The Effects of Finishing Practices on Bison Meat Nutrient Density

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A half truth to the saying, you are what you eat!

Article

A reference map of potential determinants for the human serum metabolome

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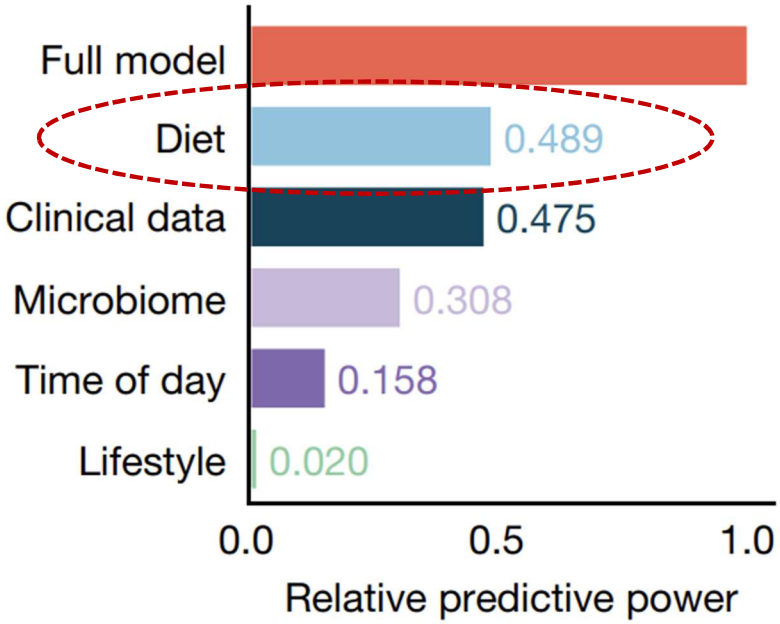
Noam Bar[1,2,81], Tal Korem[1,2,3,4,5,81], Omer Weissbrod[1,2,6], David Zeevi[1,2,7], Daphna Rothschild[1,2], Sigal Leviatan[1,2], Noa Kosower[1,2], Maya Lotan-Pompan[1,2], Adina Weinberger[1,2], Caroline I. Le Roy[8], Cristina Menni[8], Alessia Visconti[8], Mario Falchi[8], Tim D. Spector[8], The IMI DIRECT consortium*, Jerzy Adamski[9,10,11], Paul W. Franks[12,13], Oluf Pedersen[14] & Eran Segal[1,2]✉

I am what I ate?



About 50% of what circulates in the human body is determined by what we eat

Linking plant compounds, animal health and human nutrition

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Journal of Animal Science and Biotechnology

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Pasture-finishing of bison improves animal metabolic health and potential health-promoting compounds in meat

Stephan van Vliet, Amanda D. Blair, Lydia M. Hite, Jennifer Cloward, Robert E. Ward, Carter Kruse, Herman A. van Wietmarchsen, Nick van Eekeren, Scott L. Kronberg & Frederick D. Provenza

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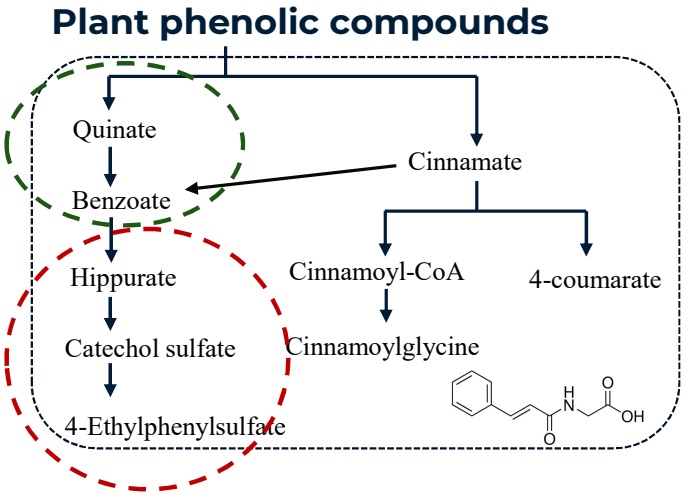
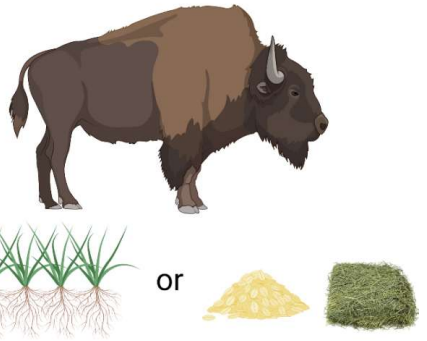
Studying metabolites related to animal health and human nutrition in bison meat in response to pasture vs. pen-finishing

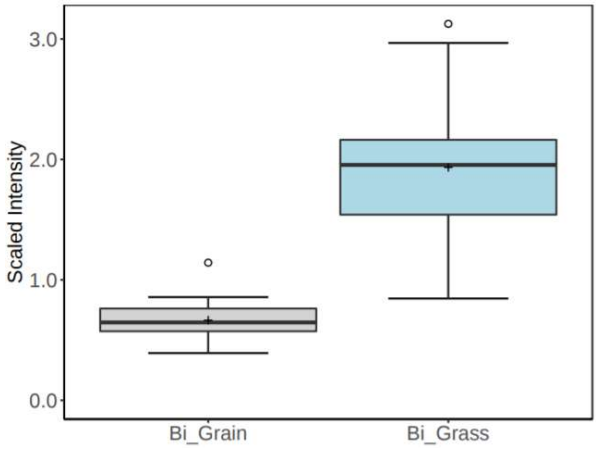
TURNER RANCHES

Phytochemicals (plant-produced metabolites) and health

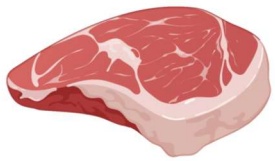


On average 2.5 times more plant-derived anti-oxidants in pastured bison





Hippurate



Nutrient Class	Compound Name	Fold difference Bi_Grass / Bi_Grain
Phytochemicals	hippurate	2.91
	catechol sulfate	4.06
	cinnamoylglycine	3.27
	p-cresol sulfate	1.32
	4-ethylphenylsulfate	17.96
	2,6-dihydroxybenz acid	3.24
	homostachydrine	0.41
	stachydrine	0.2

Bison Meat Project 2.0: Preliminary findings

1: Range-finished on diverse species

2: Range-finished on monoculture species/less diverse

3: Range-finished on monoculture species w free-choice corn

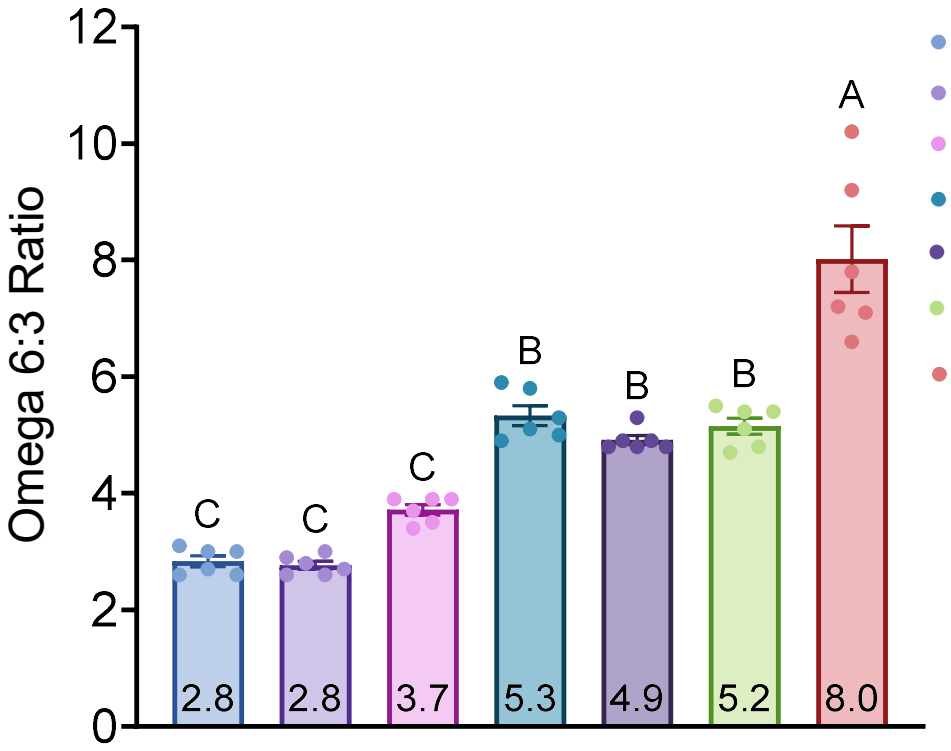
4: Pen-finished w low-stocking density and free-choice alfalfa, meadow hay, and corn

5: Pen-finished w low-stocking density and total mixed ration

6: Pen-finished w high-stocking density and free-choice alfalfa, meadow hay, and corn

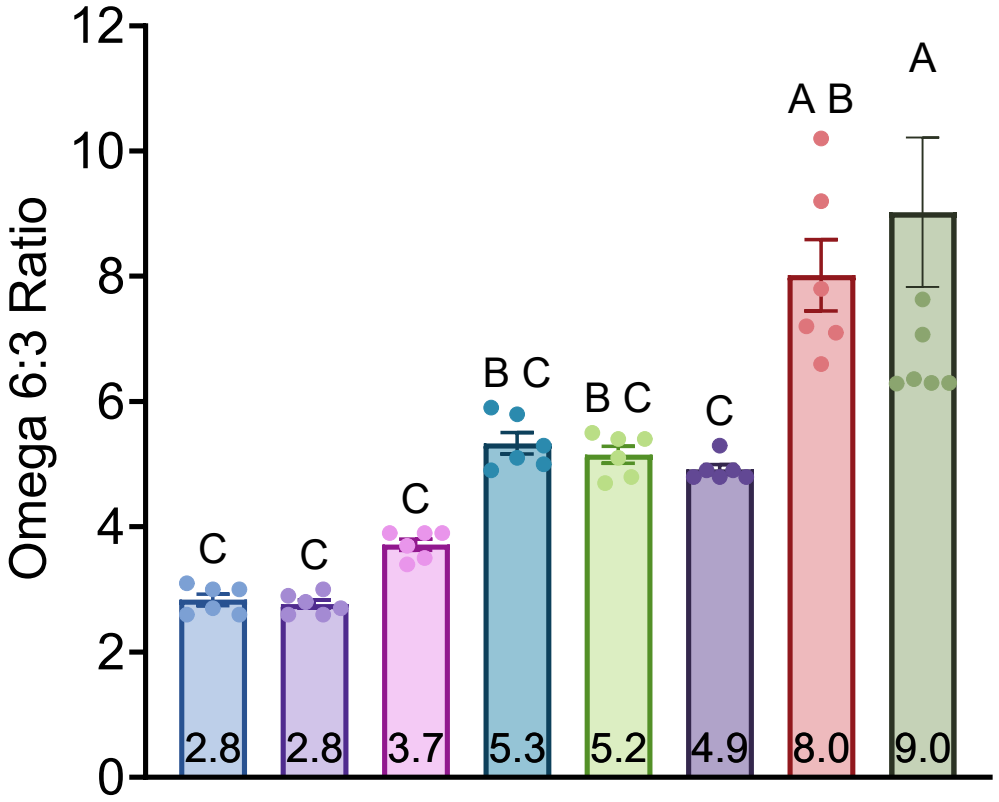
7: Pen-finished w high-stocking density and total mixed ration (different ranch)

Bison Meat Metabolomics Project 2.0: Preliminary findings



- Pasture finished diverse native range
- Pasture finished limited forage diversity
- Pasture finished limited forage diversity + free choice corn
- Pen finished free choice hay/corn + low stocking density
- Pen finished with hay/corn TMR + high stocking density
- Pen finished with hay/corn TMR + low stocking density
- Pen finished with TMR + high stocking density (different ranch)

Bison Meat Metabolomics Project 2.0: Preliminary findings



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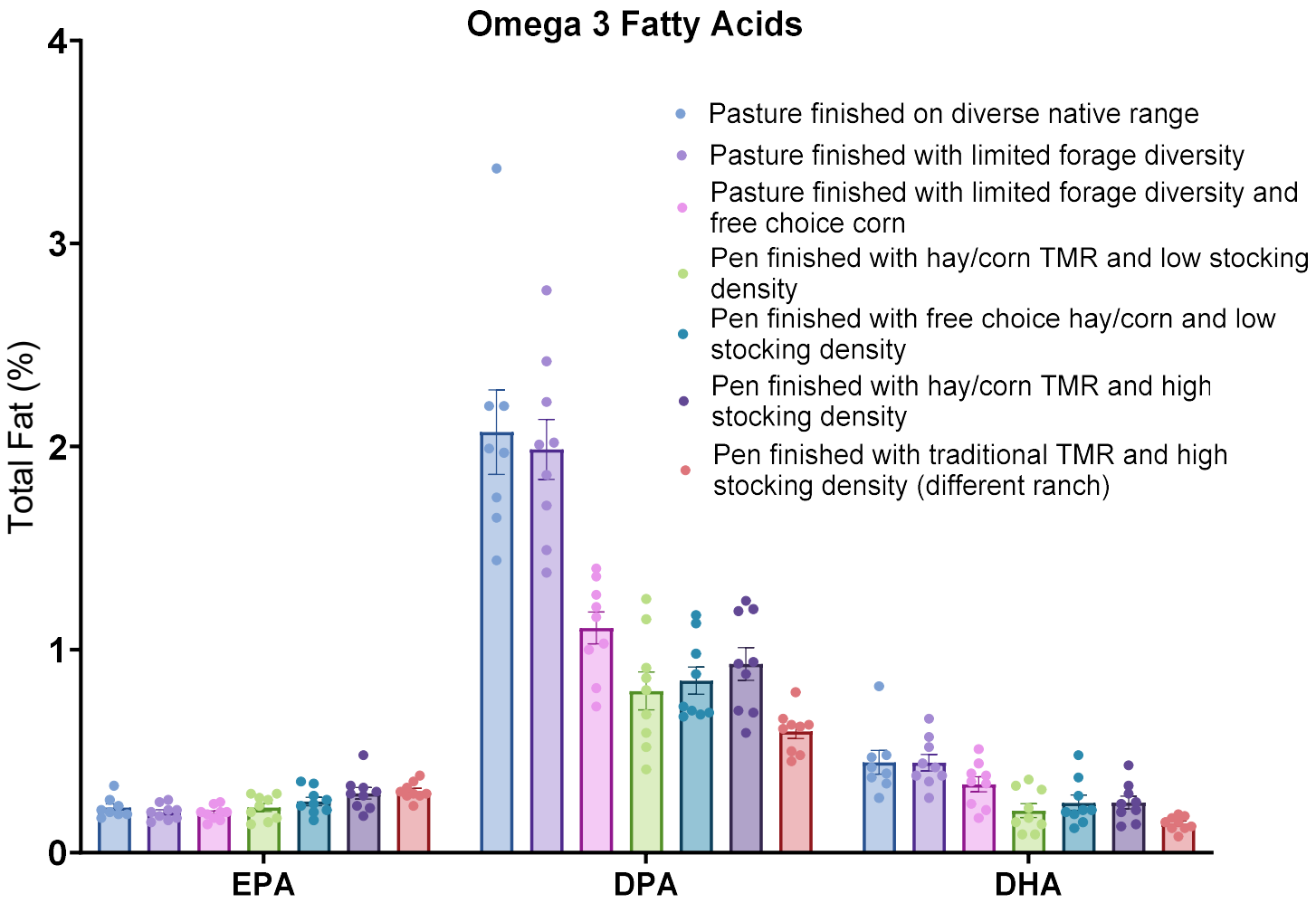
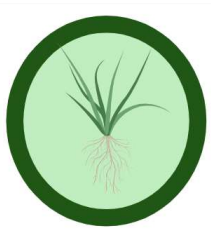
- Pen finished free choice hay/corn + low stocking density
- Pen finished with hay/corn TMR + high stocking density
- Pen finished with hay/corn TMR + low stocking density
- Pen finished with TMR + high stocking density (different ranch)
- Feedlot-finished beef

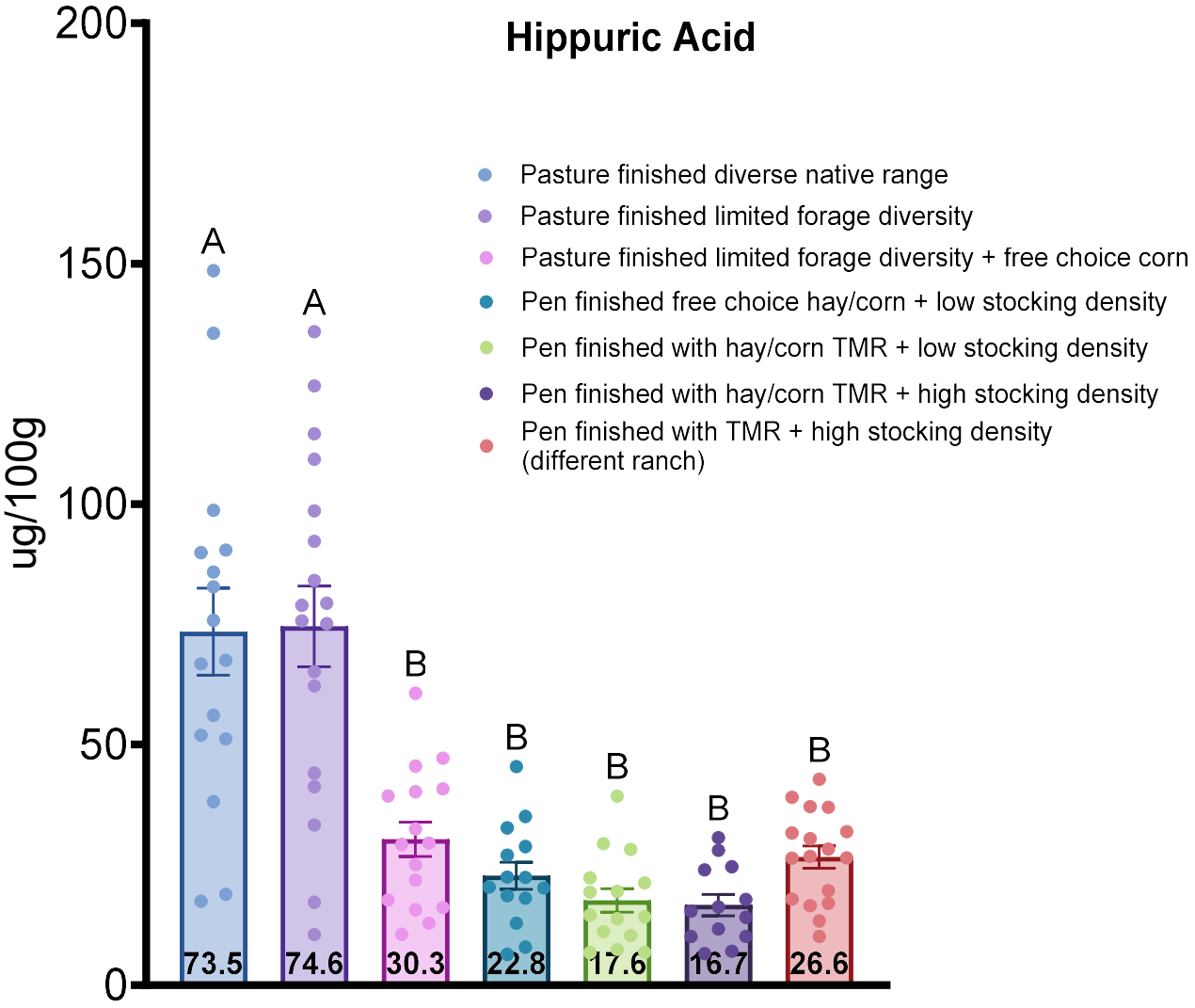
Bison Meat Metabolomics Project 2.0: Preliminary findings

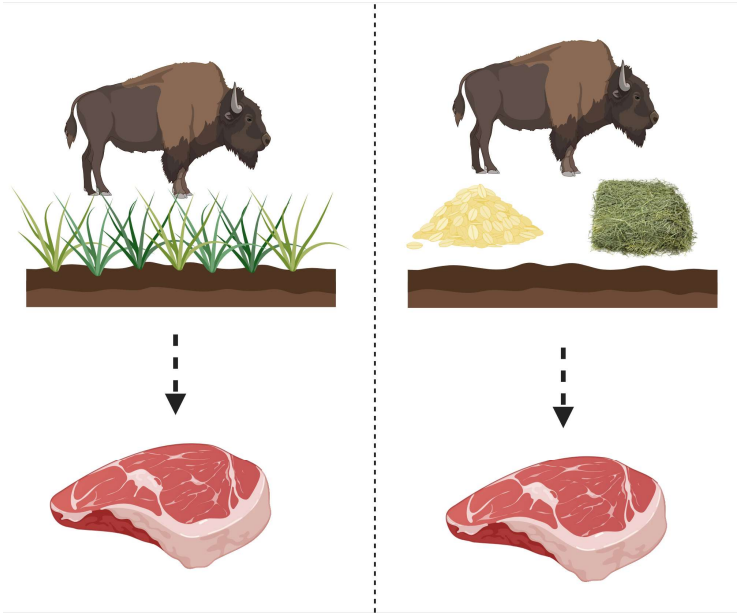




Forages are rich in omega-3s

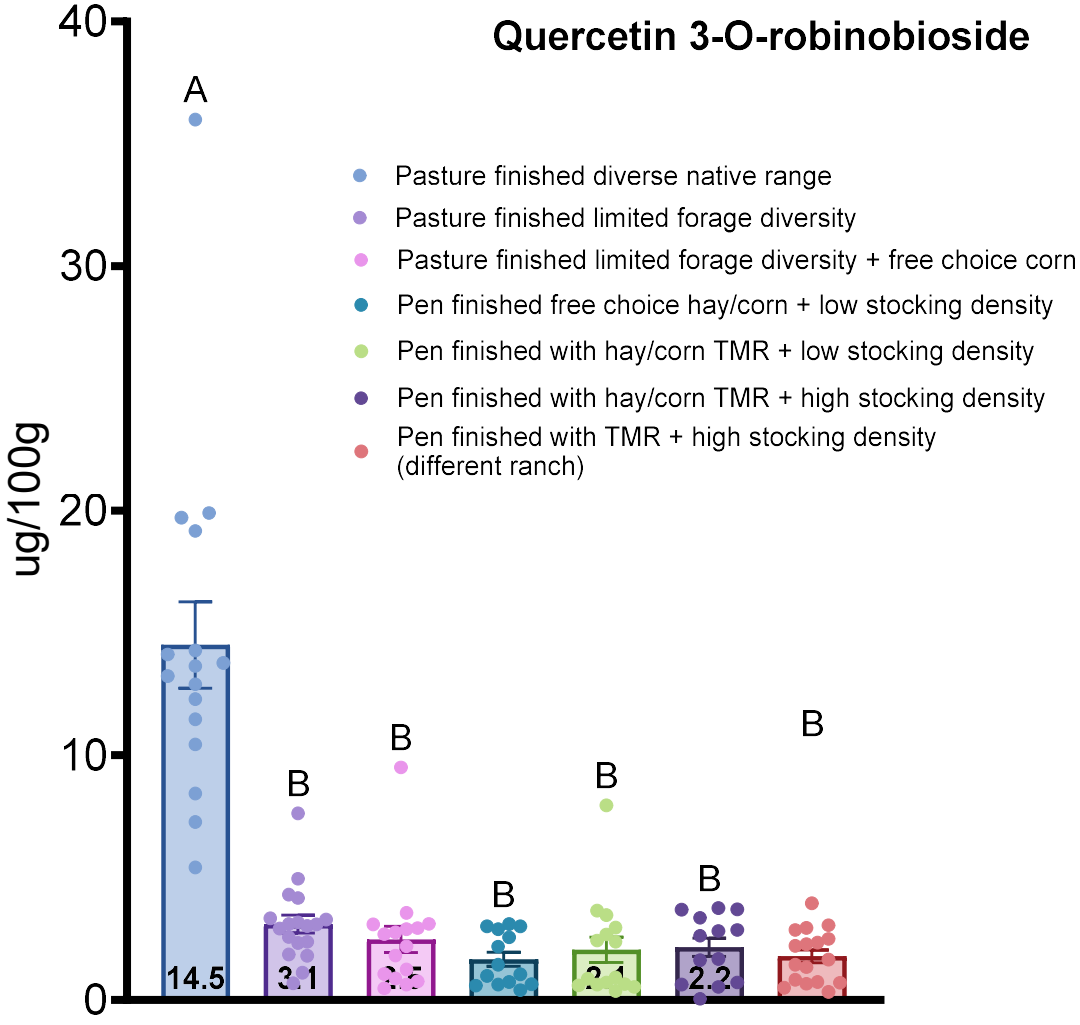
Bison Meat Metabolomics Project 2.0: Preliminary findings

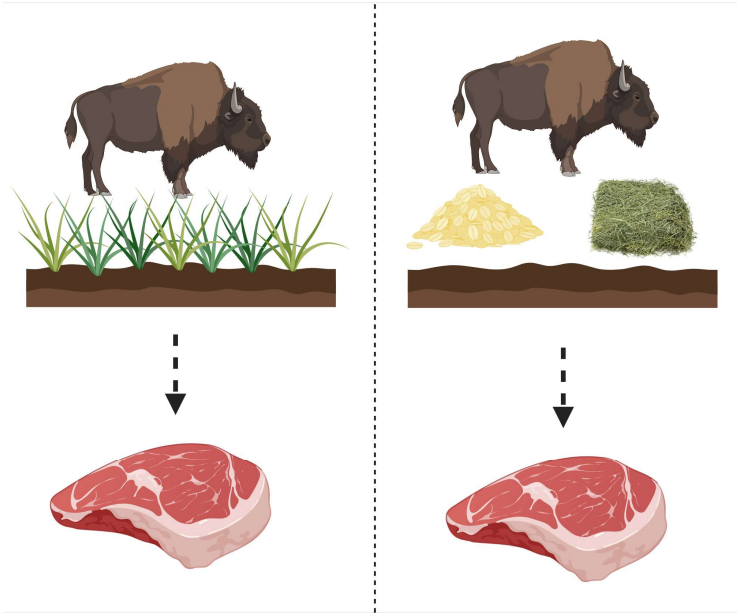




A major antioxidant in mammals and an indicator of polyphenol intake

Bison Meat Metabolomics Project 2.0: Preliminary findings

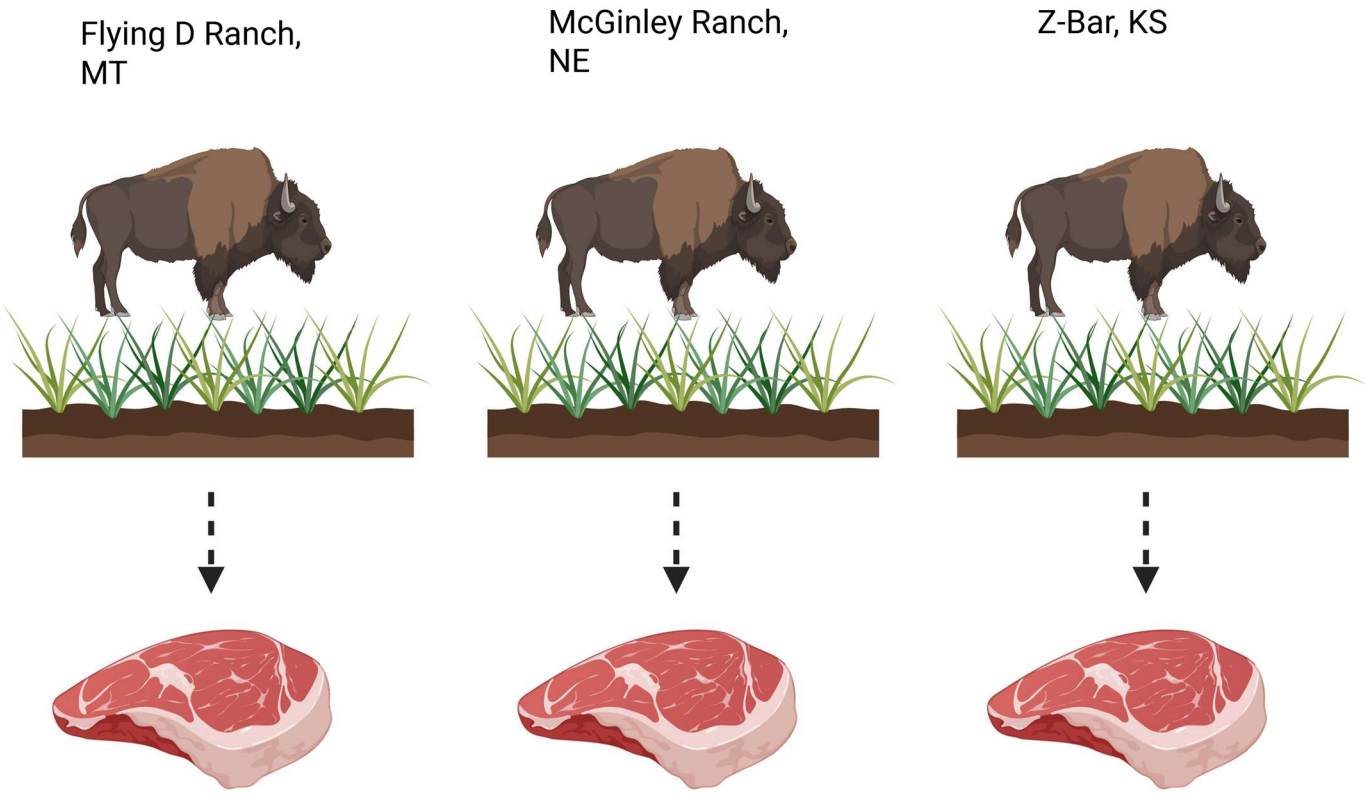




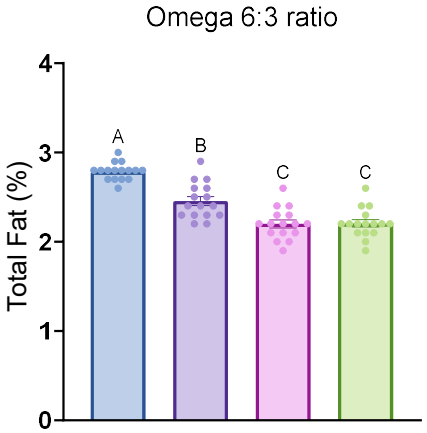
More diversity provides higher levels of various phytochemicals

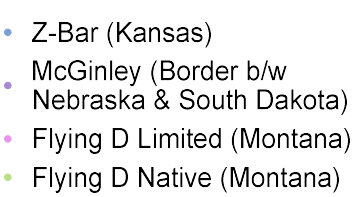
The effect of ecoregion (“terroir”) on bison meat nutrient density

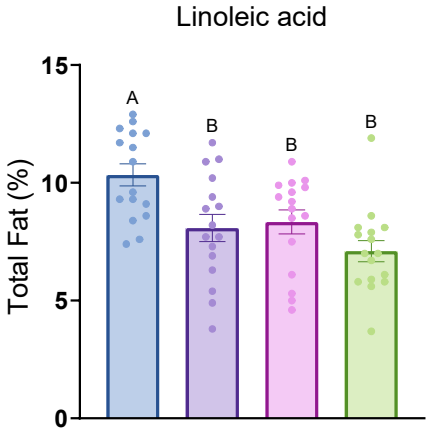
Pastured-finished on Western Rangelands in different ecoregions ("terroir")

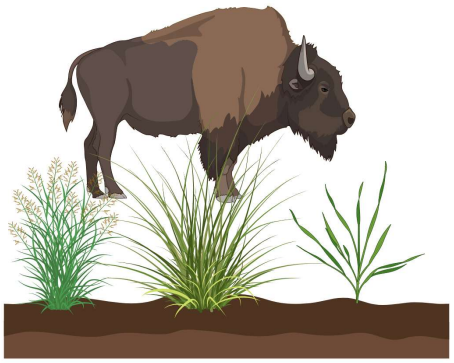


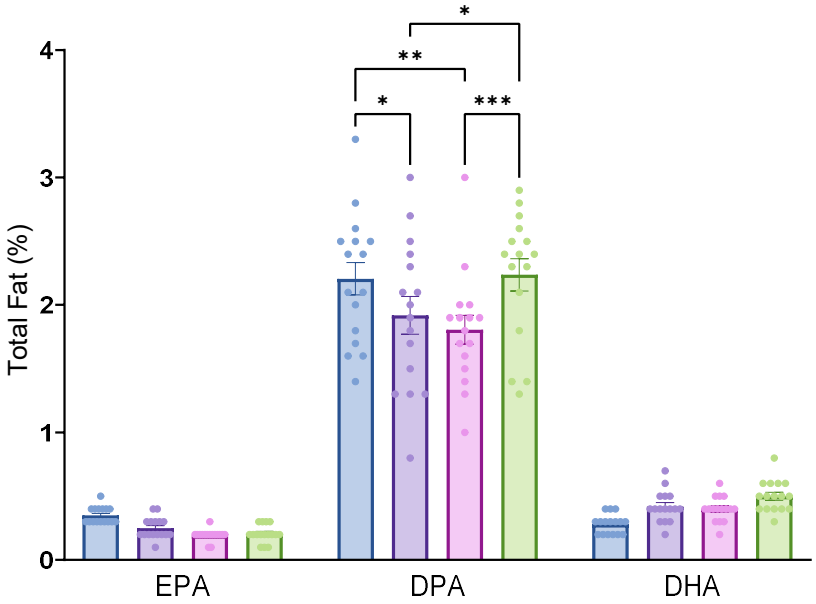
The effect of ecoregion (“terroir”) on bison meat nutrient density







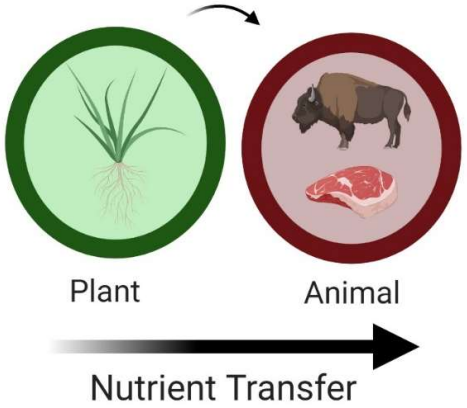




Conclusion and future directions

- Phytonutrient metabolites—phenols, flavanoids, and other anti-oxidants—become concentrated in the meat of bison finished on pasture.
- Likely to have health benefits to the animal and potentially humans (though more research is needed on that!). They are also potent flavor compounds.
- A potential benefit for greater plant diversity.
- As the proportion of feed vs forage increases, the omega-6:3 ratio and phytochemicals become reduced.
- There appears to be an initial effect of ecoregion on the fatty acid profile of pasture-finished bison; phytochemicals will be analyzed next.

"Herbivores consume plant species otherwise not consumed by humans; representing a dietary avenue by which additional unique phytochemicals are ingested."



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