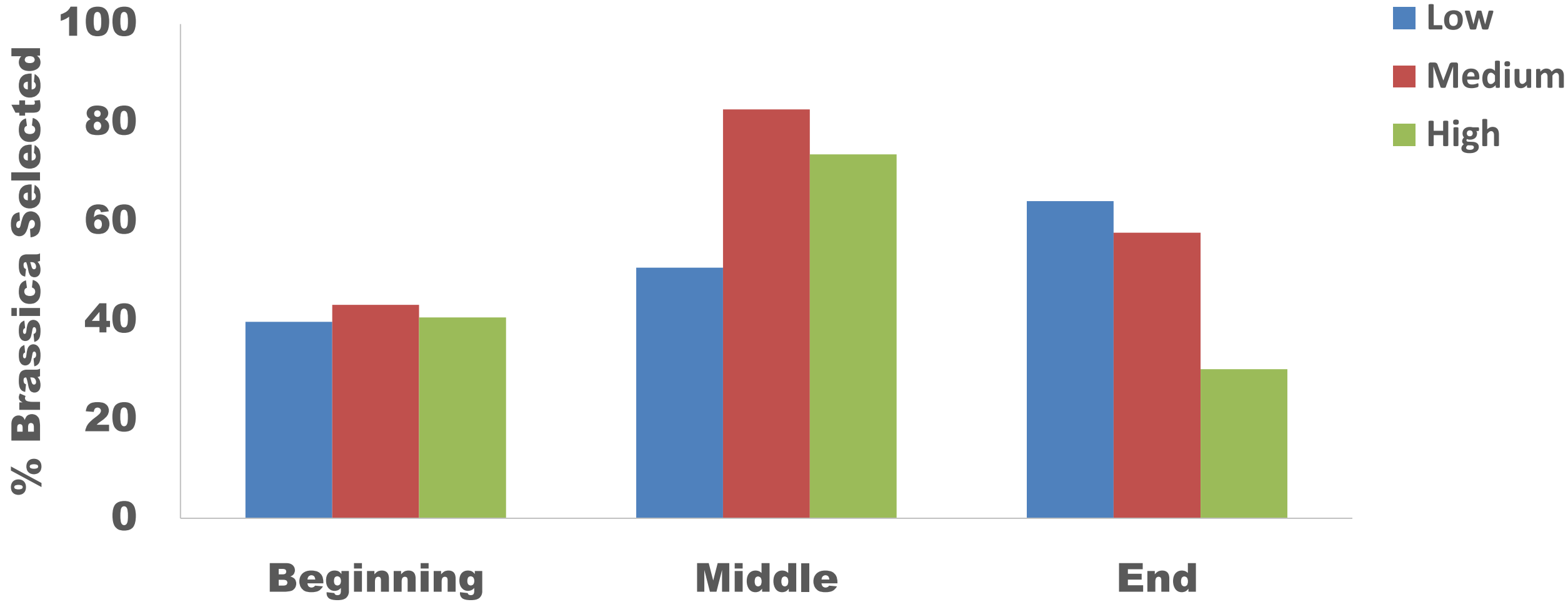


Forage composition

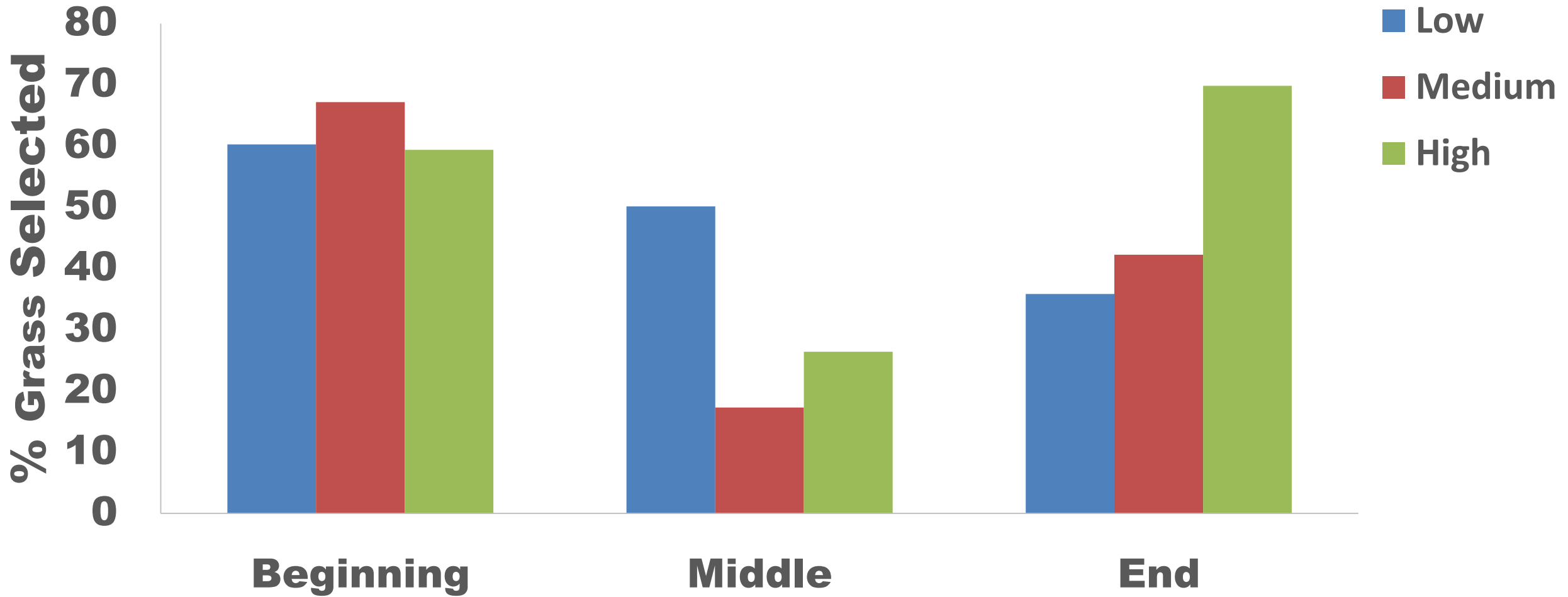
Forage	OM, %	CP, %	NDF, %
Brassica	81.3	13.8	26.5
Grass	83.2	9.3	60.8



Forage Consumption



Forage Consumption



Nutrient Selection

% DM	Time			Contrasts	
	Initial	Intermediate	Final	Linear	Quadratic
OM	82.0	84.6	81.2	0.45	<0.01
NDF	48.2	35.5	42.8	0.11	<0.01
ADF	33.6	32.8	34.1	0.82	0.61



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Nutrient Selection

% DM	Stocking Rate, AUM × ha ⁻¹			Contrasts	
	1.7	2.3	2.9	Linear	Quadratic
OM	82.7	82.1	83.0	0.90	0.71
NDF	41.2	41.2	44.1	0.25	0.52
ADF	33.4	33.2	34.0	0.48	0.49



Digestibility

Item	Stocking Rate, AUM × ha ⁻¹			Contrasts	
	1.7	2.3	2.9	Linear	Quadratic
DMI, kg	6.0	9.1	8.2	0.07	0.05
Digest., %					
DM	67.8	83.3	79.7	0.01	0.02
OM	76.7	87.7	84.8	<0.01	<0.01
NDF	69.0	80.0	80.0	<0.01	0.03
ADF	74.1	83.7	80.5	0.12	0.08



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Period ADG

kg	Stocking Rate, AUM × ha ⁻¹			Contrasts	
	1.7	2.3	2.9	Linear	Quadratic
0-22d	0.3	0.1	0.1	0.05	0.24
22-48d	1.1	1.2	1.0	0.69	0.16



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Overall	0.7	0.6	0.6	0.15	0.78



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