



UNIVERSITY OF LIFE SCIENCES
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Sustainable Development**



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**Nutritional Quality Assessment of Alfalfa (*Medicago sativa* L.) Genotypes
Developed for Improved Stress Resilience**

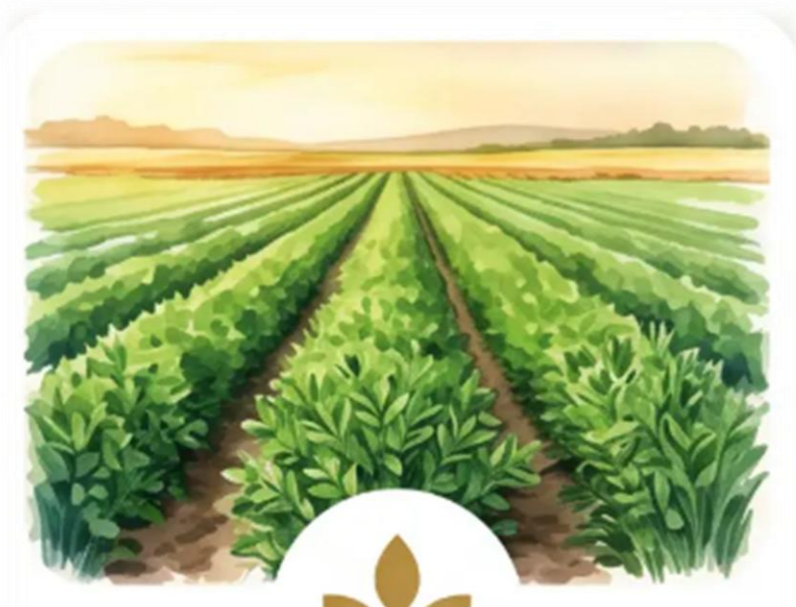
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Introduction

Alfalfa – a cornerstone crop for sustainable livestock systems and health agroecosystems



Key Forage Crop

Essential for sustainable livestock production — delivering high biomass yield with rapid regrowth cycles



Nutritional Powerhouse

Superior crude protein content and a favorable fiber profile — ideal for high-performance ruminant diets



Agroecosystem Benefits

Biological nitrogen fixation reduces fertilizer dependency while improving long-term soil structure and health



Economic Value

A cornerstone input for milk and meat production efficiency — directly influencing farm profitability and output

Materials & Methods

69 experimental samples analyzed | **Systematic Multi-Plot Analysis**

- 49 *Medicago sativa* L. varieties developed at **NARDI Fundulea**.
- Cultivars are synthetic populations created via the polycross method.

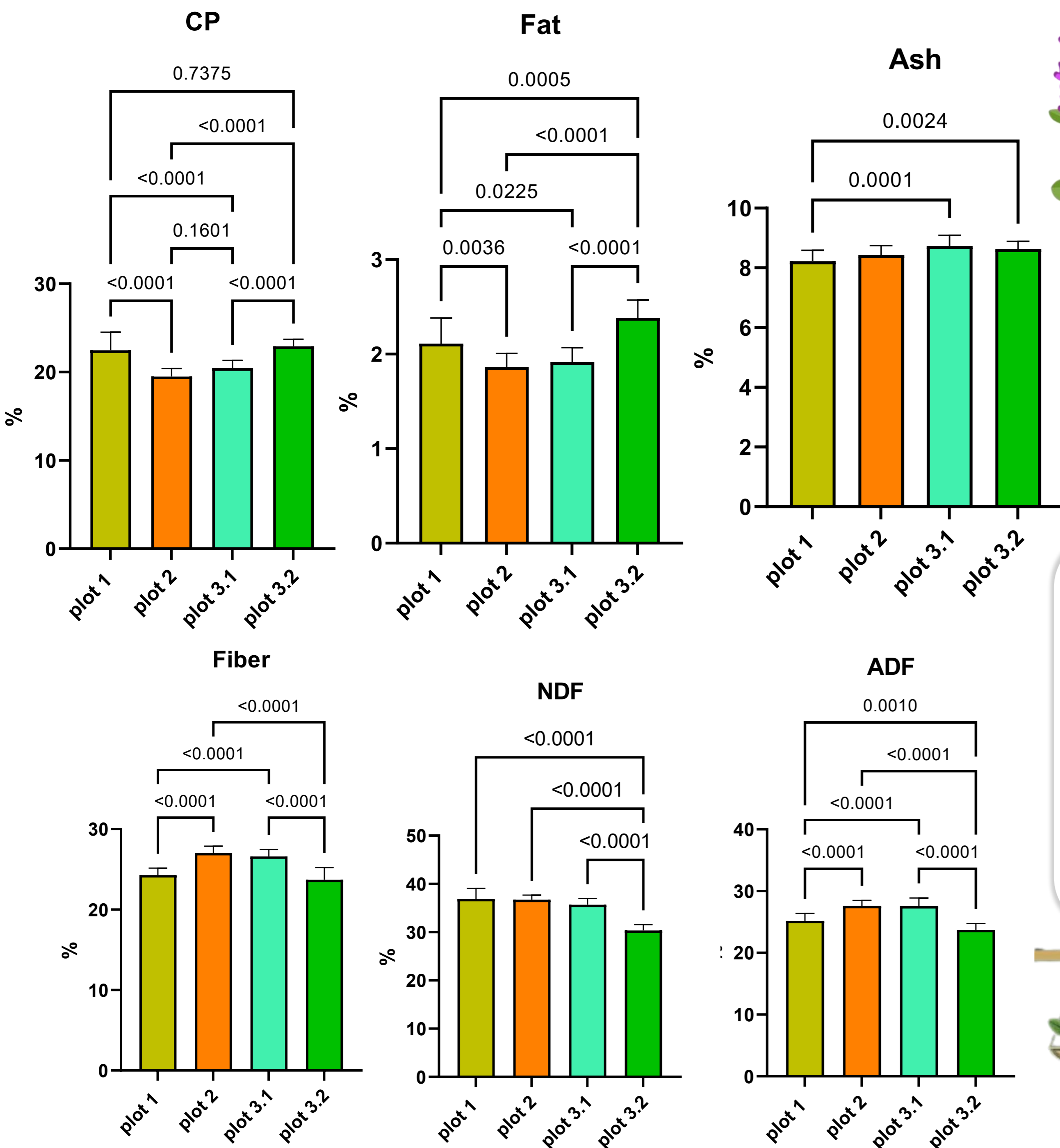
Chemical Analysis
Standardized analytical methods

Feed Value Indices
Total Digestible Nutrients (TDN), Relative Feed Value (RFV)

Results and discussions

Key Nutritional Results and Fiber Analysis

Comparative results across four plots showed that the second cut of second-year vegetation achieved optimal quality.



Plot Nutritional Assessment

- **Plot 3.2 (2nd Cut):** Achieved highest Crude Protein (22.87%) and lowest fiber fractions (NDF 30.11%, ADF 23.56%).
- **Plot 1 (4th Year):** High mean CP (22.46%) but significantly higher fiber levels compared to younger regrowth stages.
- **Plot 2 (3rd Year):** Lowest CP mean (19.48%) and elevated fiber, indicating reduced digestibility with age.

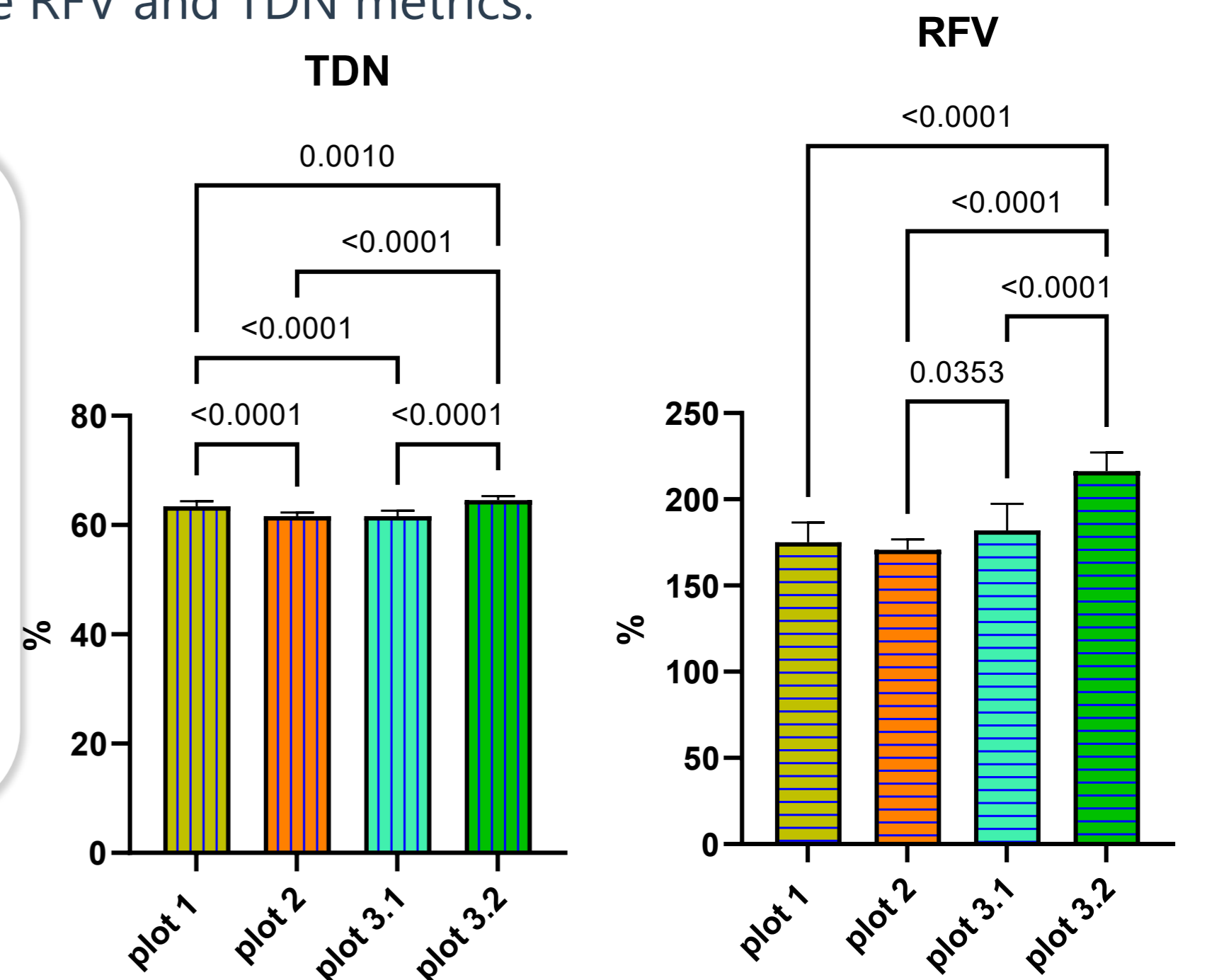
Superior Performance Genotypes

- **Petra (F 2626-17):** Consistent top performer in crude protein across multiple plots (up to 26.16%).
- **Ancuta:** Demonstrated the optimal nutritional profile in plot 3.2 with CP 24.61% and lowest fiber.
- **F 31013-1-2023:** New synthetic genotype showing highly competitive RFV and TDN metrics.

Key Insight
While TDN showed limited but significant variation between treatments, RFV clearly differentiated forage quality, with Plot 3.2 achieving the best nutritional performance.



Breeding programs now prioritize combining stress tolerance with improved forage quality — **resilience alone is insufficient if nutritional value is compromised.**



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Conclusions

The findings emphasize the potential of improved alfalfa genotypes to **enhance feed efficiency** and **animal performance**, supporting their **role in modern animal nutrition and sustainable agricultural systems.**

