Climbing chalk harmful to cliffside plants

Jake Buehler

For a firmer grip on unforgiving rock faces, rock climbers often dust their hands with climbing chalk. Composed of magnesium carbonate hydroxide, the powdery white substance leaves floury streaks behind on popular climbing routes. New research suggests that this influx of chemicals could be harmful to the vegetation that ekes out a precarious existence in this habitat.

Large boulders are often strewn about in valleys carved out by glaciers, deposited there by ancient ice flows. In the lowlands of southern Switzerland, these acidic, siliceous rock "erratics" contrast against the basic, calcareous valley floor. The islands of habitat harbor acid-loving ferns and mosses, but in recent years, these huge rocks have also become popular with rock climbers, who use the rocks' sheer surfaces for bouldering. "Climbing chalk has a rather high pH – it's kind of calcareous – and those plants are adapted to very acidic environments", explains Daniel Hepenstrick (Swiss Federal Institute of Technology; Zurich, Switzerland).

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Northern spleenwort (*Asplenium septentrionale*), a rare fern that grows on erratic boulders, is potentially threatened by the use of climbing chalk.

To determine whether the chalk adversely affected these plants, Hepenstrick and his team measured magnesium carbonate hydroxide levels on boulders used by climbers in the Swiss canton of Ticino, and brought four fern species and four mosses into the lab to see if various climbing chalk concentrations influenced their survival or how they germinated from spores.

Chalk levels were elevated in 65% of the areas that didn't even have visible white marks, indicating the presence of climbing chalk in the ecosystem beyond fresh deposits. The team also found that the chalk impeded the germination and survival of all of the studied ferns and mosses (*Ecol Evol* 2020; doi.org/10.1002/ece3.6773).

Most research on the impacts of rock climbing to date has focused on the mechanical stress of hands and feet crushing sensitive plants, but the new findings identify an adverse chemical impact as well. This could be a conservation concern for rare rock-dwelling plants like northern spleenwort (*Asplenium septentrionale*), for which only six populations remain in this part of Switzerland.

Going forward, Hepenstrick wants to test if the chalk exposure experiments can be replicated in the field. "Maybe this study will make people use climbing chalk more considerately", he wonders. Climbers could also consider using grip-enhancing alternatives, he says, like sticky colophony resin.

Pandemic plans for nature

Lesley Evans Ogden

A perspective piece written by an international collaboration of scientists contends that most countries have neglected to include considerations of nature in their national pandemic recovery plans. Pamela McElwee of Rutgers University (New Brunswick, NJ), the report's lead author, and coauthors from several countries assert that a post-COVID world must tackle the economic drivers of ecological disruptions (*One Earth* 2020; doi.org/10.1016/j.oneear.2020.09.011).

In the article, the group – who also contributed to the Global Assessment report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) – propose that humankind is now at a crossroads. They urge that thought be given not only to the short-term pandemic-related economic pain but also to the development of a sustainable, just, and equitable economic future. At a minimum, they argue, economic recovery plans should "do no harm" to ecosystems, but stress that this moment in history could serve as a pivot point for transforming the global economic system to address the interdependencies of biodiversity, climate, and well-being.

"There have been so many reports in the past 5 years about climate change and biodiversity reaching crisis and tipping points", says McElwee, "and then we get COVID on top of that". Yet times of crisis are often times of policy change, reason the authors. "COVID has shown us that if you need to respond quickly with a large amount of money, governments can do it", points out McElwee. So the authors outline a list of suggestions for how recovery packages, including stimulus funding, can promote positive biodiversity impacts.

Immediate needs and short-term priorities consist of a shift from harmful subsidies to beneficial ones, expansion of new taxation policies levied on environmental harms, recovery guidance to support and do no harm to biodiversity, and funding of ecosystem-focused work programs and income support. Examples of harmful subsidies include those provided to fisheries that contribute to overexploitation of fish stocks and agricultural operations that support unsustainable production methods, as well as subsidies for fossil-fuel production.

Longer-term economic strategies, the authors suggest, include rethinking production and supply-chain models, reducing consumption, shifting fiscal policies to reflect environmental values, incentivizing the financial sector with respect to nature-related risks, ensuring continued international conservation funding, addressing inequality, and adopting new economic metrics and models to replace conventional measures like GDP.

While several regions and countries such as the EU and India already include positive biodiversity stimulus measures, other countries, including the US and China, have implemented negative ones. As a time to affect change, notes McElwee, "here is your moment".