A NEW PTEROSAUR SPECIMEN WITH SOFT TISSUE FROM THE LOWER CRETACEOUS SANTANA FORMATION (CRATO MEMBER), ARARIPE BASIN, BRAZIL

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A new pterosaur partial skeleton (MPSC R 771) with soft tissue is reported here. The specimen is housed at the Museu de Paleontologia of Santana do Cariri (Ceará State) and was recovered from the lacustrine laminated limestone layers of the Crato Member (Aptian), the basal unit of the Santana Formation (Araripe Basin, NE Brazil). It consists of an almost complete left wing (ulna, radius, carpals, pteroid, metacarpals I-IV, digits I-IV) and the left hindlimb (femur, tibia, tarsals and foot). The bones are flattened, a typical feature of specimens recovered from this *lagerstätte*. Fusion of several elements (e.g, carpals, proximal tarsals + tibia) suggests that this was an adult animal. All elements of the wing are articulated or closely associated. Among the interesting anatomical features is the presence of a sesamoid inside the fovea carpalis of the lateral distal carpal, a region commonly thought to house the pteroid bone. The distal carpal series is fused forming a rectangular unit, different from the triangular shaped unit of the Pteranodontoidea. The second phalanx of the wing finger is more than 30% smaller than the first, a featured shared by Azhdarchidae and Tapejaridae (= Azhdarchoidea). The manual ungueals are remarkably large. A marked depression is present at the region of the wing finger. Several bones are deformed at the border of this depression (e.g., metacarpal IV, ph1d4, ph2d4, tibia), clearly indicating that this specimen was partially pushed inside this hole when the carcass reached the bottom of the lake and was subsequently submitted to compression. Soft tissue is only preserved inside this depression and due to its association with the wing elements it is interpreted as part of the wing membrane. UV light shows that areas of the soft tissue are phosphatized. Several layers of fibers are found, a common feature in pterosaur wing membranes, but here some are crossing each other. Contrary to most other pterosaur wing membranes reported so far, here we can observe layers of fibers with changing directions and variable diameters forming in several areas a criss-cross pattern. SEM analysis was not able to show the nature of those fibers (e.g., elastic, muscle), but judging from other specimens they might have been muscle fibers. The possibility that these fibers are muscle ones is particularly attractive since they would permit subtle changes in the membrane tension during flight allowing an accurate control of flight movements. Additionally, it would also help to organize the membrane when the animal was not flying.