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Permian Pollen Eating

The Random Samples item "Permian pollen eaters" (16 May, p. 1035) provides a stimulating account of the discovery by Russian paleobiologists Alexander Rasnitsyn and Valentin Krassilov of identifiable pollen in the guts of Early Permian insects. Paleobotanist William Chaloner is quoted as saying that inadvertent consumption of pollen could explain the occurrence of this pollen. One of the preserved insects is a member of the Synomaloptilidae, ancestral to modern bark lice and a member of a Paleozoic insect clade that was postulated by Rasnitsyn to consume "plants by feeding primarily on their reproductive organs . . ." (*1*, p. 27, translated from the Russian). In 1977, Rasnitsyn predicted that these and related taxa possessed head and mouthparts that consumed material nutritionally equivalent to pollen (*2*, p. 65).

It has been known that Late Carboniferous coal-ball permineralizations include fossilized fecal pellet assemblages containing histologically pristine plant tissues, some of which consist entirely of spores, pollen, and associated tissue (*3*). And insect consumption of wind-dispersed pollen has been demonstrated repeatedly in such consummate pollenivores as syrphid flies (*4*), bees (*5*), and other pollenivorous insects (*6*). The occurrence of pollen interpreted as wind-dispersed in the guts of Permian insects is thus unlikely to be accidental. A more parsimonious conclusion is that several lineages of Early Permian insects were actively consuming nutritionally rich pollen, regardless of the mode of dispersal. Such a diet was a necessary prelude to pollinator mutualisms between seed plants and insects that occurred subsequently in geologic time (*7*).

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