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Eco-physiologically Highly Efficient Woody Plant Species in Northeastern Mexico

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In a forest ecosystem, different trees and shrubs grow together mutually sharing solar radiation and absorption of nutrients from soil horizons. Each species has its own mechanism for coexistence and adaptation in the ecosystem for different moro-physiological traits such leaf traits, branching pattern, leaf pigments, epicuticular wax, leaf nutrients, carbon fixation, protein and other traits. Nevertheless, some species are more efficient in most of these traits over all other species. Therefore, there is a great necessity to select species with highly efficient morpo-physiological traits. In the Forest Science Faculty, Universidad de Nuevo Leon, Mexico , using standard protocols, we are undertaking consistent research inputs in evaluating 37 woody plant species in a woodland forest ecosystem in Northeastern Mexico for a large number of morpho-physiological traits (24 parameters). We have selected few topmost species for these traits. For only 22 traits.

Morphological traits: Morphological traits contribute to the productivity and forage values for ruminants

Leaf length (cm): *Parkinsonia aculeate* (33.5), *Leaucaena leucocephala* (17.8), *Gymnsperma glutinosum* (16.0), *Berberis, chococo* (16.0), *Casaesalpinia mexicana* (15.69) [1].

Leaf breath (cm): *Caesalpinia mexicana* (15.5), *Sargantia greggiii* (4.3), *Leucaena leucocephala* (13.4), *Acacia berlandieri* (9.8), *Cordia, boissieri* (8.6), *Berberis chococo* (8.3).

Ptiole length (cm): *Berberis chococo* (5.5), *Caesalpinia mexicana* (4.1), *Leucaena, leucocephala* (3.65), *Srgantia greggii* (3.6), *Prosopis laevigata* (3.5), *Caesalpinia mexicana* (3.9).

Ecophysiological traits: Various eco-physiological traits mentioned below contribute to the productivity and adaptation of woody plants in the ecosystem.

Leaf area (cm^2): *Caesalpinia mexicana* (109.1), *Cordia boissieri* (97.4), *Leucaena leucocephala* (94.7), *Sargantia greggii* (60.7), *Berberis chococo* (51.5), *Acacia berlandieri* (50.5) [2].

Specific leaf area ($cm^2\ g^{-1}$): *Condalia, boissieri* (199.1), *Karwinskia humoltdiana* (183.3), *Cordia boissieri* (162.0), *Zanthophyllum fragara* (160.2), *Gymnospermum glutinosum* (186.9).

Leaf dry weight (g): *Caesalpinia mexicana (Sargantia, Berberis, Leucaena, C. boissieri)*

Wood density ($g\ cm^{-3}$): *Acacia shafneri* (1.09), *Fraxinus greggii* (1.01), *Hellieta parviflora* (0.99), *Acacia rigidula* (0.97), *Quercus viginiana* (0.96), *Ebenopsis ebano* (0.91).

Epicuticular wax ($\mu g\ cm^{-2}$): *Diospyros, texana* (698.26), *Acacia farnesiana* (446.85), *Bermardia celastriana* (147.58), *Forestieria angustifolia* (572.76), *Bernardia myricifolia* (353.33).

Leaf pigments (mg g^{-1} fresh weight: Leaf pigments help in the capture of solar energy and photosynthesis and plant productivity.

Chlorophyll a: *Ebenopsis, ebano* (1.755), *Cercidium suveoleon* (0.589), *Amyrys texana* (1.66), *Leucaena leucocephala* (1.403), *Gymnosperma glutinosum* (1.228).

Chlorophyll b: *Ebenopsis ebano* (0.398), *Amyrys texana* (1.66), *Eysenhardtia polystachya* (0.366), *Parkinsonia aculeate* (0.369), *Diospyros palmeri* (0.433).

Total Chlorophyll (Chl a+Chl b): *Ebenopsis ebano* (2.253), *Leucaena, leucocephala* (1.687), *Gynosperperma glutinosum* (1.528), *Amyrys texana* (1.506), *Cercidium angustifolia* (1.497).

Carotenoids$_{(x+c)}$: *Berberis chococo* (0.585), *Diospyros palmeri* (0.433), *Gymnosperma, glutinosum* (0.33), *Amyrys texna* (0.438), *Ebenopsis ebano* (0.425).

Leaf nutrients (μg (Cu, Fe, Zn) or mg (K, Mg, P) g^{-1} dw): leaf nutrients contribute to the physiological functions of trees and also serve as sources of nutrients for ruminants.

Cu content: *Cordia boissieri* (30.71), *Croton suaveolens* (26.67), *Celtis pallida* (25.98), *Blumia celastrinum* (25.24), *Acacia farnesiana* (24.62).

Fe content: *Cordia boissieri* (280.55), *Acacia farneciana* (259.79), *Acacia rigidula* (252.33), *Blumelia celastriana* (249.09), *Croton suaveolens* (229.13), *Celtis laevigata* (254.09).

Zn content: *Salix lasiolepis* (144.86), *Cordia boissieri* (51.87), *Parkinsonia aculeate* (51.86), *Eysenhardtia polystachya* (51.39), *Berberis chococo* (50.68), *Prosopis lavaegata* (48.47).

K content: *Croton, suveolens* (75.62), *Cordia boisiieri* (45.58), *Celtis pallida* (49.60), *Acacia rigidula* (38.75), *Diospyros, texana* (36.55).

Mg content: *Ehretia anacua (9.45), Condalia hookeri (6.50), Parkinsonia aculeate (5.29), Hellieta parviflora (3.15), Guaiacum Virginia (2.*60).

P content: *Croton suaveolens (2.45), Eysenhardtia polystachya, Prosopis, laveagata (1.65) Celtis laveagata (1.57), Parkinsonia aculeate (1.56).*

Crude Protein (%): *Gymnospermum glutinosum (36.81), Diospyros texana (36.55), Bermardia celastrina (33.02), Celtis pallida (25.75), Ebenopsis ebano (24.13, Cordia boissieri (20.5) [3].*

Carbon content (%): *Leucophylum frutescens (49.97), Forestieria angustifolia (49.47), Blumelia celastrianum (49.29), Acacia berlandieri*

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((49.29), A. rigidula (48.23), Sargantia greggii (44.07), C. boissieri (44.43)/a

Nitrogen content (%): *Gymnospermum glutinosum (5.89), Blumelia celastrinum (4.21), Celtis pallida (4.12), Acacia berlandieri (3.82), Acacia texana* (3.71).

C/N ratio: *Sargantia greggii (23.13), Quercus virginia (21.51), Croton suveolens (20.16), Diospyros palmeri (17.36), Blumelia celastrina (15.17) [4].*

It is expected that the woody species selected for high values of different morphological. Eco-physiological and leaf nutrients are more efficient in physiological function, plant productivity as well as could serve as good sources of nutrients and forage for wild animals. This hypothesis needs to be confirmed in future studies. These species could also serve as model sample for various research projects in forest science.

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