



As the forest canopy's appearance changes, its carbon dioxide uptake changes too

Climate science

Cameras capture climate-cooling efforts of trees

DIGITAL CAMERAS COULD become an important tool for monitoring the growing threat of climate change, now that ecologists have found a way of using them to measure how much carbon dioxide forests are taking up.

Forests are a vital 'sink' for the carbon released when fossil fuels are burned. A global network of tower-mounted carbon dioxide (CO₂) sensors called FLUXNET currently monitors this carbon uptake by forests. These sensors are expensive, and cover only a small fraction of the Earth's surface – but it now appears that taking a series of photos of a forest will do the same job.

University of Edinburgh ecologists fixed two cameras on Alice Holt forest in Hampshire and took a photo every half hour during daylight for two years, giving them 38,000 snaps in total. They then used image-processing software to analyse changes in the forest canopy. As expected, the strength

of the green signal in the images jumped up during the spring season as the leaves came out. Of all the parameters measured, the forest canopy's colour showed the strongest agreement with measured carbon uptake.

The Edinburgh ecologists say that spring is arriving earlier each year, but it's not known how these longer growing seasons affect the amount of carbon absorbed by trees. A global network of forest-monitoring digital cameras is now being established that will provide some insights, but there's still a lot to learn.

"It's important for us to replicate the same method in other forests," says Toshie Mizunuma, a PhD student at Edinburgh. "In Alice Holt we studied an oak forest, but other trees such as maples and ash trees have different colours. So we're trying to study forests of different species."

Visit bit.ly/VWcabM to watch a video about the research.

JAMES LLOYD

1 MINUTE EXPERT Memory molecule

What's that?

It's a protein that has been held up as *the* molecule that allows memories to form. The idea, based on research on rats, was that blocking this enzyme, kinase M- ζ or PKM- ζ , could wipe out old memories, while adding it could strengthen old ones.

Why is it in the news?

Neuroscientists at Baltimore's Johns Hopkins University deleted two genes, one for PKM- ζ and another for a related protein called PKC- ζ , in mice embryos. Researchers at the University of California, San Francisco, created similar mice. In both cases, the mice had perfectly normal memories.

So what does this mean?

Todd Sacktor at New York's SUNY Downstate Medical Center, who did the earliest research on PKM- ζ , says a different protein may have stepped into the breach as the mice grew. But the Johns Hopkins team also created mice whose PKM- ζ gene could be deleted by giving them a specific drug. This meant they could stop PKM- ζ production when the mice were adults, and they still had a normal memory. The Johns Hopkins team say this doesn't mean PKM- ζ isn't involved in memory – it just may not play as pivotal a role as was thought.

WHO'S IN THE NEWS?

Elon Musk

Co-founder of PayPal and founder of SpaceX



What did he say?

He revealed his vision for an 'oasis' settlement on Mars that would be home to 80,000 pioneers. Speaking at the Royal Aeronautical Society in London, he said he'd been waiting 10 years to reveal his vision. "Then it seemed ridiculous because there were no rockets, no infrastructure and NASA was the only game in town – and it

had no schedule for exploring Mars. But with my work, and many others working in the private sector, the mission is coming closer to reality."

How does he see this colony developing?

Musk said he would initially start with a group of 10 pioneers who would build a greenhouse in which to grow crops. Over time,

the colony would be extended to tens of thousands of people. "Too few, and the gene and culture pool dries up," Musk said. "Too many and you risk civil war."

How can you become a Martian?

Musk hopes that one day the general public will be able to buy a ticket to Mars for \$500,000.