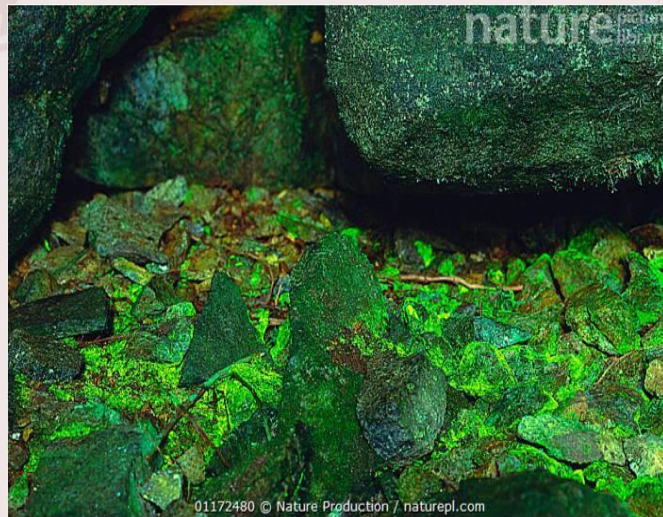


The light that loves the cave

A cave is synonymous with an underground mysterious world, from where bats are whizzing out at night, the dark interior engulfs you once you are inside, and you may be awestruck by the beautiful stalactite and stalagmites. So, it's a world packed with thrill and adventure. Like caves, cave dwellers are also fascinating. Cave life forms represent a diverse group of members with an array of adaptations against meager light availability and other limiting factors. Plants that grow in the interior of the cave show clear gradation and diverse adaptation responding to the light they receive. Luminous moss is one such example that shows how beautiful evolutionary mechanisms mould the plant cellular system to exploit the minimal sunlight.

Luminous moss has also one more name, Goblin's gold. It is a lower group plant that botanically belongs to the Bryophyte and is a widely distributed member in the northern hemisphere. Like any other common moss, it has two distinct stages of the life cycle, gametophyte and sporophyte. The gametophyte phase primarily appears as filamentous *Protonema* from which later leaf-like scaly structure develops. *Protonema* requires light for its growth; since the moss growing in the cave interior light is a challenging issue. But, here comes the master stroke to deal with the luminous challenge. At the earlier phase of growth, *Protonema* develops a group of transparent lens-shaped cells on its surface with a tapering end at one side where chloroplast accumulates. The cells are mostly developed in the area which receives little light. When the light falls on the cell surface, the refracted light is concentrated at the tapering end where chloroplast resides. And this refracted light along with the green light which is not absorbed by the chloroplast bounces back into the environment. As a result, the *Protonema* emits a luminous green glow throughout the area. We have to go inside the dark cave with very minimal provision of light for visiting this luminous green light show. Interestingly, nature also believes in optimization, that's why when light intensity or area increases these transparent cells disappear.



A cave may be dark, dangerous, or deadly but once you enter you may encounter some awesome examples of natural adaptation like luminous moss.

Image courtesy: www.naturepl.com

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