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**MICROSPORANGIATE ORGANS FROM THE LOWER CARBONIFEROUS OF NORTHEASTERN BRAZIL (PARNAÍBA BASIN, POTI FORMATION)**

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The record of pteridosperm reproductive organs is very rare in the Carboniferous of Gondwana. These structures had been found until now in Carboniferous strata from Peru and Argentina in South America continent.

Specimens of *Kegelidium lamegoi* Dolianiti, 1954 (Bol. DGM, 148: 24-27) are reviewed and redescribed here. The original diagnosis is emended. The studied material comprises detached portions of leafless branches bearing terminal sporangia collected from one core and outcrops of the Poti Formation, of Visean age, according to palynological studies.

More complete specimens of *Kegelidium* show a three-dimensional branch system bearing a dichotomous and alternate arrangement of the axes. The axes are always attached at acute angles. Sporangia are 2.9-4.1 mm long and 0.7-1.4 mm wide, banana-shaped, with a lengthwise striated surface, without markings of dehiscence and tapering to a short blunt tip. *Kegelidium* sporangia are borne always in two pairs of four unfused sporangia, loosely arranged. Each terminal sporangial pair is joined at the base in a single sustaining structure.

*Kegelidium* is comparable to pteridosperm nonsynangiate organs, like *Zimmermannitheca* from the Lower Carboniferous of Europe. *Kegelidium* is also very similar to *Obandotheca* from the lowermost Upper Carboniferous of Peru, but, due to differences in surface characters, terminal arrangement of sporangia, and, mainly, in branch system, *Kegelidium* is considered a distinct taxon.

*Kegelidium* is an important element for the understanding of Paleozoic gymnosperm evolution. *Kegelidium* could be related to early pteridosperm groups which probably were the ancestors of the major groups (e.g. Lyginopteridaceae). However, *Kegelidium* has some exclusive characters and distinct geographical distribution in relation to euramerican taxa, which could indicate that it originated from a different evolutionary lineage. Therefore, Gondwana groups may be related to euramerican ones only at higher levels of taxa. — (5 de dezembro de 1996).

**THE LATE PALEOZOIC LAPA SANDSTONE (ITARARÉ SUBGROUP): A POSSIBLE TUNNEL-VALLEY FILL?\***

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The Lapa sandstone forms an almost continuous, broadly sinuous, linear ridge that extends for about 180 km, with a general NNW-SSE trend, from south of Rio Negrinho (SC) to north of Palmeira (PR). The ridge varies from a few hundred meters to 2 km in width and it rises up to 80m above the surrounding topography. At its northern end, north of Lapa (PR), as far as the area of the Vila Velha Park (PR), the ridge is dismembered into several smaller, elongated sandstone crests that seem to merge with the Vila Velha sandstone.

Recent mapping showed that the ridge comprises several lithofacies associations that seem to make up the exhumed fill of a subglacial tunnel-valley deeply carved into Itararé Subgroup sediments and reaching bedrock of middle Paleozoic sandstone (Furnas Formation) at its northern extremity. Though this indicates that the valley was cut into rocks successively older from south to north its exact age relationship within the Itararé Subgroup is not yet entirely clear. Maximum tunnel height was at least 80m, but relatively steep erosional contacts along the sides of the ridge suggest an originally deeper floor. Valley profile is irregular both transversely, as well as along its axis.

Main lithofacies associations recognized include interbedded fluvial-deltaic and marine reworked, fine to medium sandstone and subsidiary conglomerate, and mass flow diamictites (supraglacial glaciogenic deposits?). These overly in erosional contact eskerlike, locally deformed (faulted and slumped) bodies of interbedded coarse conglomerate, sandstone and diamictite. Near Porto Amazonas (PR) fine-medium sandstone turbidites, fluidized or grain flow sandstones and debris-flow diamictites associated with the Lapa sandstone suggest a deeper marine setting.

Field evidence indicates that the Lapa sandstone at least partially overlies the Vila Velha sandstone. Both are probably genetically related in terms of the depositional model for the Lapa sandstone presented herein. Sedimentary structures and geometry of the Vila Velha are suggestive of a shallow marine setting. Low dipping

cross-stratification and vertical and horizontal burrows suggest a tidally influenced environment.

The preliminary depositional model interpreted for the Lapa sandstone involves formation of a subglacial drainage way or tunnel-valley below the Paraná glacial lobe through headward erosion by confined meltwater with possible contribution of glacial abrasion. Erosion may have started by piping at the margin of the glacier. Eroded sediments were transported and deposited as an extensive apron or delta in front of the marine margin of the lobe (Vila Velha sandstone). During waning flow ice contact esker-like sediments were deposited within the tunnel.

Retreat of the glacier margin and subsequent rise in sea level resulted in exposure of the subglacially cut topography and its recurrent infilling by fluvial, deltaic, glacial-marine and marine sediments, and by marine reworking of these. Post-glacial transgression resulted in deep penetration of marine waters southward into the valley and deposition of draping marine mud on top of the Lapa sandstone. These processes ended with post-glacial isostatic upwarping, documented by the recurrence of fluvial cross-stratification above marine beds. — (5 de dezembro de 1996).

\*Support FAPESP.

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#### TAFOFLORA DAS CAMADAS NOVA IORQUE, DEPÓSITOS NEÓGENOS DO RIO PARNAÍBA, MA, BRASIL: FABACEAE

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Dos 16 espécimes já identificados, até o nível de família, na taoflora pliocênica das camadas Nova Iorque, 11 pertencem às Leguminosae (Fabaceae); 3, às Myrtaceae; 1, às Malvaceae e outro, às Smilacaceae. Dentro das Leguminosae foi possível estabelecer, entre compressões foliares e cárpica seis grupos parataxonômicos, segundo metodologia aplicada por Pole (1993, *J. Royal Soc. N. Z.*, 23: 345-391): *Paratixa* FNNY-L.1-6. FNNY-L.1, com 3 folíolos fortemente assimétricos e romboédricos, de margem inteira, venação broquidódroma imperfeita e festonada e

intersecundárias em áreas intercostais irregulares, apresenta venação terciária reticulada ortogonal variando ao longo da lâmina. FNNY-L.2 compreende 3 folíolos oblongos assimétricos, de margem inteira, com venação secundária broquidódroma, originando campos intercostais de áreas variadas. Presença de intersecundárias. Venação de hierarquia superior em padrão ortogonal. FNNY-L.3, representado por folíolo assimétrico oblongo de margem inteira, com arranjo secundário broquidódromo imperfeito definindo áreas marginais diferentes e zonas costais quase paralelas, possuindo venação intersecundária pouco evidente e terciárias-aternárias reticuladas. Estas três fisionomias são freqüentes em Mimosoideae. FNNY-L.4 compreende 2 folíolos simétricos e elípticos, de margem inteira, venação secundária broquidódroma, definindo áreas intersecundárias semelhantes. Venação de hierarquia superior reticulada. Intersecundárias raras. FNNY-L.5 representa 1 folíolo elíptico, assimétrico na base, de margem inteira, com venação secundária mista, multi-festonada. Intersecundárias presentes. Estes aspectos morfológicos são freqüentes em folíolos de Caesalpinioideae. FNNY-L.6 refere-se à parte meso-distal valvar de fruto polispérmico com pericarpo não septado, não apiculado, pouco espesso, contendo, pelo menos, quatro funículos. É forma próxima às Mimosoideae. A presença marcante e diversificada das Leguminosae nas camadas Nova Iorque é evidenciada por sua macroflora, não tendo sido detectada em seu conteúdo palinológico (Lima, no prelo). — (5 de dezembro de 1996).

\*Curso de Pós-Graduação.

#### PALEOENVIRONMENTAL AND STRATIGRAPHIC IMPLICATIONS OF THE PRESENCE OF *Navifusa* COMBAZ LANGE & PANSART, 1967 IN THE ITARARÉ SUBGROUP (WESTPHALIAN), ARAÇOIABA DA SERRA (SP), PARANÁ BASIN, BRAZIL

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Varied fossil remains of gastropods, bivalves, brachiopods, foraminifera, sponge spicules, crustaceans, crinoids and fish, together with ichnofossils, indicate a marine-influence during sedimentation of certain levels