LIBRO DE RESUMENES

# XVIII SIMPOSIO ARGENTINO DE PALEOBOTÁNICA Y PALINOLOGÍA

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*"Los enfoques ecológicos y paleoecológicos, a diferentes escalas espaciales y temporales, desde la paleobotánica y la palinología"*

construction), and photosynthetic capacity. They were calculated using a 3D-multivariate model based on data obtained by Fourier transform infrared spectroscopy, and trait relationships that link density and the properties mentioned above, which have been previously established for leaf tissues of living plants. Cuticles of *P. micropapillosum* leaflets have a predominantly aromatic chemical composition with lower contents of aliphatics. The chemical groups detected are related to diagenetically resistant molecules, e.g., lignin-, tannin-, and resin-like polymeric structures. Calculated mean values (including apical, middle, and basal leaflets) of biomechanical/ physiological properties are: density = 0.94 $g/cm^3$, resistance to fracture = 4.54 MPa, stiffness = 810 MPa, metabolic construction costs = 0.76 $g/cm^2$, and photosynthetic capacity = 53 nmol $g^{-1}s^{-1}$. Comparisons indicate that rigid, tough, and brittle apical and basal leaflets may have had considerably higher density, resistance to fracture, stiffness, and metabolic construction costs than leaflets from the middle frond parts. On the other hand, the highest photosynthetic capacity was determined for the relatively more flexible and cheaply constructed leaflets from the middle frond part. Results suggest that, theoretically, the once-living plants bearing *P. micropapillosum* leaves may have invested considerable amounts of resources for the construction of aromatic, high-density, biomechanically resistant, and metabolically expensive foliar cuticles. *P. micropapillosum* pinnae may have employed a combination of biological and biochemical characteristics that optimized their biomechanical stability and physiological activities. Cutinization and lignification implied variable concentrations of chemical structures related to phenols (e.g., free phenolic compounds, phenylpropanoids, lignins, and tannins). They are often astringent and bitter to taste, and so possibly reduced the palatability of *P. micropapillosum* leaflets, particularly those located in apical and distal frond parts, or even imbued them with life-threatening toxicity to herbivores (i.e., a chemical defense strategy). This case study illustrates the utilization of chemically-based, 3D-multivariate models to perform detailed and realistic studies on the biomechanics, physiology, autecology, and synecology of extinct plants.

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## ADVANTAGES OF FEEDING ON *Dicroidium* AND *Johnstonia* (CORYSTOSPERMACEAE, TRIASSIC): INFRARED SPECTROSCOPICAL ANALYSIS EXPLAINS HERBIVORE'S FOOD PREFERENCES

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This contribution provides the first chemical, biomechanical, and physiological data that help explain the food preferences of herbivores that feed on pinnules of *Dicroidium odontopteroides* and *Johnstonia stelzneriana* (Corystospermales, Corystospermaceae). Fossils were collected from two Triassic localities located on the southern side of the Cacheuta Hill (Cacheuta, Mendoza, Argentina): Quebrada del Durazno (upper Potrerillos Formation) and Trinchera La Mary (lower Cacheuta Formation). Some of the studied samples are affected by herbivory, showing external, foliage damage, i.e., traces by hole, surface and marginal feeding, sucking and piercing, and possibly gall. Specimens were chemically analyzed by Fourier Transform Infrared spectroscopy. Chemical data were used to calculate different pinnular properties, i.e., density, tensile strength (resistance to fracture), tensile modulus of elasticity (stiffness), leaf mass per area (metabolic cost of tissue construction), photosynthetic capacity, and maximum rate of Rubisco carboxylase activity

(maximum rate at which leaves are able to fix carbon during photosynthesis). Pinnules show an aliphatic-rich composition with organic chemical groups derived from well-preserved and diagenetically resistant polymers, e.g., lignins, tannins, phenylpropanoids, and resin-like compounds. Comparisons with published values of the calculated, aforementioned biomechanical/ physiological properties, obtained for Paleozoic and Mesozoic taxa, indicated that, theoretically, *D. odontopteroides* and *J. stelzneriana* had relatively low values of density, resistance to fracture, stiffness, and metabolic costs of tissue construction. This implies that the studied pinnules were likely deciduous, having a short-expected lifespan and a resource-acquisitive leaf strategy that resulted in relatively small, fast-growing, tender, flexible, and cheaply constructed pinnules. On the other hand, they showed relatively high values of photosynthetic capacity and carboxylase activity, resulting in a high production of carbohydrates (nutrients). These characteristics suggest that pinnules of *D. odontopteroides* and *J. stelzneriana* may have been a high-quality and attractive food source for herbivores, i.e., "easy to eat and digest" (tender tissues), safe (non-poisonous), palatable (non-astringent), and nutritious (rich in carbohydrates). This case study provides new information on the chemistry, biomechanics, and physiology of the Corystospermaceae with important implications for a better understanding of some plant-animal interactions (e.g., food preferences of herbivores), particularly when the body fossils of the herbivores themselves are absent. Chemical studies will enhance our understanding of the relationship between paleodiets and paleoenvironments, leading to more realistic reconstructions of the complex, food webs of the high-latitude, Gondwanan Triassic ecosystems.

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## CIANOBACTERIAS FILAMENTOSAS EN AMBIENTES GEOTÉRMICOS DEL JURÁSICO DE SANTA CRUZ, ARGENTINA

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Se describen restos de cianobacterias filamentosas silicificadas preservadas anatómicamente en yacimientos geotérmicos del Macizo del Deseado (Complejo Bahía Laura, Jurásico Superior, provincia de Santa Cruz, Argentina). Los restos se preservan en brechas compuestas por fragmentos de sinter de baja temperatura (30°- 45°C) con textura en empalizada y restos orgánicos fragmentarios. Las muestras fueron analizadas con microscopía óptica y confocal. Los tricomas fluorescen entre los 647 y 738 nm al ser excitados a 633 nm, lo cual permite su reconstrucción tridimensional detallada. Los filamentos (=tricomas) de cianobacterias se preservan en una matriz silícea, de forma más o menos agrupada, de manera libre sin adherirse a un substrato. Los tricomas consisten de cadenas de células en forma de barril, más largas que anchas, de tamaño regular (4,33–5,45 µm de ancho x 5,26–7,00 µm de largo). Los tricomas son uniseriados, sin ramificar, y no se observa vaina protectora ni matriz mucilaginosa. En algunos tricomas, se observa la presencia de células levemente más grandes (6,13 µm de ancho x 7,45 µm de largo) que podrían representar heterocistos. Adicionalmente, el análisis con microscopía confocal permitió observar el desarrollo de septos transversales en algunas células. Los filamentos uniseriados, sin ramificar y sin vaina protectora, sugieren una afinidad con los órdenes