Holistic approach of soil health in a rangeland in northern Mexico: development of an index

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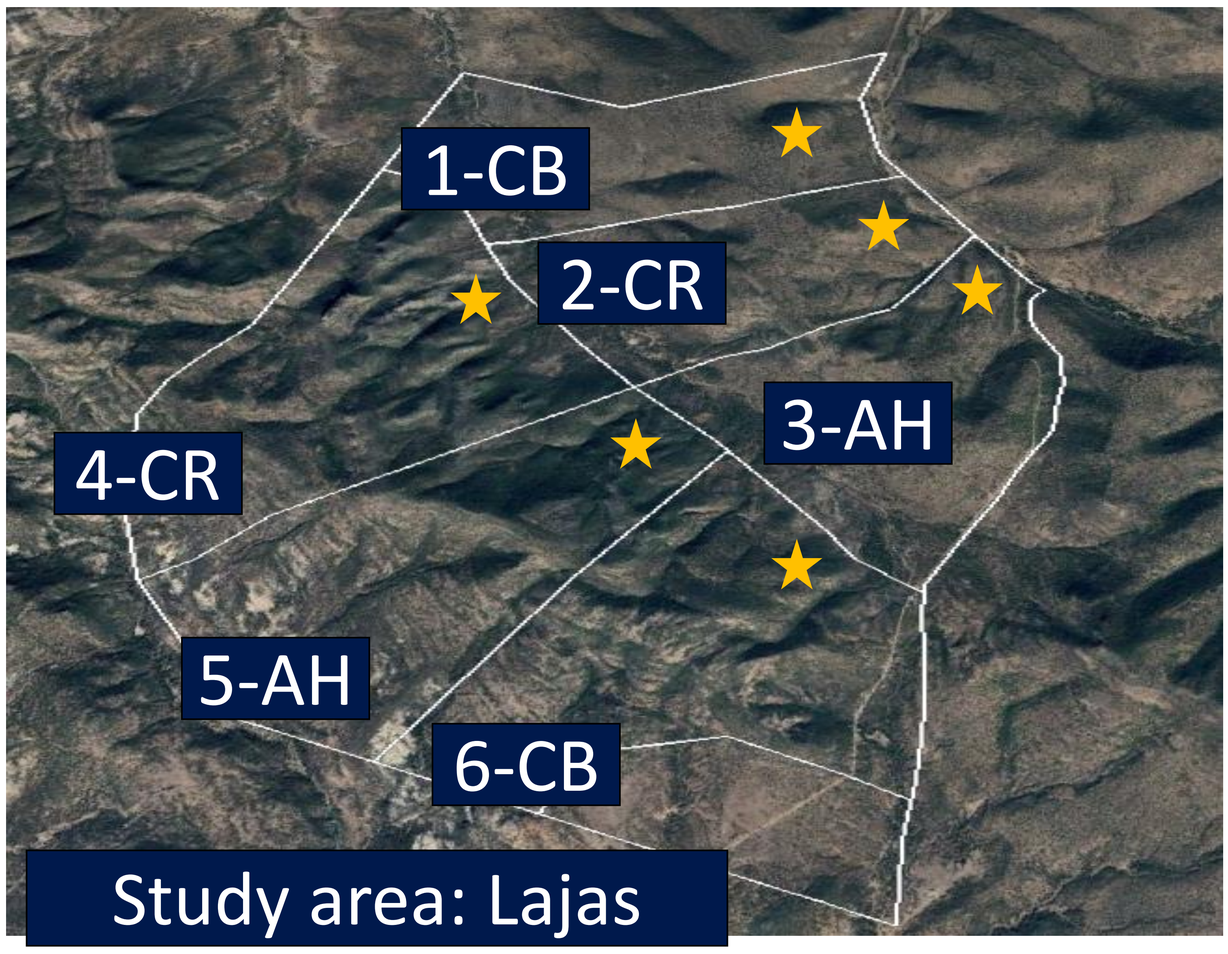
Introduction

Common threats to soil health in rangelands are cattle trampling and grazing.

Achieving sustainability? Cattle breeds better adapted to their environment.

Criollo cattle explores more the terrain, diverse diet, weight less. What about the impact on soil health?.

To develop an index to compare the impact of three cattle breeds: Criollo, Angus-Hereford and Criollo-Angus.



Study area: Lajas

Methods

The study area is “Lajas” located in the experimental ranch “Teseachi” in Chihuahua, Mexico.

Soil indicators to date: infiltration, bulk density, aggregate stability, electrical conductivity, pH, and visual evaluation of soil structure.

Scoring of indicators (scale 0-1) → More is better Less is better Optimum → Soil quality index

Results

After four years, the impact of trampling and grazing on soil health indicators and index is not different among cattle breeds.

The presence of platy structure in all areas evidences a degradation in soil structure.

Breed	Inf	Bd	Agg	pH	Ec	SQI
CB	22.6^{a}	1.2^{a}	0.5^{a}	6.3^{a}	42.9^{a}	0.41^{a}
CR	18.6^{ab}	1.1^{a}	0.5^{a}	6.4^{a}	75.0^{a}	0.33^{a}
AN	17.5^{b}	1.2^{a}	0.4^{a}	6.2^{a}	50.3^{a}	0.39^{a}

Same letters mean no significant difference at $p<0.05$

Conclusions

Literature demonstrates that the CR breed has different foraging behavior from Angus breeds.

However, at the short term these differences are still not evident in the selected indicators and overall soil health.

Long-term monitoring of soil indicators is needed to determine whether the CR has a lesser impact on soil health.