can potentially be generalized to marine ecosystems dominated by sessile organisms in which disturbance is an important factor.

Work cited: Grime, J.P. 1974. Vegetation classification by reference to strategies. *Nature* **250**:2631.

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*Molecular preservation of upper Miocene fossil leaves from the Ardeche, France: implications for kerogen formation

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Organic diagenesis is an important mechanism in fossilisation. Here we report the results of an investigation of the upper Miocene freshwater diatomite of St. Bauzile, which yields diverse plants and arthropods. All the fossil leaves irrespective of plant type show characteristic alkane/alkene peaks (the pyrolysis product of an aliphatic macropolymer) ranging from C-8 to C-33, as well as lignin products and prist-1-enes and prist-2-enes. Polysaccharide and protein moieties were not detected but some samples provide the first reliable demonstration of cutin in fossil leaves. The beetles also yield an aliphatic signature and chitin and protein are absent. No resistant aliphatic macropolymer is present in the extant analogues of several of our samples including conifer needles, oak leaves and beetles. Thus the macromolecular composition of the fossils must be the result of diagenesis. It is clear that short chain aliphatic compounds, with or without other constituents, condense into a macromolecule of cross-linked n-alkyl units with carbon chain lengths up to at least C-33. This mechanism has been referred to as the *in-situ polymerisation model.* The striking similarity between pyrolysates of plant and arthropod fossils and kerogens (the dominant sedimentary organic matter) suggests that *in-situ polymerisation* is important in kerogen formation.

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*A new archaeopteridalean progymnosperm from Venezuela

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Coalified compressions of new archaeopteridaleans were collected from the lowermost Upper Devonian Campo Chico Formation, Sierra de Perijá, Venezuela. The spectacularly preserved specimens made up of branching axes and leaves initially appear two-dimensional like extant fern fronds, but are probably leafy branches of an early tree. *Archaeopteris* itself was originally classified as a fern based on its planated fronds, and only recently has its three-dimensional nature been documented. Morphologically this has put the genus much closer to *Svalbardia,* another archaeopteridalean, which has always been known to have spirally arranged axes but has more deeply dissected leaves than *Archaeopteris.* This study has demonstrated a three-dimensional structure of the new archaeopteridaleans and leaf morphology more or less intermediate between *Svalbardia* and *Archaeopteris.* Clearly the morphology of the Venezuelan plant is similar to that of both *Archaeopteris* and *Svalbardia* indicating its archaeopteridalean nature. The fertile parts closely resemble *A. fissilis/S. polymorpha,* vegetative leaves share