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**Title:** Romanian cave contains novel ecosystem.

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**Abstract:** States that the Movile Cave in Romania contains the first known ecosystem which draws sustenance solely from energy-rich molecules in rocks instead of from solar energy. Presence of the first known land animals not tied to photosynthesis; Other species discovered; Why Movile Cave is of interest to researchers who are designing missions to search for life on Mars; Study of cave by Brian K. Kinkle, in the June 28, 1996 `Science.'

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**ROMANIAN CAVE CONTAINS NOVEL ECOSYSTEM**

A cavern isolated from the rest of the world under a Romanian cornfield nourishes the first known ecosystem of its kind, three biologists report this week. The 48 animal species-including 33 new ones-found in Movile Cave are part of a food chain that draws sustenance solely from energy-rich molecules in rocks instead of from the power packed in the sun's rays.

Almost all life systems on Earth depend on photosynthesis-directly or indirectly-to fill their metabolic needs. Most animals that live only in caves rely to some extent on photosynthesis because they consume decayed plants swept down from the surface, says Brian K. Kinkle, a microbiologist at the University of Cincinnati.

Scientists have discovered other ecosystems that derive their energy purely from chemical sources, such as bacteria living underground (SN: 10/21/95, p. 263) or deep-sea communities that feed off mineral-rich hydrothermal vents. However, the Romanian cave is unique, Kinkle says, in that it contains the first known land animals not tied to photosynthesis.

The biologists analyzed the animals' diet by taking specimens of bacteria, fungi, and small invertebrates and comparing the ratios of four nonradioactive carbon and nitrogen isotopes. The results showed that the animals live on fungi and bacteria floating on water that partially fills the cave, Kinkle and his colleagues report in the June 28 Science. These microorganisms consume hydrogen sulfide from the rocks.

The scientists see Movile Cave as a biological time capsule. It was sealed off more than 5.5 million years ago, they say, and its creatures have evolved into specialized, self-sufficient forms. The only thing they need from above is oxygen, which leaks into the cave via minute cracks.

Thomas C. Kane, a biologist at the University of Cincinnati and report co-author, said he was excited by "not just finding a new species-that happens every day-but finding 33 new species."

The discoveries include grazers such as four species of isopods, or pillbugs, six springtails, a millipede, and a bristletail. Among the new species of carnivores are two pseudoscorpions, a 2-inch-long centipede, a worm-sucking leech, four spiders, and a water scorpion.

That such a diverse community can feed itself in a cave's perpetual night is news to other scientists, too. Larry Lemke of NASA's Ames Research Center in Mountain View, Calif., says Movile qualifies as an excellent "Mars analog site."

Lemke works on the design of new missions to search for life on the Red Planet. Scientists now hold that life may have existed there 3.5 billion years ago, when the planet was warmer and wetter (SN: 8/27/94, p. 137). If that life still survives, it would have to be underground, where liquid water could exist, as it does in Movile Cave.

"Movile Cave is interesting because it seems to be truly closed to outside sources of organic material," notes Lemke.

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E. Skindrud

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