



Plate 1. The Chapada do Araripe. (a) View looking south from Santana do Cariri towards the spring-line village of Cancau with the escarpment of the Chapada do Araripe in the background. The Crato Formation crops out on the lower flanks of the chapada in this region. (b) A typical stone quarry in the Nova Olinda Member of the Crato Formation between Nova Olinda and Santana do Cariri with the Chapada do Araripe escarpment in the background.

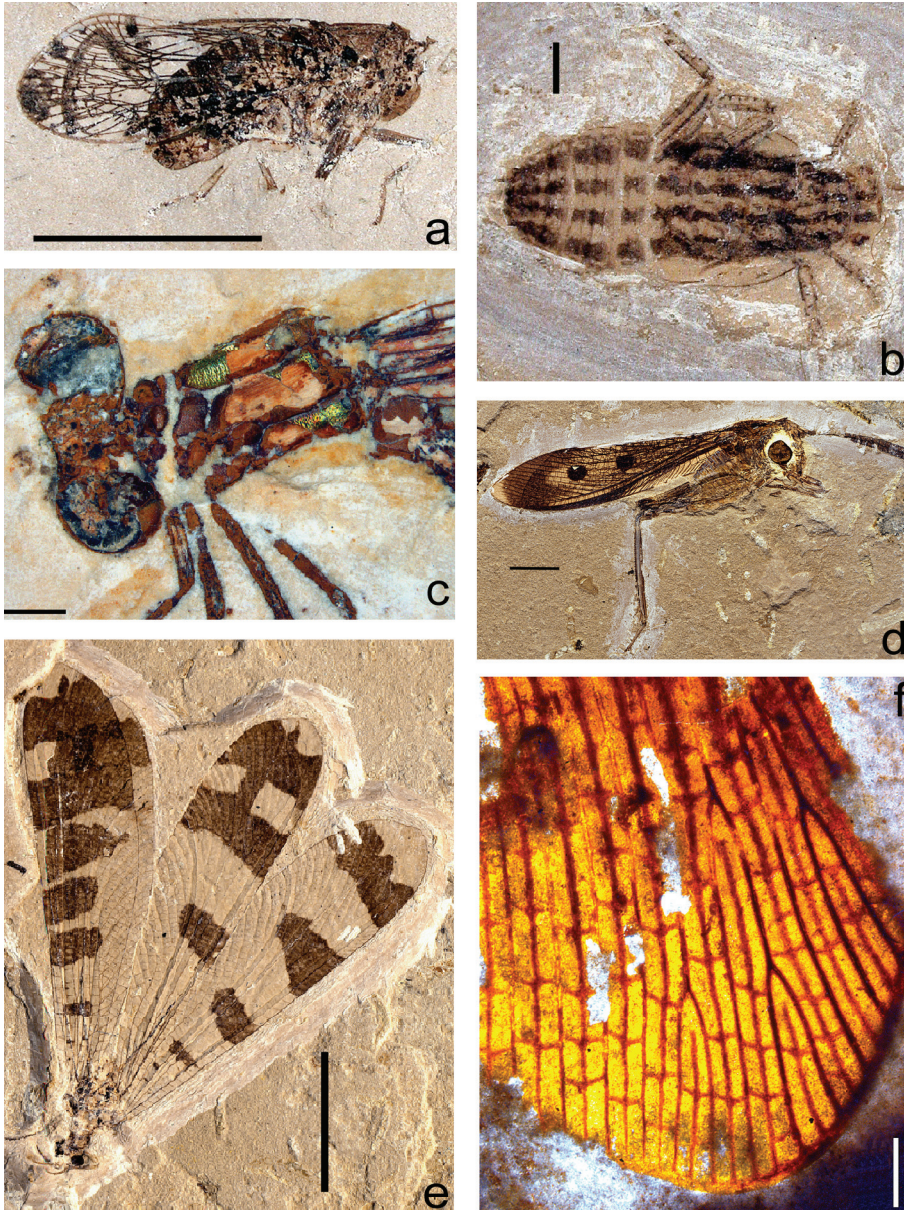


Plate 2. Colour preservation in Crato Formation insects. (a) Spots on the wings of a cicadomorph; scale bar, 10 mm. (b) Stripes on the body of a probable cockroach larva, scale bar, 2 mm. (c) Metallic green colour preserved on thorax of the odonatan *Cretarchistigma* (?) *essweini*, SMNS 66393; scale bar, 1 mm (this is the oldest fossil record of preserved interference colours!). (d) Spots and anterior wing stripe on an orthopteran; scale bar, 5 mm. (e) Spots on the wings of the neuropteran *Baisopardus cryptohymen*, holotype SMNS 65470. (f) A roach wing, acid-prepared from both sides and embedded in synthetic resin; scale bar, 0.5 mm.

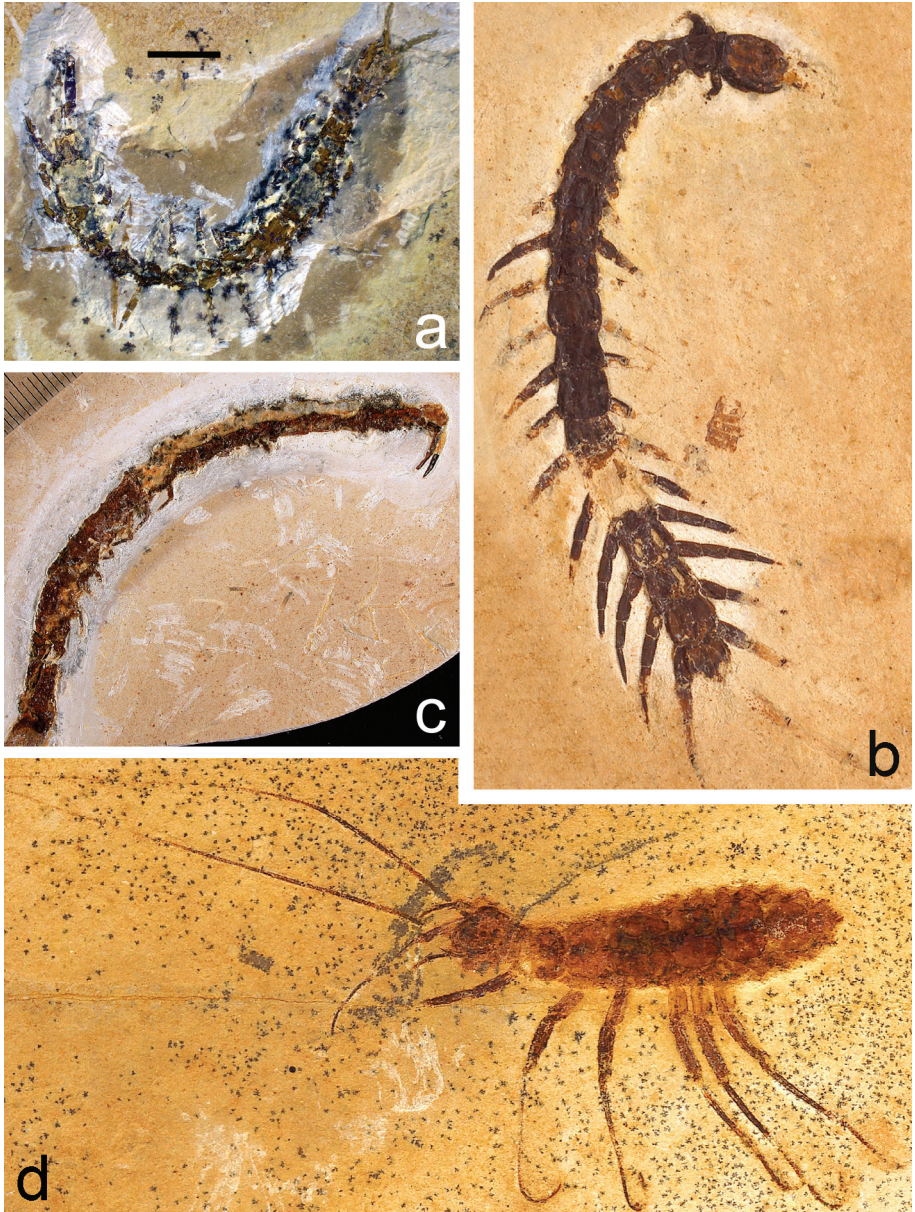


Plate 3. Crato centipedes: (a) *Velocipede betimari* (Martill and Barker, 1998), SMNK 2345; (b) *Cratoraricrus oberlii* (Wilson, 2003), holotype specimen SMNS 64431; (c) undetermined centipede, MURJ; (d) *Fulmenocursor tenax* (Wilson, 2001), holotype SMNS 64275. Scale bars, 10 mm.

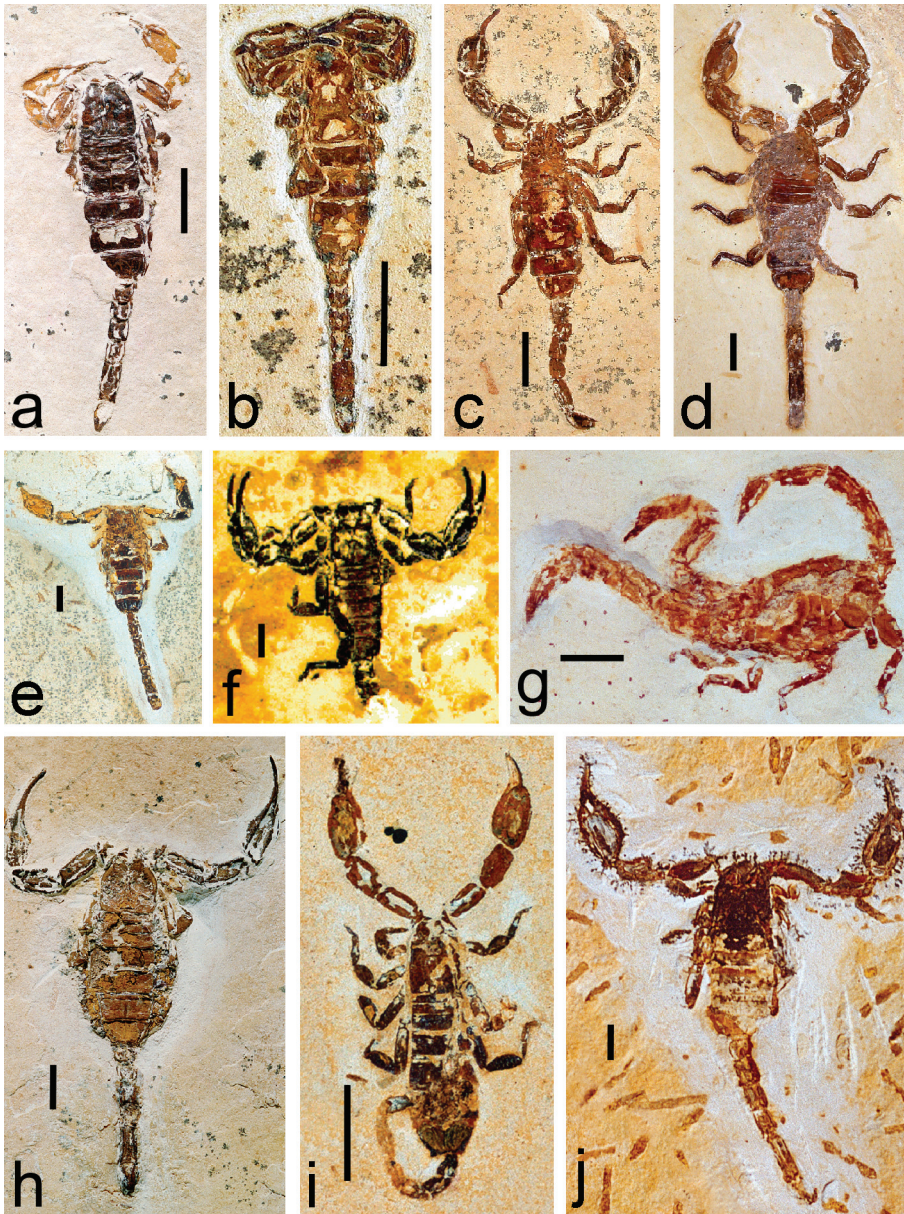


Plate 4. Crato scorpions: (a–f, i, j) *Protoischnurus axelrodorum* Carvalho and Lourenço, 2001; (g) Scorpionidae indet.; (h) *Araripescorpius ligabuei* Campos, 1986. Scale bars, 10 mm.

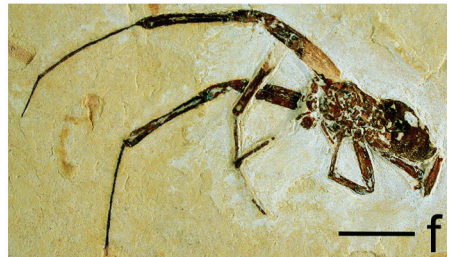
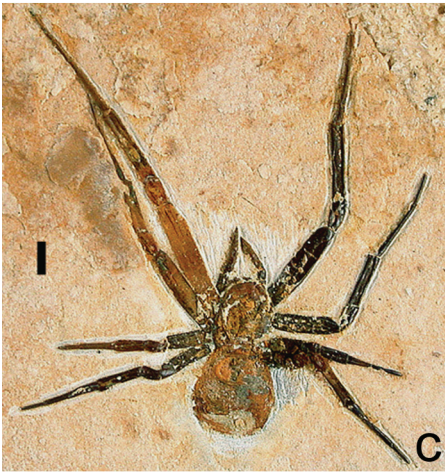
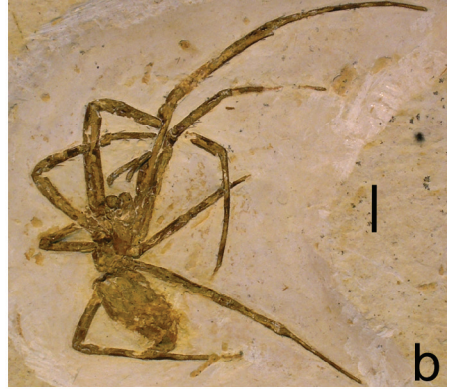
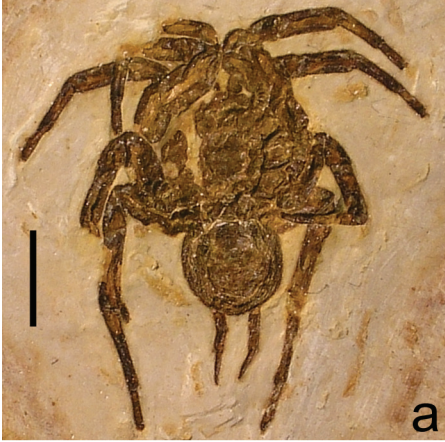


Plate 5. Crato spiders: (a) *Dinodiplura ambulacra* Selden, 2006; (b, c, e, f) *Cretaraneus martinsnetoi* Mesquita, 1996; (d) *Cretadiplura ceara* Selden, in Selden *et al.*, 2006. Scale bars, 5 mm (a, b, f), 1 mm (c).

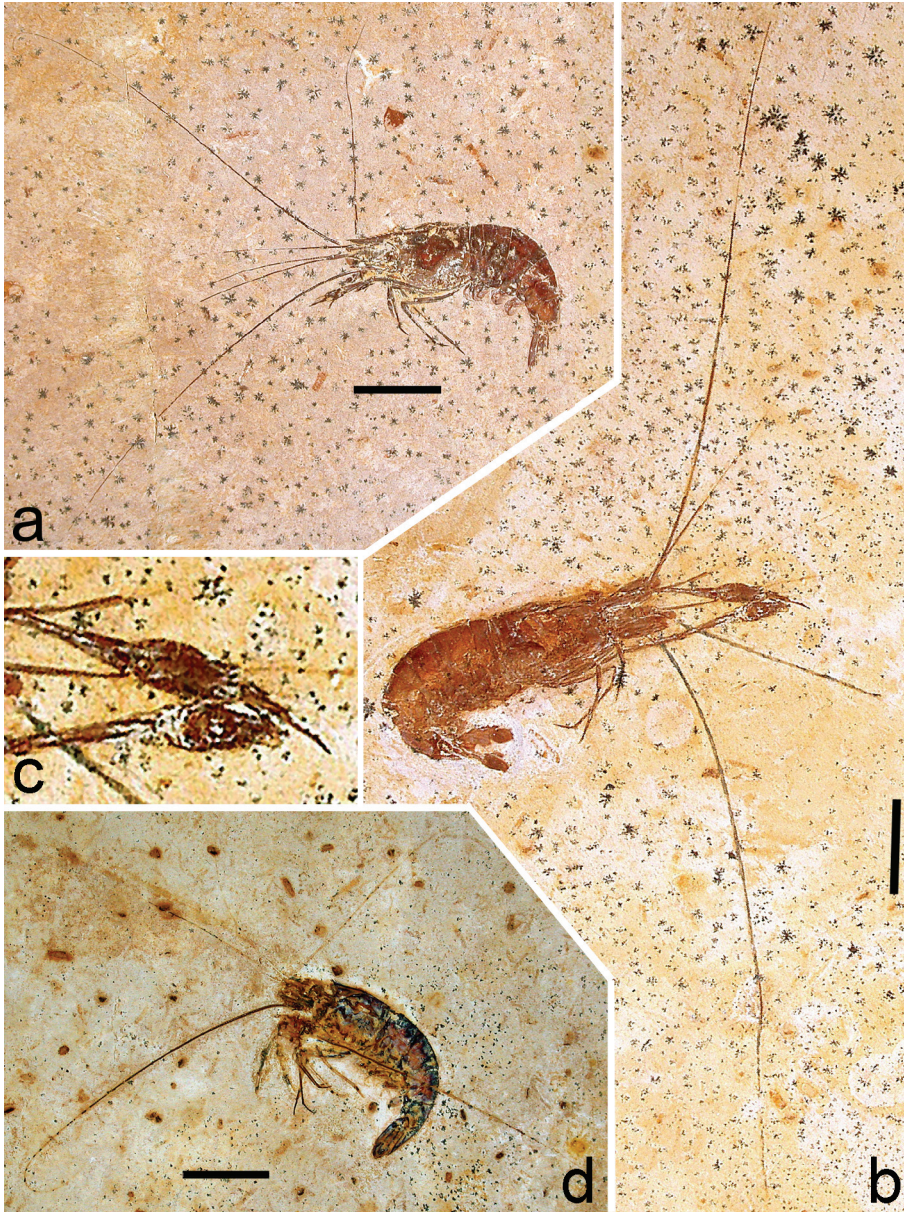


Plate 6. Crato shrimp *Beurlenia araripensis* Martins-Neto and Mezzalira, 1991. (a) MURJ. Length of specimen from tip of the rostrum to the end of the tail fan, measured along the dorsal line, is 37 mm. (b) A well-preserved example, MURJ. (c) Detail of terminal anterior appendages. (d) Moult with preserved rostrum but lacking some appendages, MSF; length of specimen approximately 23 mm. Scale bars, 10 mm.

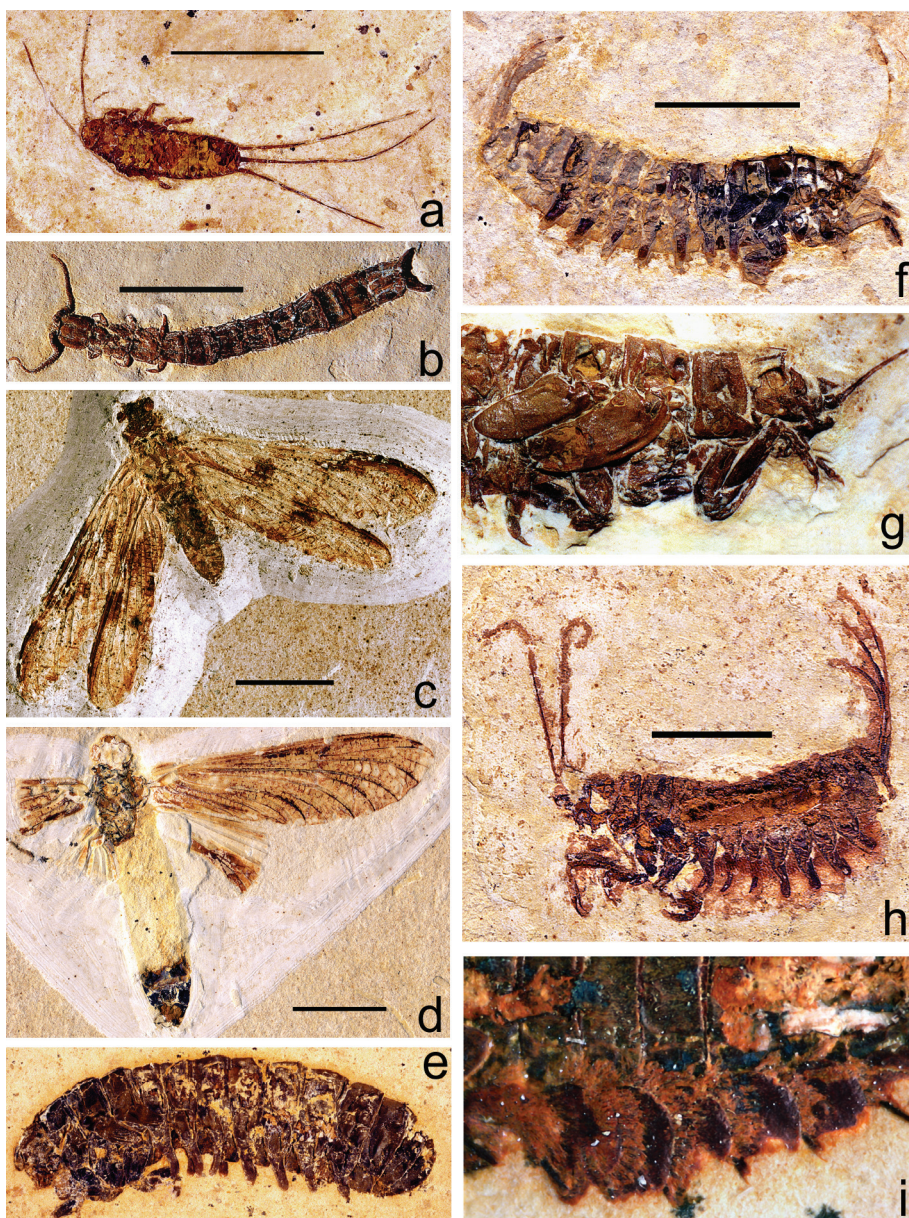


Plate 7. Crato insects: (a) *Zygentoma*, Lepismatidae gen. et sp. nov., SMNS 66535; (b) *Diplura*, Japygoidea, *Ferrojapyx vivax* Wilson and Martill, holotype, SMNS 64276; (c) *Cretereisma antiqua* sp. nov., holotype SMNS 66546 (Photo B. Schuster); (d) *Cretereisma schwickertorum* sp. nov., holotype SMNS 66598, ventral aspect; (e) *Cretereisma* sp., nymph, SMNS 66673; (f) *Cretereisma* sp., nymph, SMNS 66547; (g) *Cretereisma* sp., nymph no. 512 MURJ; (h) *Cretereisma* sp., nymph, SMNS 66599; (i) Ephemeroptera, Hexagenitidae, *Protoligoneuria limai*, larval gills with tufts, MSF Q4. Scale bars, 10 mm.

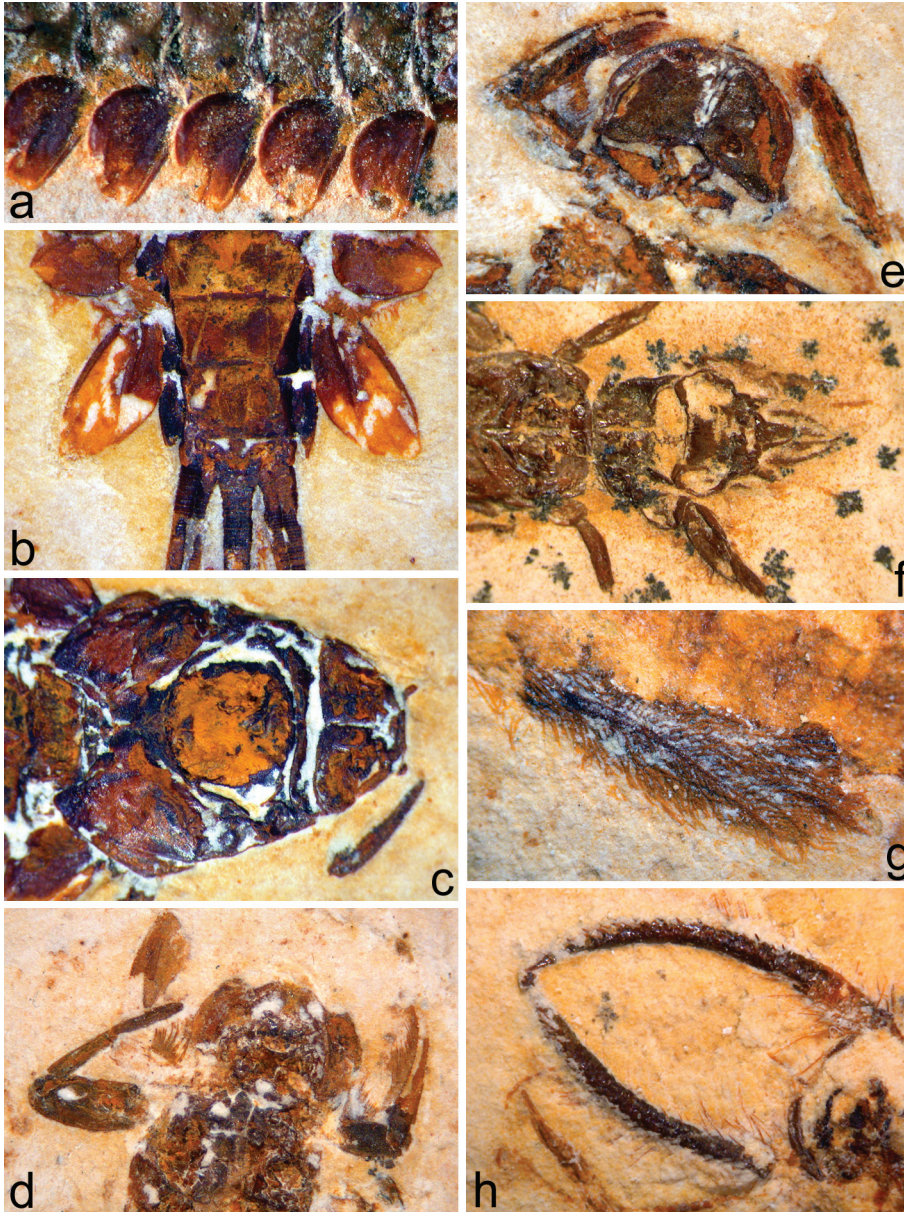


Plate 8. Crato mayfly larvae: (a) *Protoligoneuria limai*, larval gills with tufts, MSF Q9; (b) *Protoligoneuria limai* larval seventh gill plates, SMNS 66537; (c) *Protoligoneuria limai*, larval head and thorax with fusion of wing pads, SMNS 66537; (d) *Colocrus indicum*, larval filter apparatus, SMNS 66538; (e) *Colocrus indicum*, larval head with labial plate, SMNS 66619; (f) Ephemeroidea indet., larval head, SMNS 66630; (g) Euthyplocidae, *Pristiplocia* sp., larval gills, SMNS 66621; (h) Euthyplocidae, *Pristiplocia* sp., larval mandibles, SMNS 66621. Without scale bars.

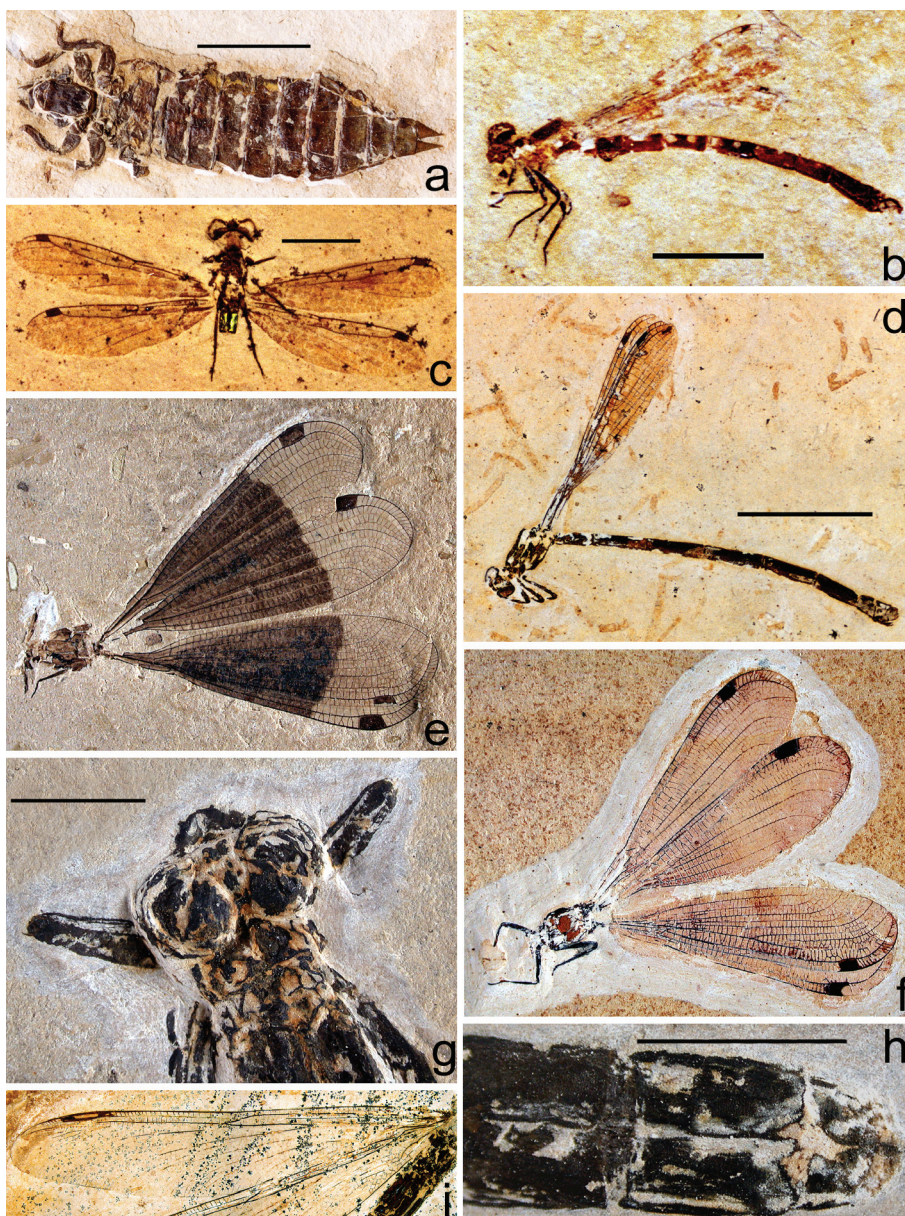


Plate 9. Crato Odonata: (a) gomphid larva with mask, SMNS 66402; (b) Hemiphlebidae?, *Cretarchistigma essweini*, male with anal appendages, MSF G3; (c) *Parahemiphlebia cretacica* with preserved green metallic colour on first abdominal segment, MSF 39; (d) *Eoprotoneura hyperstigma*, female with ovipositor, MSF O6; (e) *Euarchistigma atrophium* with colour pattern, SMF Q55; (f) *Euarchistigma marialuiseae* sp. nov., holotype SMF Q56; (g) *Cratostenophlebia schwickerti* gen. et sp. nov., male head, holotype SMNS Z109; (h) *Cratostenophlebia schwickerti* gen. et sp. nov., male anal appendages, holotype SMNS Z109; (i) *Cratostenophlebia schwickerti* gen. et sp. nov., female, left forewing, paratype and allotype SMNS Z110. Scale bars, 10 mm, except (a), 5 mm.

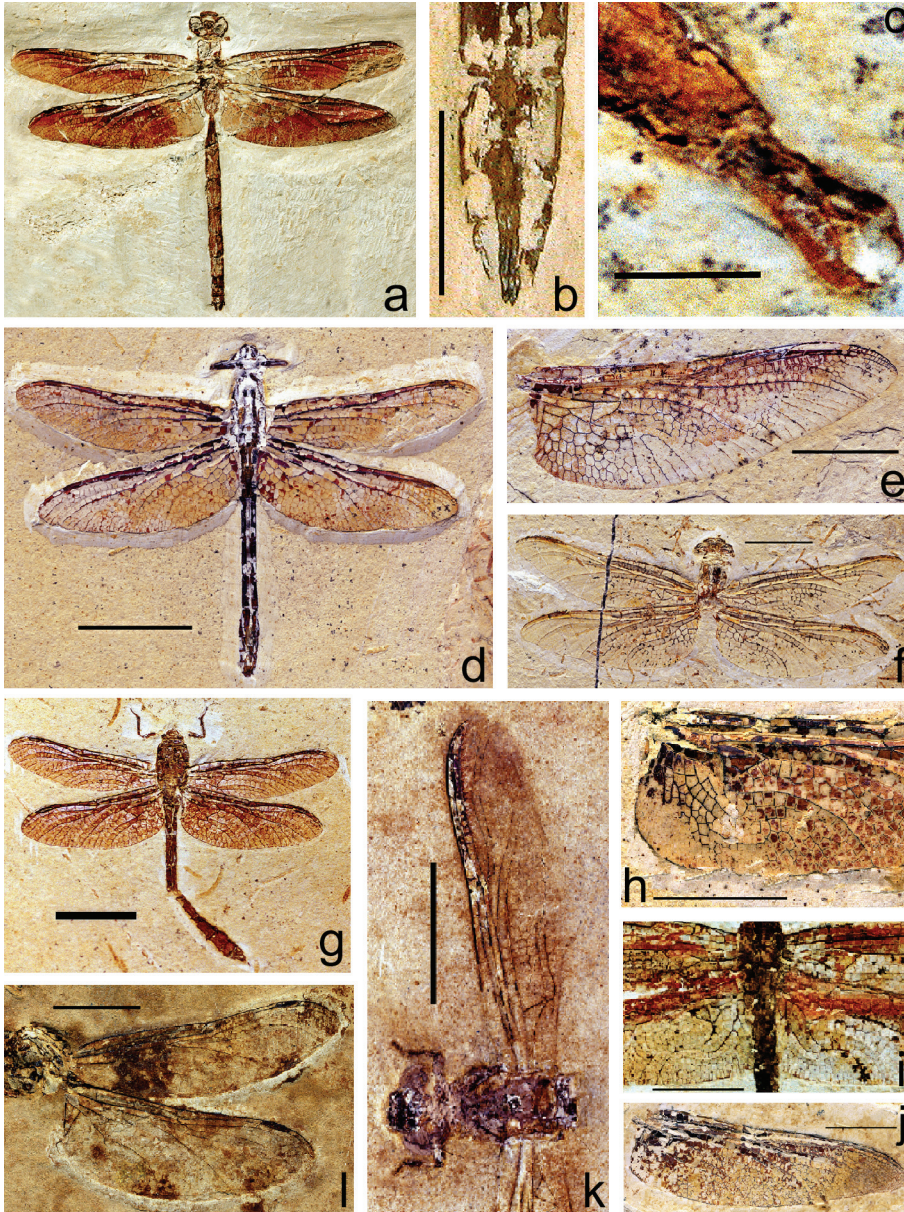


Plate 10. Crato Odonata: (a) *Araripeliupanshania annesuseae*, male, holotype MB. 1999.3 MB.I.2047; (b) *Araripegomphus andreneli*, female, ovipositor, SMNS 66392; (c) *Araripegomphus andreneli* male, anal appendages, MSF G10; (d) *Cordulagomphus* cf. *tuberculatus*, female, SMNS 64361; (e) *Cordulagomphus winkelhoferi* sp. nov., male, holotype SMNS 66607; (f) *Cordulagomphus hanneloreae* sp. nov., female, holotype SMNS 66591; (g) *Procordulagomphus michaeli* sp. nov., male, holotype MURJ no 514; (h) *Araripephlebia mirabilis*, female?, right hind wing, SMNS 66618; (i) *Araripephlebia mirabilis*, female?, wing bases, MSF G16; (j) Odonata, Anisoptera, gen. et sp. nov., female, SMNS 66567; (k) Odonata, Anisoptera, gen. et sp. nov., SMNS 66608; (l) Odonata, Anisoptera, gen. et sp. nov., male, SMNS 66614. Scale bars: (b), 5 mm; (c), 3 mm; (d, f, j, k), 15 mm; (e, g, h, i, l), 10 mm.

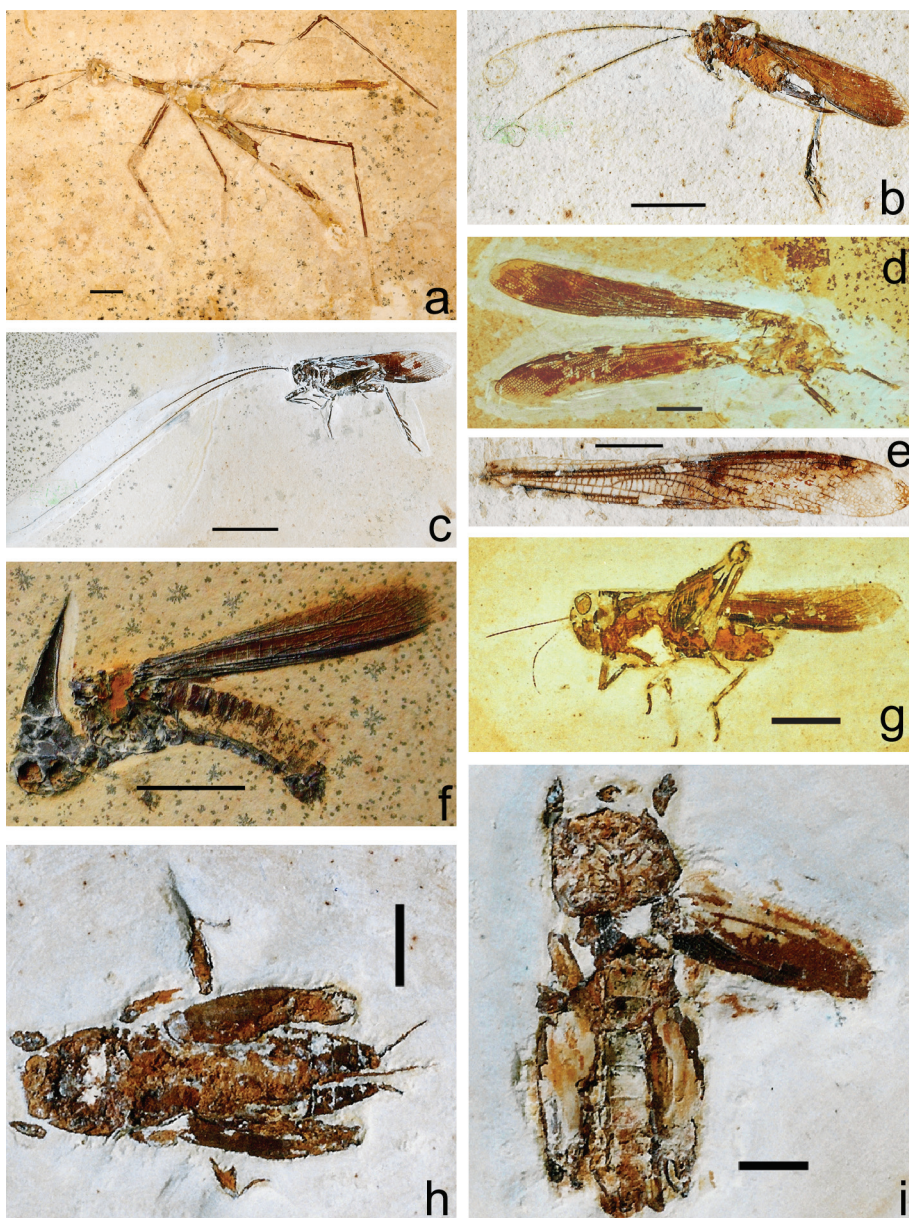


Plate 11. Crato Orthoptera: (a) Proscopiidae gen. et sp. nov. SMNS 66000–135; (b) Elcanidae, *Cratoelcana damianii* Martins-Neto, 1991a, SMNS 66498; (c) *Cratoelcana zessini* Martins-Neto, 1991a, SMNS 66566; (d) Locustopseidae, *Zessinia pulcherrima* Martins-Neto, 1990, priv. coll.; (e) Locustopseidae gen. nov., SMNS 66499; (f) Araripelocustidae, *Araripelocusta longinota* Martins-Neto, 1995, koshny coll.; (g) *Araripelocusta brevis* Martins-Neto, 1995, priv. coll.; (h) Tridactylidae, *Cratodactylus ferreirai* Martins-Neto, 1990, SMNS 66495; (i) *Cratodactylus ferreirai* Martins-Neto, 1990, SMNS 66489. Scale bars, 5 mm except h and i, 2 mm.

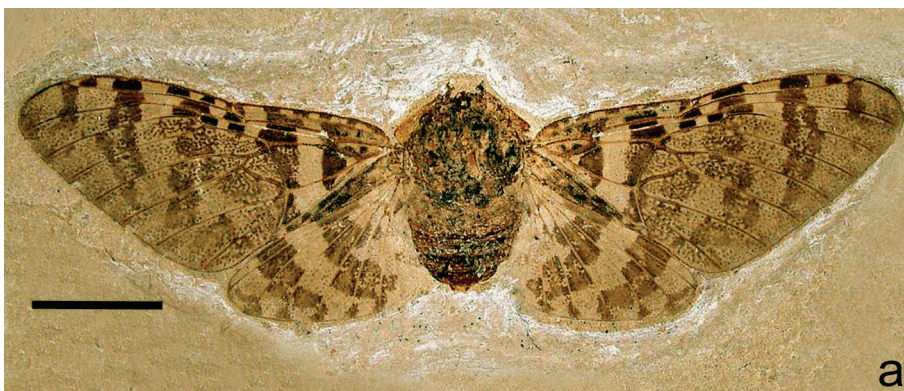


Plate 12. Crato Cicadomorpha and Fulgoromorpha: (a) fine example of palaeontinid cicadomorph *Baeocossus* cf. *fortunatus* Menon and Heads, 2005, with colour pattern preservation, KMNH without number; (b) Tettigarctidae *Tettagalma striata* Menon, 2005 with colour pattern preservation, SMNS 66507; (c) Fulgoromorpha, Fulgoridae, gen. et sp. nov., SMNS 66413, ventral aspect. Scale bars: a, b, 1 mm; c, 2 mm.

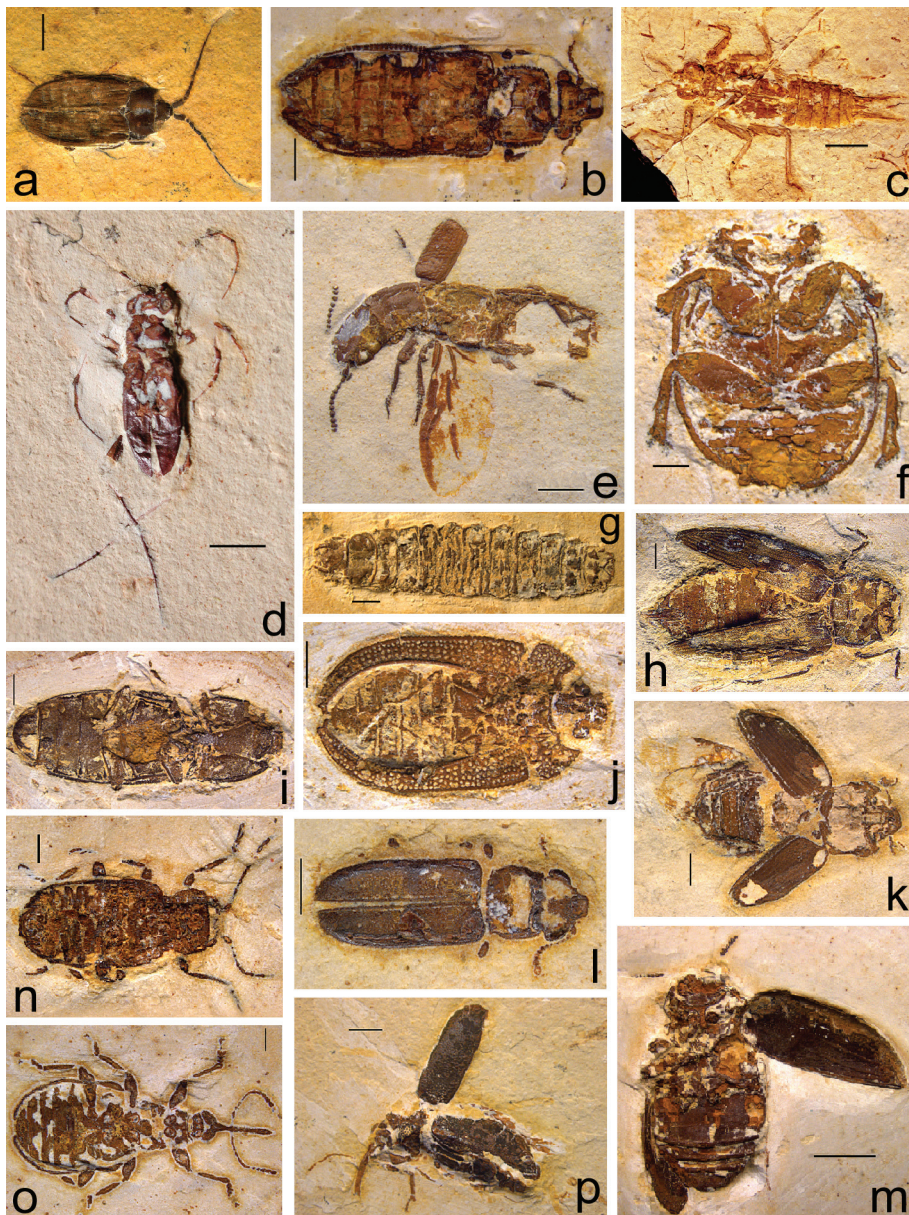


Plate 13. Crato beetles: (a) Archostemata, probably Cupedidae, SMNS 66552; scale bar, 2 mm; (b) Archostemata, probably Ommatidae, SMNS 66456; scale bar 2 mm; (c) Odonata dragonfly larva *Nothomacromia sensibilis*, originally described as a possible coptocloid beetle named *Conan barbarica* by Martins-Neto (1998); scale bar, 10 mm; (d) Carabidae, Cicindelinae, *Oxycheilopsis cretaciensis* Cassola and Werner, 2004, holotype ZSM without number; scale bar, 2 mm (photograph courtesy of Karl Werner); (e) Staphylinidae, SMNS 66452; scale bar, 1 mm; (f) Scarabaeidae, SMNS 66458; scale bar, 1 mm; (g) Hydrophilidae, larva, SMNS 66446; scale bar, 1 mm; (h) Buprestidae, SMNS 66461; scale bar, 2 mm; (i) Elateridae, SMNS 66465; scale bar, 2 mm; (j) Trogossitidae, Peltinae, SMNS 66467; scale bar, 2 mm; (k) Nitidulidae, SMNS 66470; scale bar, 1 mm; (l) Cucujidae, SMNS 66468; scale bar, 1 mm; (m) probably Tenebrionidae, SMNS 66472; scale bar, 5 mm; (n) Chrysomelidae, probably Eumolpinae, SMNS 66471; scale bar, 1 mm; (o) Curculionoidea, probably Belidae, ?Oxycoryninae, SMNS 66553; scale bar, 1 mm; (p) Curculionoidea, Attelabidae, probably Rhynchitinae, SMNS 66449; scale bar, 2 mm.

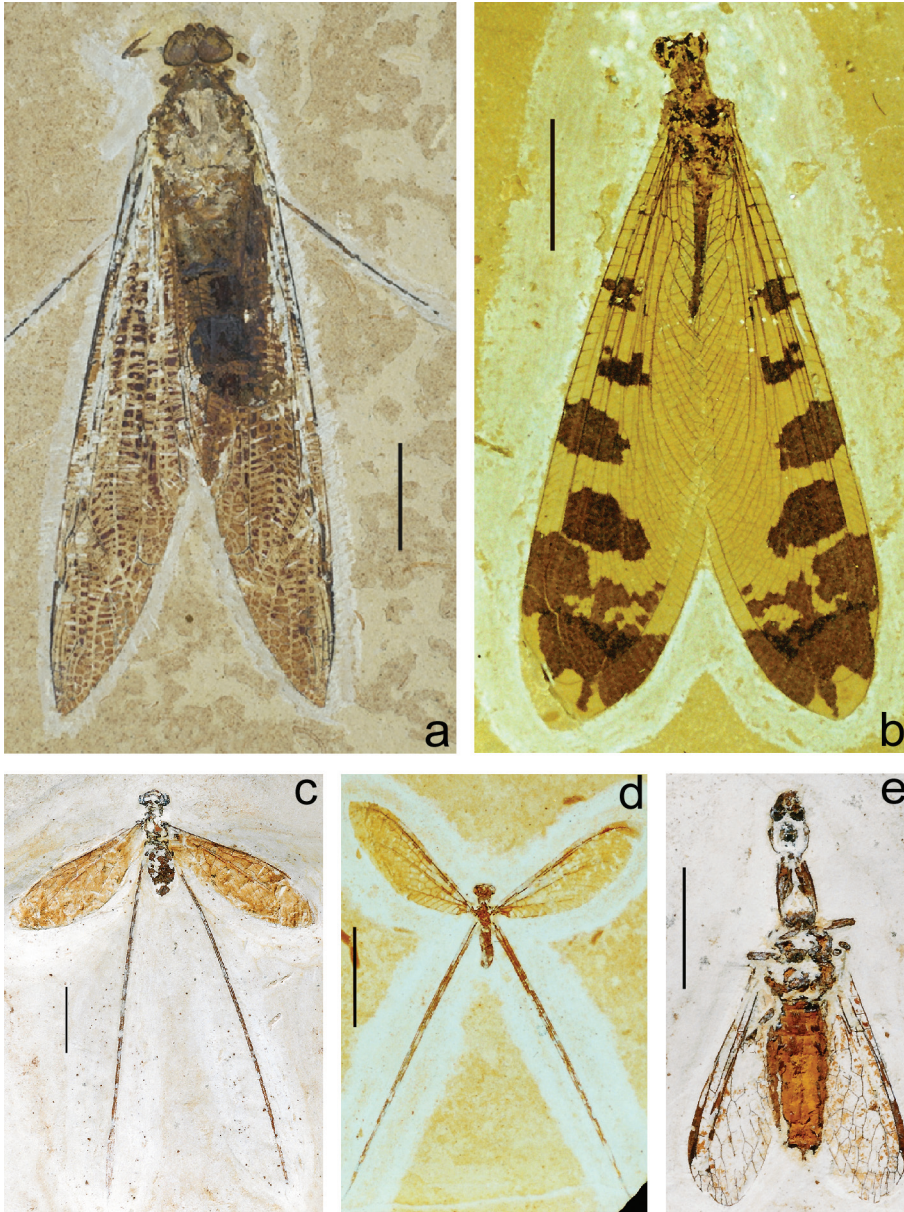


Plate 14. Crato Neuropterida: (a) Schwickertoptera Bechly ord. nov., *Rafaelia maxima* Nel *et al.* 2005, SMNS coll.; (b) Myrmeleontiformia, Palaeoleontidae, SMNS coll.; (c) Myrmeleontiformia, Nemopteridae sp. 2, SMNS 66000/260; (d) Myrmeleontiformia, Nemopteridae sp. 1, priv. coll.; (e) Raphidioptera, *Baissoptera* sp. Scale bars, 10 mm, except (e), 5 mm.

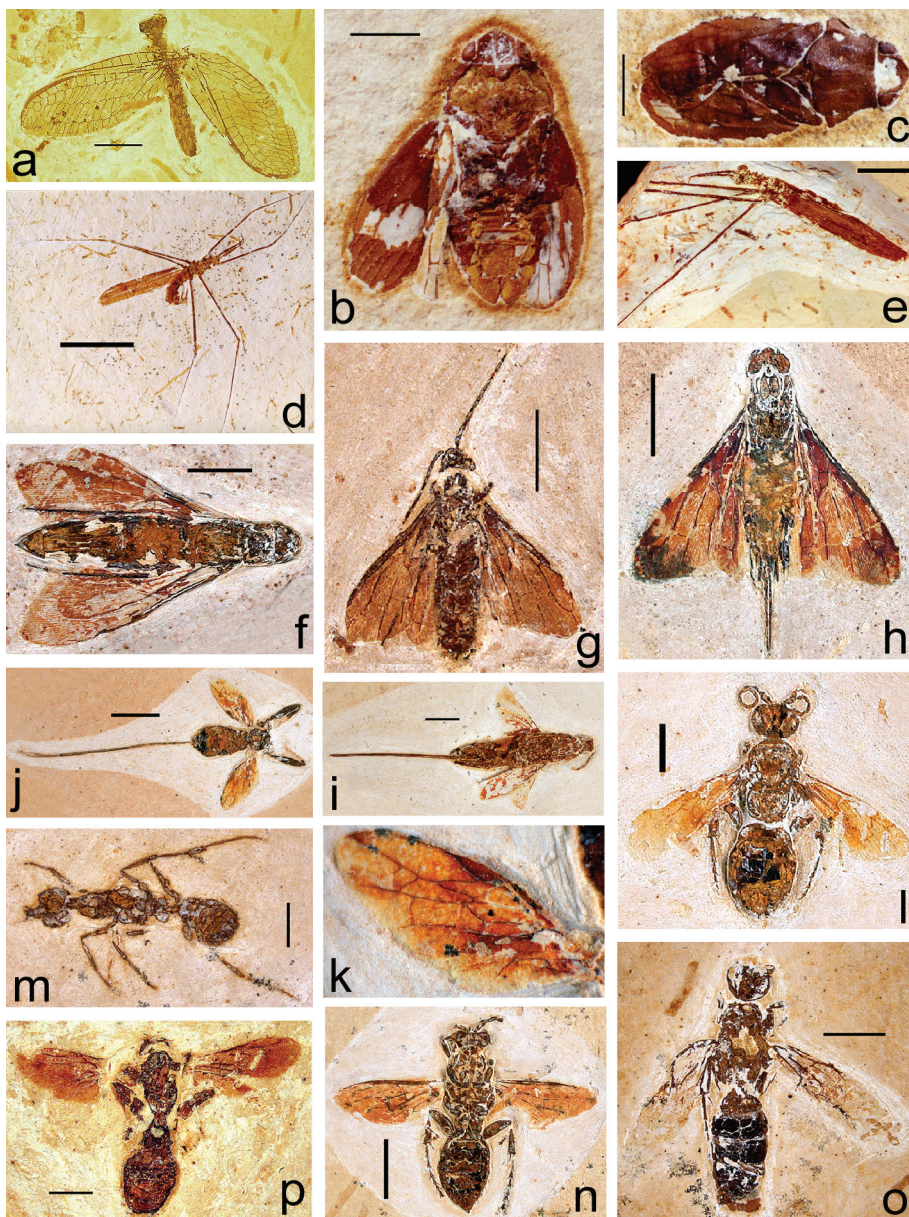


Plate 15. Crato insects: (a) Neuroptera, Hemerobiiformia, Mesochrysopidae gen. et sp. nov., priv. coll.; scale bar, 5 mm; (b) Coleorrhyncha, Progonocimidae gen. et sp. nov. SMNS 66423; scale bar, 2 mm; (c) Coleorrhyncha, Progonocimidae gen. et sp. nov. SMNS 66431; scale bar, 2 mm; (d) Chresmododea, Chresmodidae, *Chresmoda* sp. nov., SMNS prelim. no. 0134 (old no. H56), scale bar = 20 mm; (e) Chresmododea, Chresmodidae, *Chresmoda* sp. nov., ex MSF coll G88; scale bar, 10 mm; (f) Hymenoptera, Anaxyelidae, MURJ without number; scale bar, 5 mm; (g) Anaxyelidae, *Protsyntexis* sp., SMNS 66304; scale bar, 5 mm; (h) Siricidae, MURJ without number; scale bar, 5 mm; (i) ?Ichneumonoidea, MURJ without number; scale bar, 5 mm; (j) Ephialtitidae, *Cretephialtites kourios*, MURJ without number; scale bar, 5 mm; (k) Ephialtitidae, *Cretephialtites kourios*, right wings, MURJ without number, without scale; (l) ?Pompilidae, MURJ without number; scale bar, 2 mm; (m) Formicidae, Mymeciinae, *Cariridris bipetiolata*, SMNS 66565; scale bar, 2 mm; (n) Tiphidae, *Architiphia rasnitsyni*, MURJ without number; scale bar, 5 mm; (o) Tiphidae, ?Myzininae, SMNS 66303; scale bar, 5 mm; (p) Vespidae, ?Eumeninae, SMNS 66295; scale bar, 2 mm.



Plate 16. Crato Amiiformes: (a) disarticulated skull of unidentified Amiidae, possibly Vidalamiinae; scale bar, 10 mm; (b, c) rare example of a complete Crato Fm. Amiidae, MURJ coll.

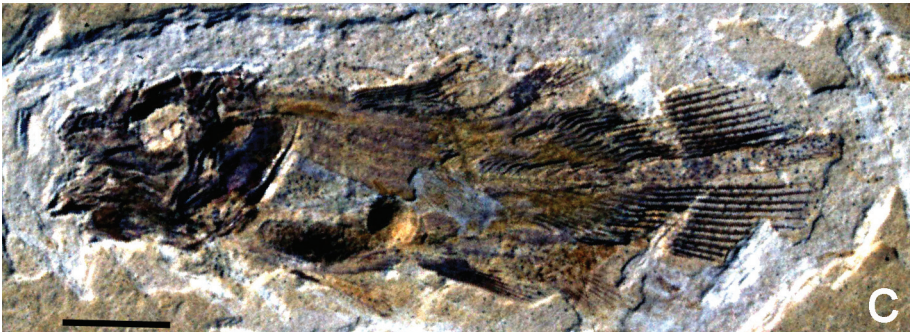
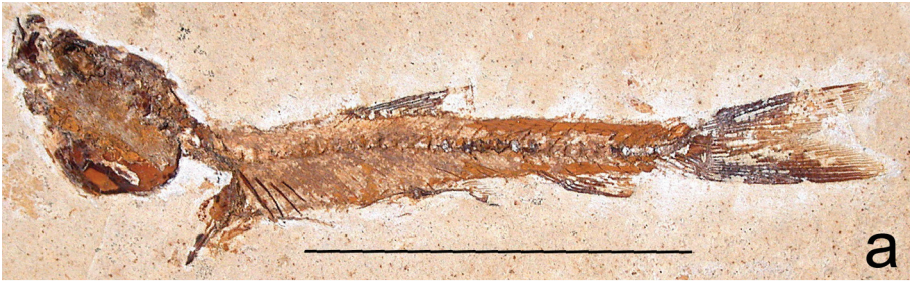


Plate 17. Crato fish: (a) *Dastilbe crandalli* Jordan, 1910, young example with partially detached skull; (b, c) two examples of juvenile coelacanth *Axelrodichthys* sp. The distal lobes of the caudal fin in (b) are a fabrication executed by the fossil collectors of Nova Olinda.

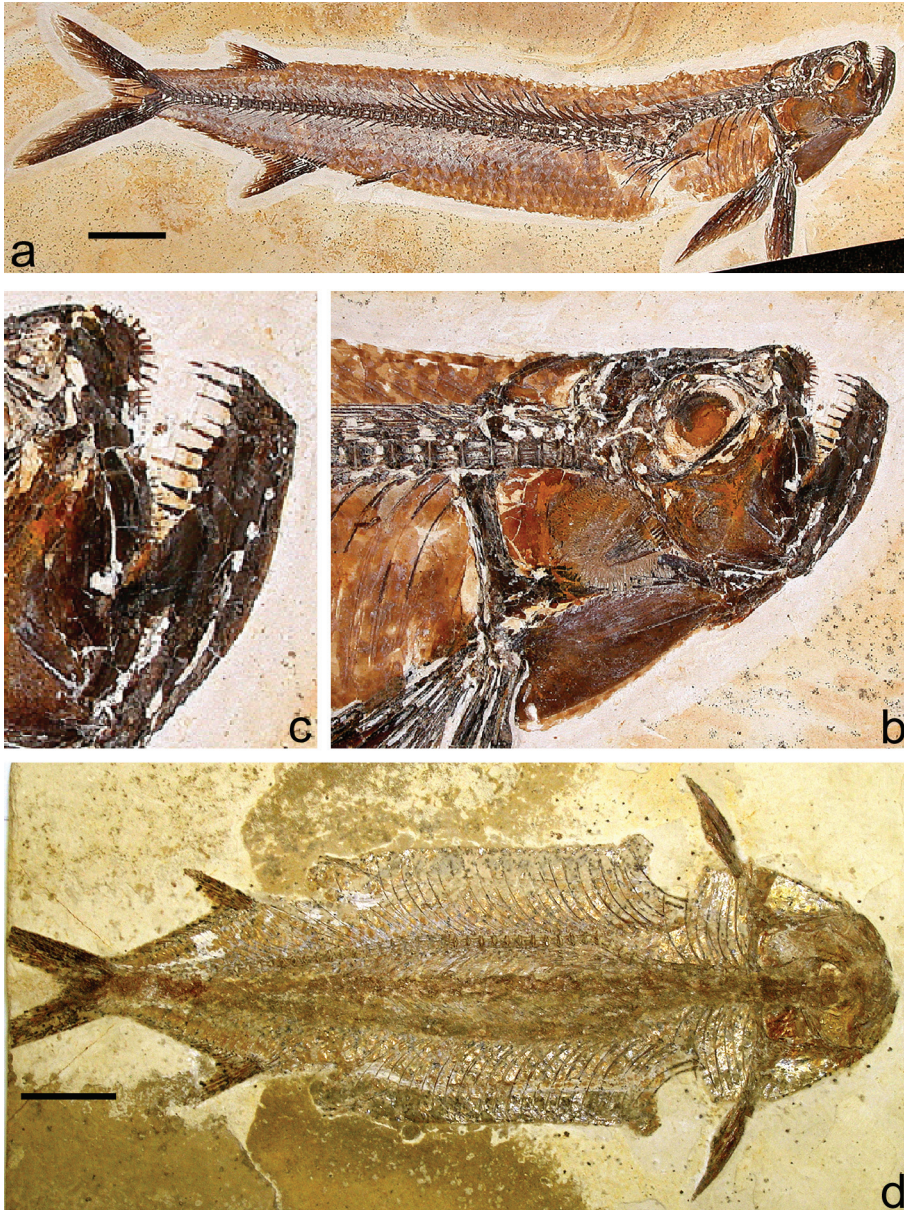


Plate 18. Examples of the ichthyodectid *Cladocycclus gardneri* Agassiz, 1841: (a) near-complete example in almost perfect condition, excepting disrupted vertebral column just above stomach region; (b) skull of same specimen highlighting the dorsally directed mouth opening; (c) dentition of same specimen showing the semi-circular dental border of the premaxilla and needle-like teeth of the dentary; (d) a 'filleted' example. Unusually, this specimen appears to have split along its ventral border. Scale bars, 20 mm.

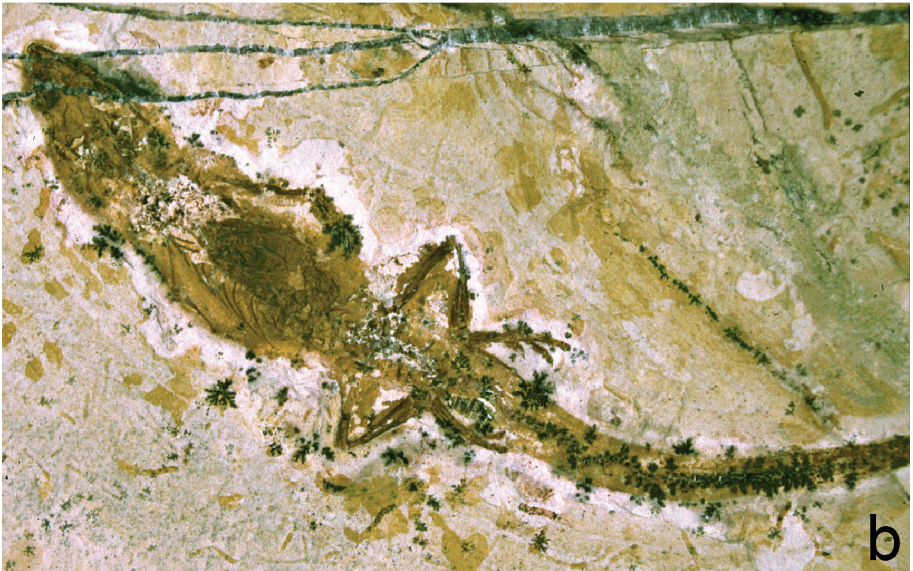


Plate 19. Crato lizards: (a) undescribed lizard missing its tail; the dark area just behind the forelimbs is the stomach contents; SMNK; (b) *Tijubina ponteii* Bonfim Jr and Marques, 1997, counterpart to the holotype, current whereabouts unknown. Scale bar, 5 mm.

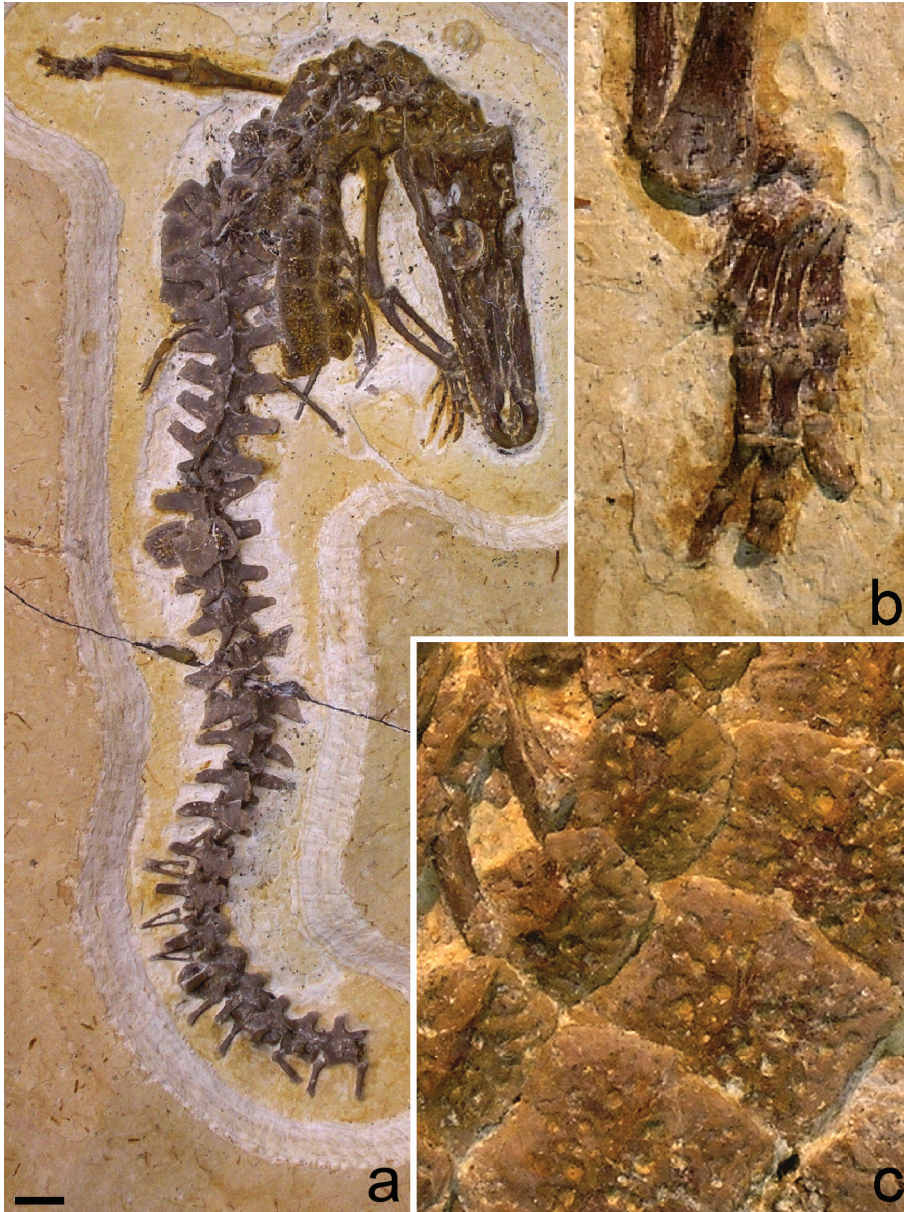


Plate 20. Crato crocodilian *Susisuchus anatoiceps* Salisbury, Frey and Martill, 2003, holotype SMNK PAL 3804: (a) partial skeleton with complete skull, both forelimbs and partial vertebral column wanting distal-most caudals, and cranial-most dermal skeleton; (b) detail of left manus; (c) detail of osteoderms. Scale bar, 10 mm.

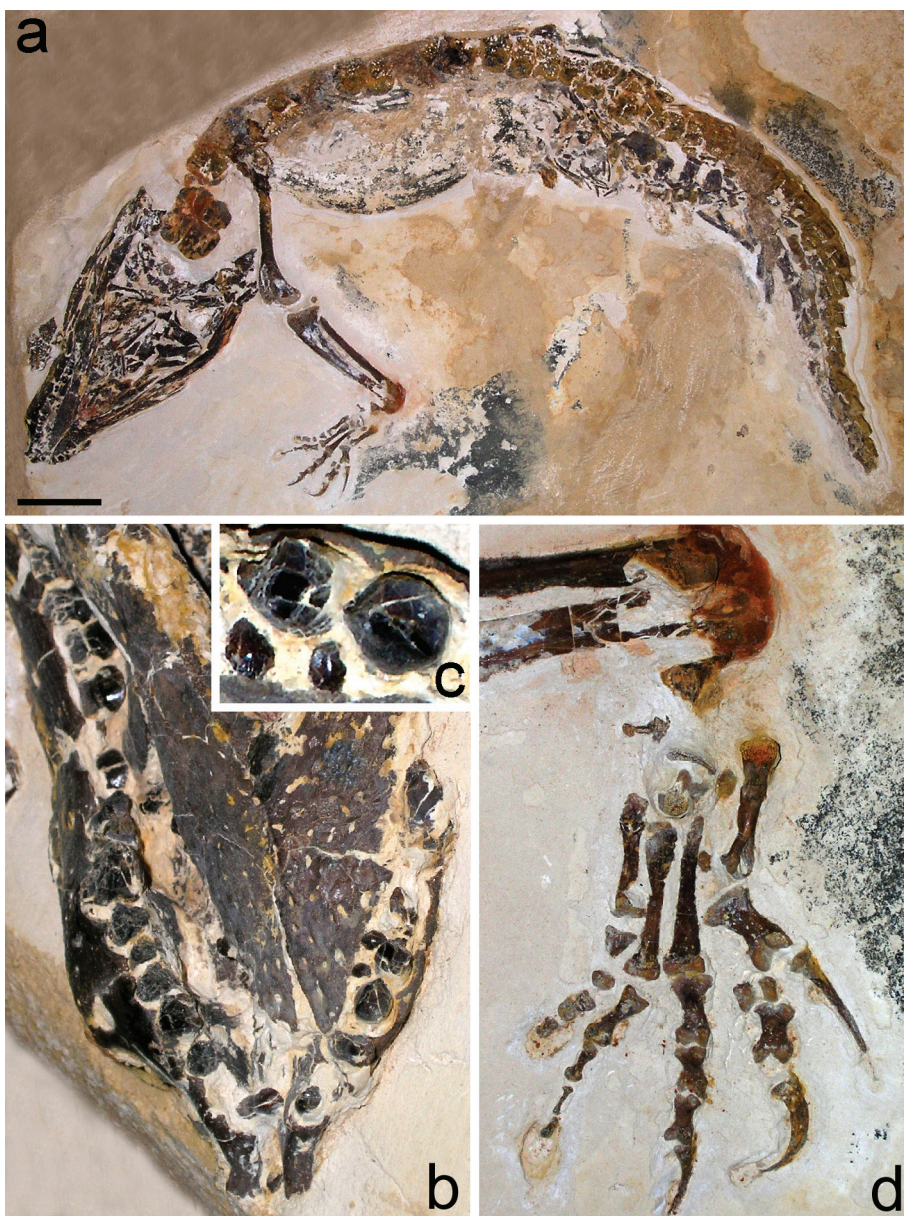


Plate 21. New araripesuchid crocodilian: (a) partial skeleton SMNK PAL 6404 with complete skull, left forelimb and axial skeleton with associated osteoderms; (b) detail of lower jaw symphysis and occlusal surface of premaxillae with exposed dentition; (c) detail of dentition; (d) detail of left manus. Scale bar, 50 mm.

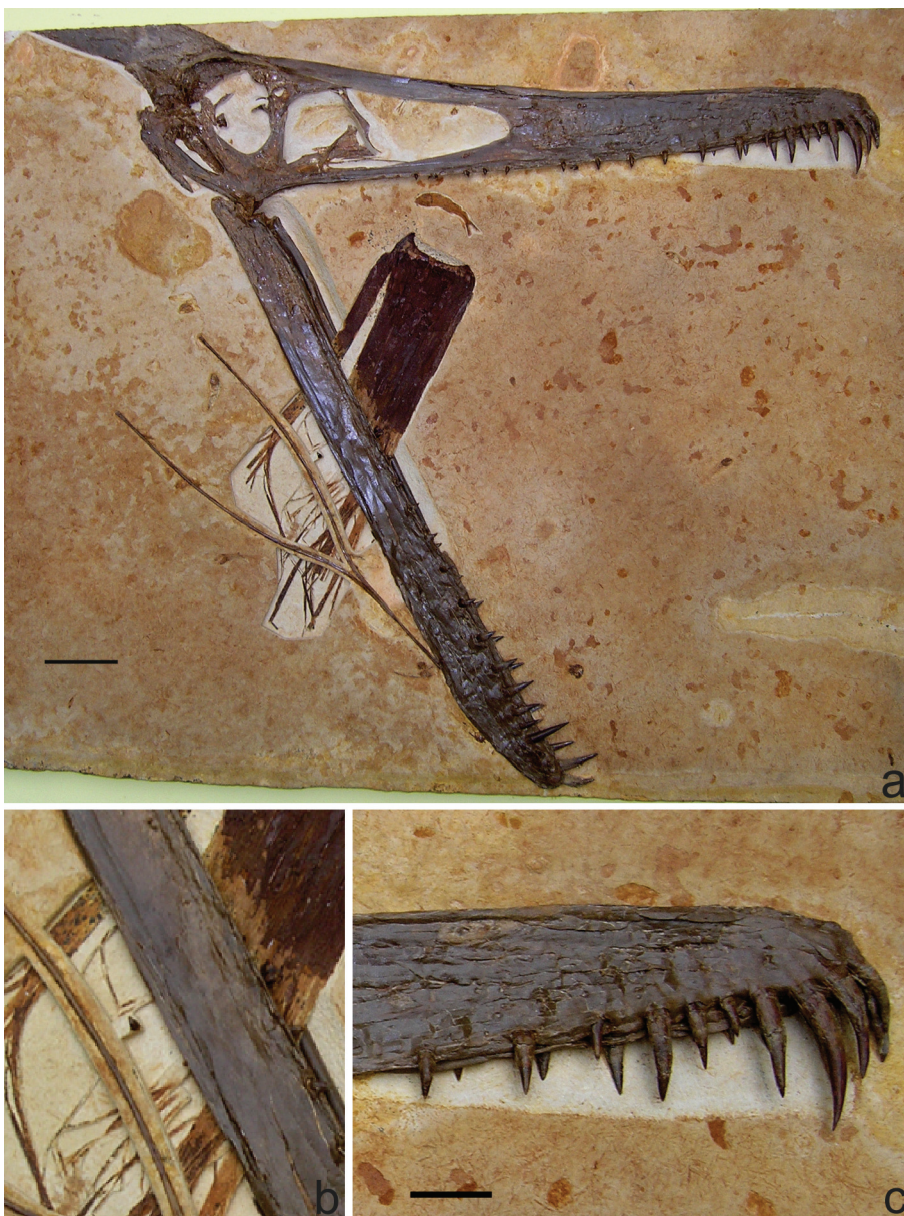


Plate 22. Skull of the Crato pterosaur *Ludodactylus sibbicki*, SMNK PAL 3828: (a) in right lateral view; (b) detail of the leaf lodged between the mandibular rami illustrating its frayed end; (c) detail of premaxillary dentition. Scale bars: a, 50 mm; c, 20 mm.



Plate 23. Skull of the Crato pterosaur *Ingridia navigans* (Frey, Martill and Buchy, 2003), SMNK PAL 2344. (a) Holotype skull in right lateral view as preserved; scale bar, 50 mm. (b) Caudal view of skull of same specimen showing occipital condyle and quadrates; scale bar, 5 mm.

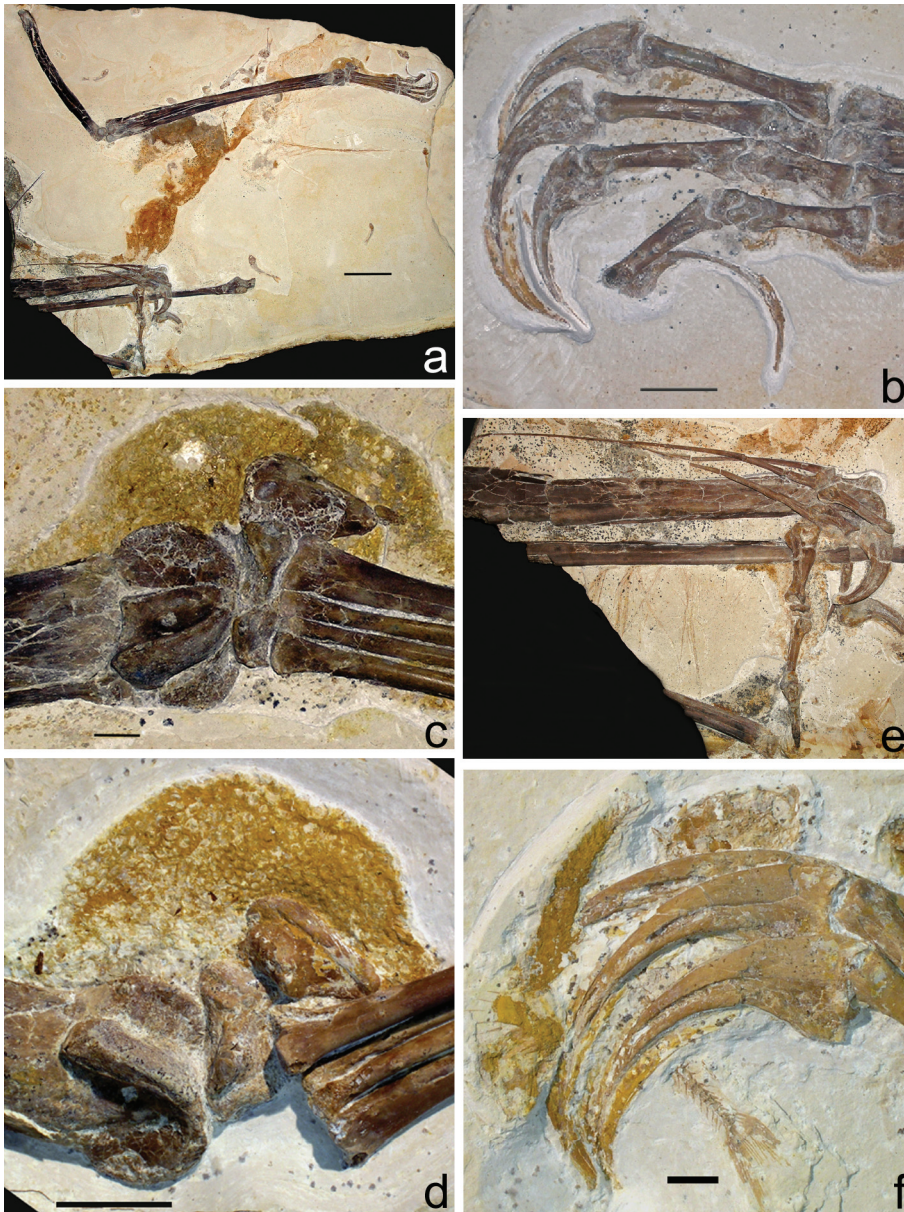


Plate 24. Tapejaridae gen. et sp. indet., SMNK PAL 3830: (a) slab bearing parts of the left forelimb and the complete left hindlimb, with a well-preserved cheiropatagium extending from the manus to the left lower leg; scale bar, 100 mm; (b) pes of same specimen with claw sheaths preserved; scale bar, 10 mm; (c, d) heel pad with scales; scale bars, 10 mm; (e) manus of same specimen showing associated soft tissues; (f) pedal phalanges with claw sheaths showing extension well beyond the unguals; scale bars, 5 mm.

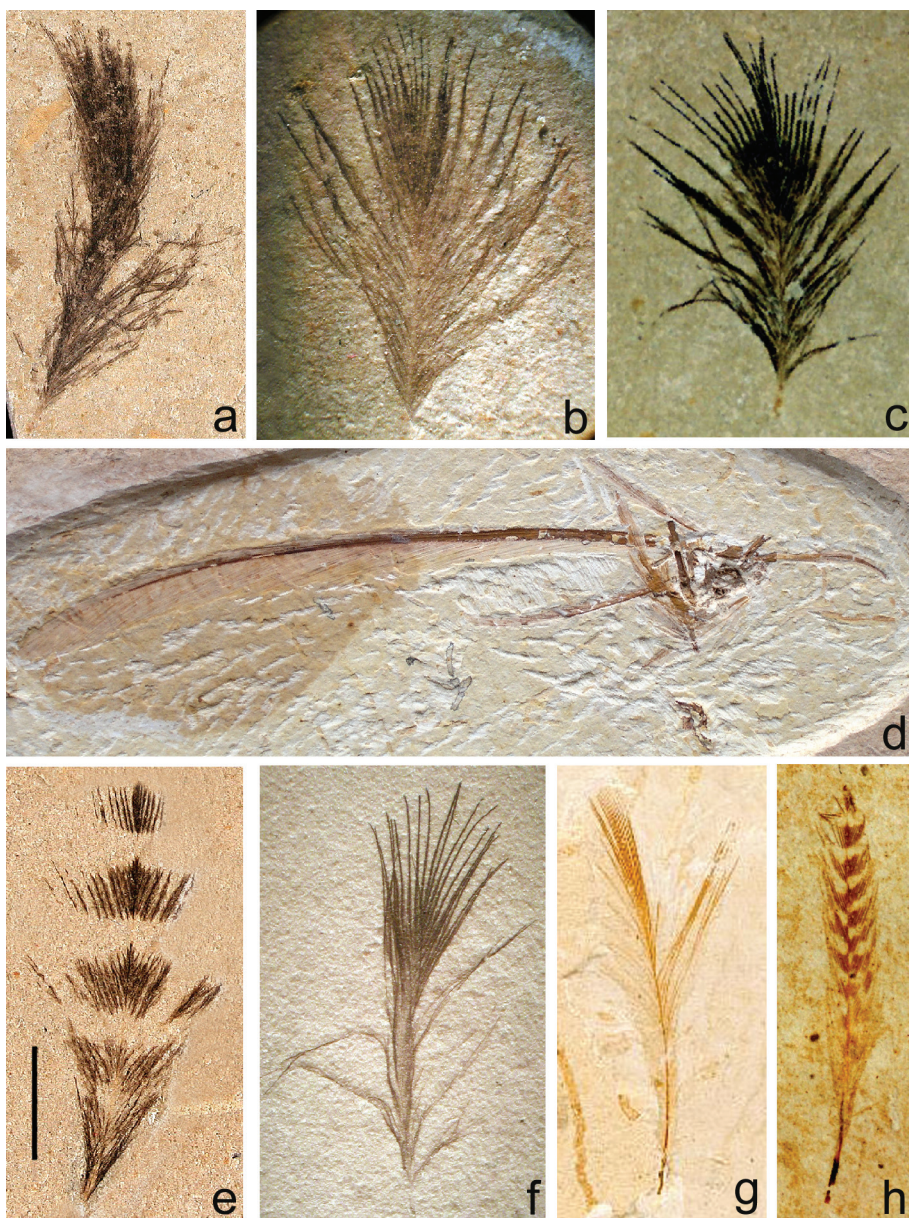


Plate 25. Crato feathers: (a–c) isolated down feathers; (d) partial ‘wing’ comprising single large asymmetric ‘primary’ flight feather, five smaller asymmetric feathers and two unidentifiable bones, non-accessioned specimen in SMF; (e) small down feather with pattern of transverse bands; (f) single elongate down feather; (g) feather with pattern of fine, diagonally arranged banding; (h) elongate symmetrical feather with pattern of offset bands. Scale bar in e, 5 mm.

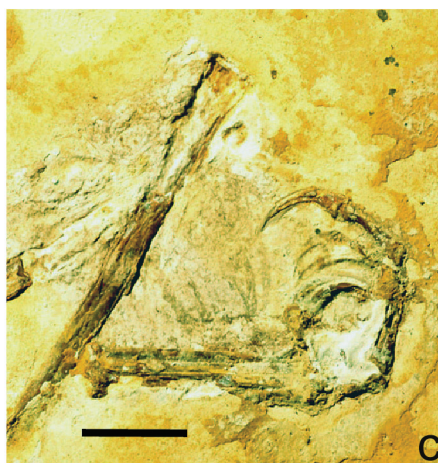
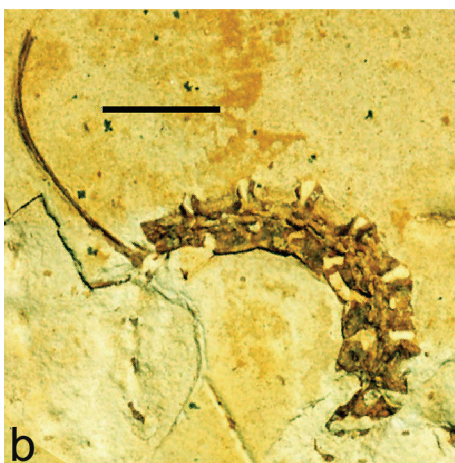
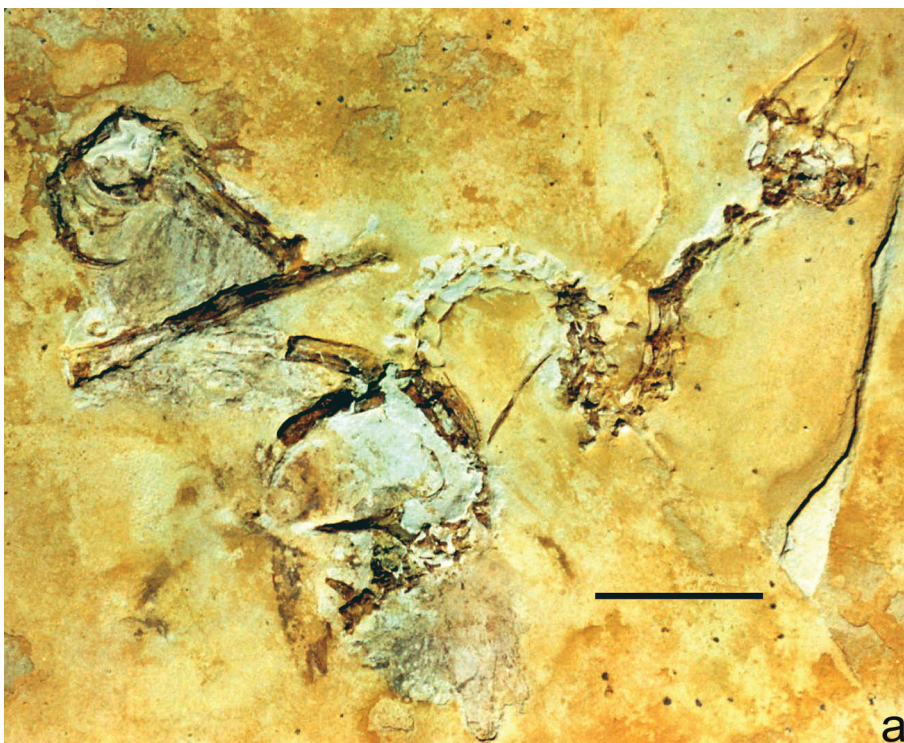


Plate 26. Crato bird: (a) partial skeleton a of probable enantiornithine bird; (b) dorsal vertebrae from counterpart slab; (c) pes showing fully reversed hallux. MURJ. Scale bars: a, 20 mm; b, c, 10 mm.

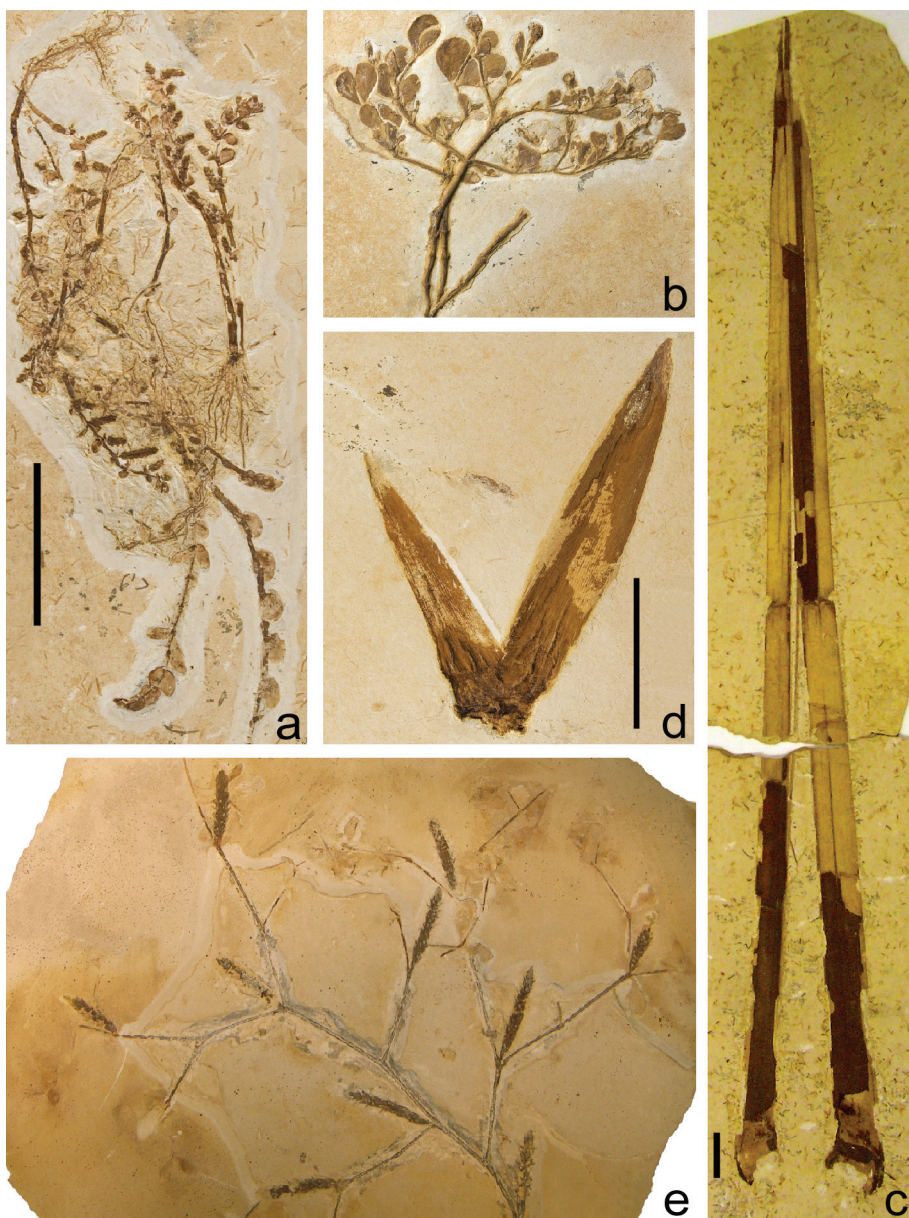


Plate 27. Crato plants: (a) Gnetophyte taxon G, small plant; (b) Gnetophyte taxon F, male plant; (c) large example of *Welwitschiophyllum* leaf; (d) an unusual example of *Welwitschiophyllum* sp. with two leaves; (e) Gnetophyte, *Welwitschiostrobus murili* Dilcher *et al.*, 2005. Scale bars: a, c, d, 50 mm.



Plate 28. Crato plants: (a) gnetophyte taxon H, a large plant with short articulated side branches; scale bar, 50 mm; (b) monocotyledon, unnamed taxon. Scale bar, 10 mm.

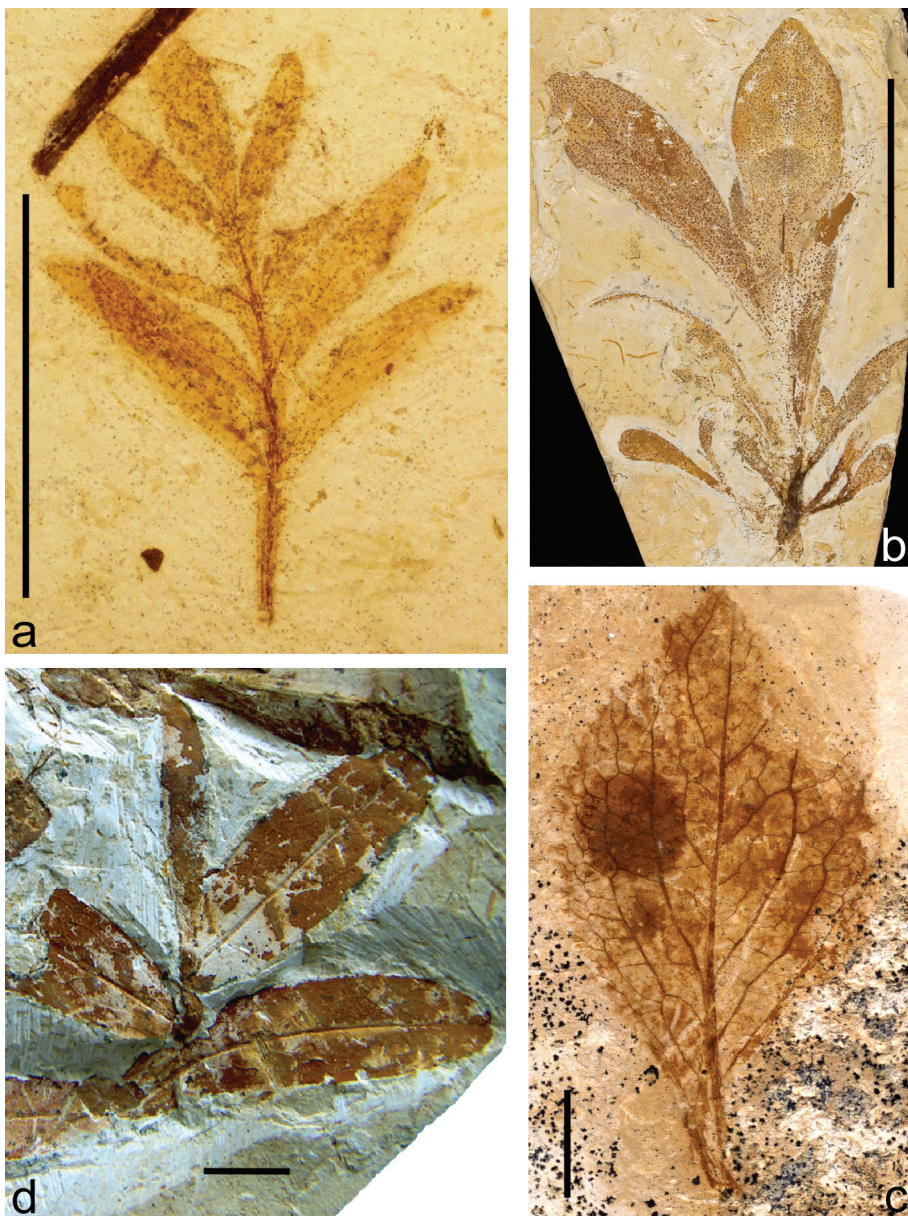


Plate 29. Crato angiosperms: (a) complex leaf of undescribed angiosperm; (b) large leaves of undescribed angiosperm; (c) chloranthacean leaf; (d) leaves of an undescribed angiosperm type B. Scale bars: a, b, 50 mm; c, d, 10 mm.

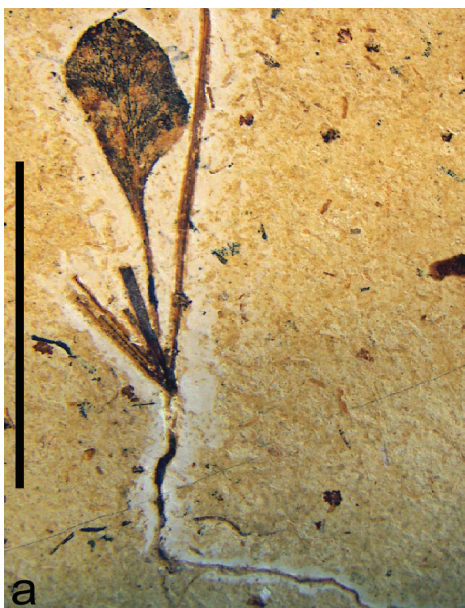


Plate 30. Crato plants: (a) young herbaceous plant with possible primary root; (b) young herbaceous angiosperm with extensive root system; (c) group of isolated angiospermous carpels; (d) possible nymphaealean cabombacean. Scale bars: a–c, 50 mm; d, 10 mm.

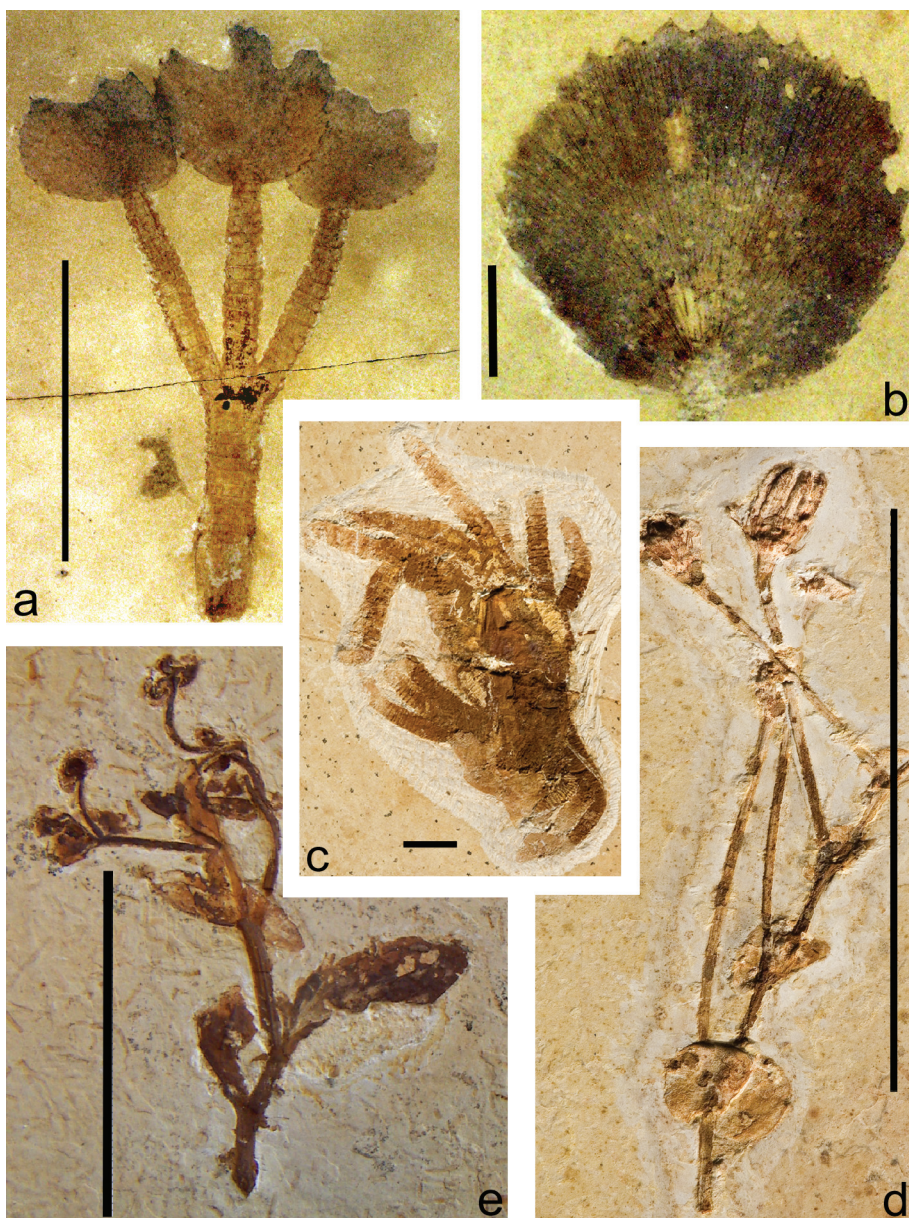


Plate 31. Crato monocotyledon plants: (a) *Klitzschophyllites flabellata* showing the typical trifurcate branching pattern; (b) *Klitzschophyllites* single leaf showing venation and terminal glands; scale bar, 10 mm; (c) basal complex of a possible multi-stemmed example of *Klitzschophyllites*; (d) *Endressinia brasiliiana* with leaves and flowers; (e) small, undescribed angiosperm type A. Scale bars. a, c, d, e, 50 mm.

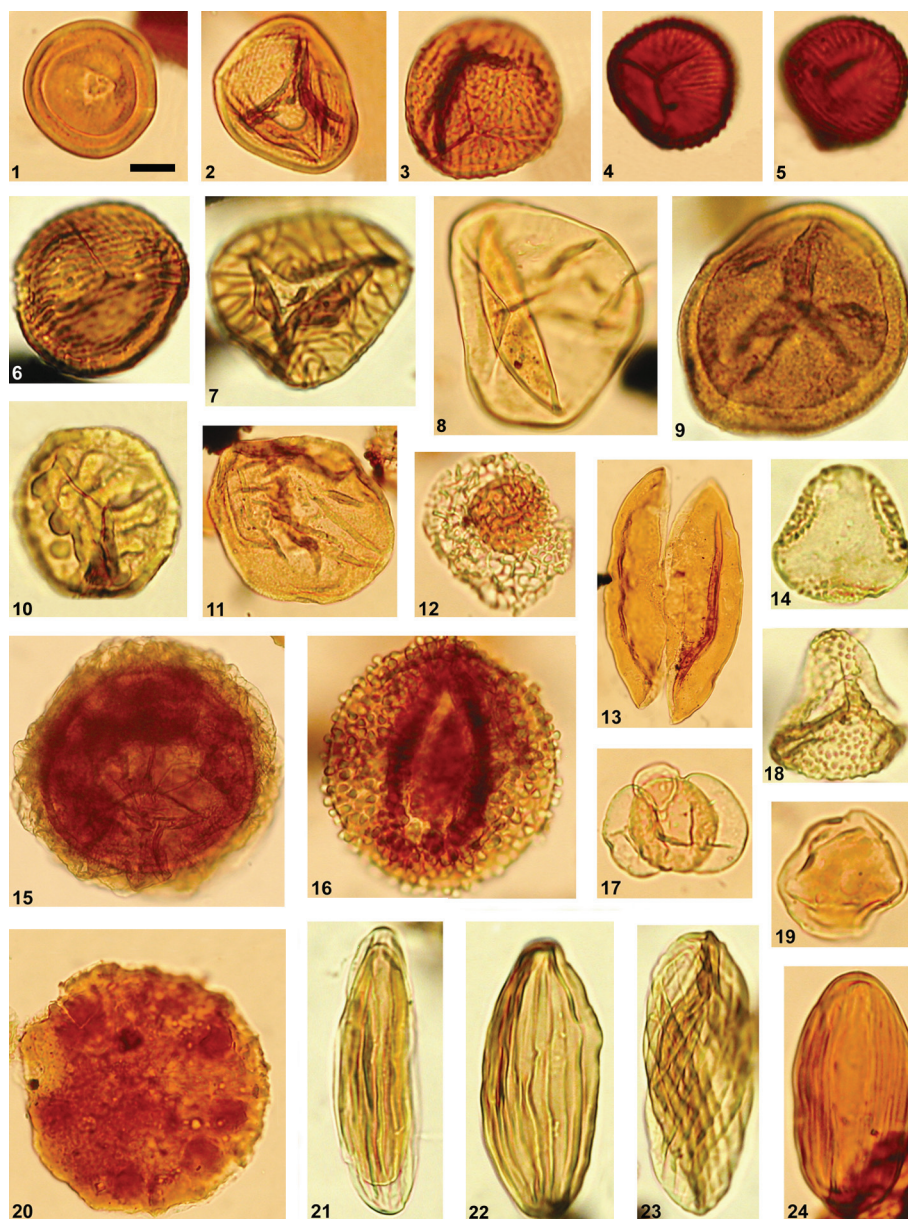


Plate 32. Crato palynomorphs: (1–2) *Classopollis* spp.; (3–7) *Cicatricosisporites* spp.; (8) *Deltoidospora* sp.; (9) *Densoisporites microgranulatus* Brenner; (10) *Interulobites* sp.; (11) *Araucariacites australis* Cookson; (12) *Afropollis jadinus* (Brenner); (13) *Ovoidites parvus* (Cookson and Dettmann); (14) *Penetetrapites mollis* Hedlund and Norris; (15) *Crybelosporites* sp.; (16) *Stellatopollis* sp.; (17) *Vitreisporites* sp.; (18) *Foveotrilletes* sp.; (19) *Exesipollenites tumulus* Balme; (20) *Maranhites mosesii* (Sommer); (21–24) ephedroid pollen grains. Scale bar in 1 represents 10 μ m and applies to all apart from 8, 11, 13, 15 and 20, the maximum dimensions of which are 66, 65, 160, 91 and 93 μ m respectively.