MAHATHIR MOHD YASIN/EYEEM/GETTY

some international students and scientists.

"This is a big worry and concern, not just for the individual nations that have been specified [in the ban], but a broader concern that I certainly have heard from people all over the world," says Katharine Donato, a sociologist at Georgetown University in Washington DC. She is beginning a research project that she hopes will quantify the policy's impact on international students' enrolment in US universities. According to a 31 March white paper from the Institute of International Education in New York City, more than 15,000 university students — mostly in graduate programmes — and 2,100 scholars currently in the United States are from the 6 countries named in Trump's executive order.

Trump said on 14 June that the travel ban would take effect within 72 hours if the Supreme Court lifted injunctions on its enforcement that had been put in place by lower courts.

The president signed his first attempt at a travel ban into law on 27 January. It blocked citizens of the 6 countries affected by today's ruling, plus Iraq, from entering the United States for 90 days. It also barred all refugees for 120 days, and Syrian refugees indefinitely. After several federal courts blocked Trump's order, the president issued a revised ban on 6 March. That policy is the subject of the legal case now before the Supreme Court. It prevented people from the 6 countries from entering the United States for 90 days, with exemptions for permanent residents and current visa holders. The order also imposed a 120-day ban on refugees from Syria.

Universities have played a key part in fighting both versions of the ban. Washington state, which sued the administration over the original policy, cited the cases of several students and "medicine and science interns" who had planned to spend time at two state universities but were blocked from entering the country. And Hawaii, which challenged the revised ban, argued that the policy would harm the state by barring students who had been admitted to the University of Hawaii.

The president hailed the court's ruling this week, calling the decision "a clear victory for our national security". ■

In dry conditions, leaves might lose more water through their outer surfaces than scientists suspected.

PLANT PHYSIOLOGY

Water loss in plants mismeasured

Issue could throw off estimates of photosynthesis.

BY HEIDI LEDFORD

Errors in how scientists account for water loss from leaves may be skewing estimates of how much energy plants make through photosynthesis, according to the latest research. This in turn could jeopardize models of how individual leaves function and even of the global climate. The errors are particularly pronounced when a plant's water supply is limited — a condition of increasing interest as plant breeders and climate scientists grapple with the effects of global warming.

"If you're trying to understand why a crop you're growing or a particular plant is able to survive and do better under drier conditions, you may misinterpret that," says plant physiologist David Hanson of the University of New Mexico in Albuquerque. Hanson presented his findings at the annual meeting of the American Society of Plant Biologists in Honolulu, Hawaii, on 25 June.

Researchers have long assumed that the main way that plants lose water is through leaf pores called stomata. When water is abundant, the stomata open wide to let carbon dioxide flow in — maximizing photosynthesis, but allowing water to exit. Plants also lose moisture through a leaf's waxy outer surface, or cuticle, but this effect has been considered negligible.

This understanding, in turn, has shaped how scientists extrapolate the flow of CO_2 into a leaf. Measuring CO_2 inside a leaf requires cumbersome, custom-made equipment, so researchers in the field often use measures of water loss and other factors to calculate the concentration of CO_2 inside. Once they have estimated the internal CO_2 concentration, researchers can calculate how efficiently the plant is converting the gas into food — a component of primary productivity, a measure that is an important factor in some climate models. ▸

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But such calculations are based on water loss through stomata, and disregard the water vapour that passes directly through the cuticle. Hanson's experiments suggest that this is a workable approximation when water is plentiful — but when it is scarce, and the stomata close, a greater proportion of moisture is lost through the cuticle. Failing to adjust for this could throw off calculations of how well plants convert CO_2 to sugars during photosynthesis, Hanson says. "While stomata are closed, this small error is now a massive error," he adds.

Hanson first became aware of this in 2015, when plant physiologist John Boyer of the University of Missouri in Columbia approached him after a seminar. Hanson had just presented data showing his attempts to explain how properties of leaf cells can limit CO_2 capture. Boyer offered Hanson an alternative explanation — water loss through the cuticle — and described data that his lab had collected in the 1980s, but that had garnered little attention.

Boyer's team had found that water loss through the cuticle skewed calculations of CO_2 concentrations inside sunflower leaves to be 15% too high when water was abundant and stomata were open (J. S. Boyer *J. Exp. Bot.* **66,** 2625–2633; 2015, and D. T. Hanson *et al. J. Exp. Bot.* **67,** 3027–3039; 2016). And when stomata were closed, predicted CO_2 concentrations were six times higher than direct measurements taken inside the leaf.

"Within six months or so of that talk, I started doing my first measures and said, 'OK, yes, this is a problem'," says Hanson. He is now working to simplify those measurements so that more labs can follow suit.

Until that happens, measurement errors could be affecting more than just individual lab experiments, says Boyer. "The carbon dioxide inside the leaf is a central feature of climate models and our understanding of how photosynthesis works," he says.

It is an intriguing issue, says Donald Ort, a plant physiologist at the University of Illinois at Urbana-Champaign. Ort suspects that water loss through the cuticle will be important only under conditions of extreme drought. "I don't see that it would be something that would impact how we're estimating global primary productivity, or have any consequence on breeding plants for greater yield," he says.

But Hanson says that in his unpublished studies of rapeseed (*Brassica napus*), a crop harvested for its oil, he found that measurements that did not account for the water lost through the cuticle overestimated water loss through the stomata by an average of 12.6%, even when the plants were well watered.

Even mild drought could be enough to affect water-use measurements, agrees Susanne von Caemmerer, a plant physiologist at the Australian National University in Canberra. "We have models that try to capture global carbon dioxide uptake and water loss," she says. "That's where this is really going to matter." ■

CHRISTIAN ÅSLUND/GREENPEACE

Research vessels use air guns to generate sound waves that probe the sea floor for natural resources.

ECOLOGY

Air-gun blasts kill plankton

Minuscule animals damaged by sound waves emitted from equipment used in oil exploration.

BY JEFF TOLLEFSON

Powerful sound waves created during offshore surveys for oil and gas can kill microscopic animals at the base of the ocean food chain, researchers find. And these lethal effects travel much farther than ecologists had previously assumed. Scientists fear that damage to these animals, collectively known as zooplankton, could harm top predators and commercially important species of fish that depend on the plankton for food.

"It could be that our focus has kind of been blinkered because it's been on whales."

Seismic surveys blast compressed air to produce pulses of sound that can probe the sea floor thousands of metres down for natural resources. At 220–250 decibels, the noise produced by these air guns is louder than a Saturn V rocket during launch. Scientists have known for decades that whales and other marine mammals that use sound to communicate change their behaviour in response to such blasts[1]. There is increasing evidence that seismic surveys also affect fish[2] and marine invertebrates[3]. And now, researchers have found that the noise from air-gun blasts can kill zooplankton at distances of up to 1.2 kilometres away — more than two orders of magnitude farther than previously thought. They reported their results[4] on 22 June in *Nature Ecology and Evolution*.

"We were quite gobsmacked," says lead author Jayson Semmens, a marine biologist at the University of Tasmania in Hobart, Australia.

Semmens and his team conducted their study off the southeastern coast of Tasmania in 2015. They used sonar and nets to assess populations of zooplankton, including krill