

ECOTERRORISM



PORTLAND, OREGON-It was a costly case of guilt by association. Last week the labs of plant geneticist Toby Bradshaw and his colleagues at the University of Washington (UW), Seattle, suffered \$3 million in damage from a fire believed to have been set by opponents of genetic engineering in plants. But the fire wound up destroying research -in areas such as understanding how

poplar trees fight disease and restoring wetlandsthat uses traditional plantbreeding methods and mainstream ecology, not the types of activities normally targeted by ecoterrorists.

On the same day, arsonists also destroyed two buildings and vehicles at Jefferson Poplar Farms, an Oregon tree farm 95 kilometers northwest of Portland that uses traditional techniques to improve the stock. Some scientists see the scale of the two attacks. which authorities suspect were related, as a worrisome sign that ecoterrorists are increasingly moving beyond fighting agribusiness and many forms of commercial development to attacking fundamental research.

As Science went to press, no group had yet claimed responsibility for the two blazes, which occurred around 3 a.m. on Monday, 21 May. But an undamaged building at the Oregon tree farm was spray painted with the letters "ELF" along with the message "You cannot control what is wild." ELF stands for the Earth Liberation Front. a loose-knit ecoterrorist collective that has claimed responsibility for some of the many illegal acts reported in recent years (see table).

Some researchers say that last week's incidents have left them feeling more vulnerable. "Toby [Bradshaw] has no direct connection to commercial research," says Steve Strauss, a plant geneticist at Oregon State University in Corvallis, whose own

RECENT ATTACKS ON U.S. RESEARCH EACH ITIES / TEST DI OTS

| Date | Location | Damage | |
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| 2001 | e and de fantage fan de sonderske gefanden was met oerhet fan te de oerhet fan te sekere de stere fan te seker | elemento d'anna | THEFT AND |
| 21 May | University of Washington, Seattle | \$3 million fire to lab/office | |
| | Jefferson Poplar Farms, Clatskanie, OR | Two buildings burned, vehicles damaged | |
| 16 May | DNA Plant Technology Corp., Brentwood, CA | 0.8 hectare of GE strawberries and onions destroyed | |
| Mid-March | Oregon State U., Corvallis | 800+ poplar trees destroyed | |
| 2000 | 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - | | |
| 9 October | University of California (UC), Berkeley | 0.2 hectare of GE corn destroyed | |
| 26 August | UC Davis | 0.4 hectare of GE maize, contents of four greenhouses destroyed | |
| 10 August | UC Davis | GE corn destroyed | |
| 1 August | Monsanto Co., Dusty, WA | 2 hectares of GE canola destroyed | |
| 22 July | MEAD Corp., Milo, ME | 1500–2000 GE trees hacked down | |
| 20 July | U.S. Forest Service biotechnology lab, Rhinelander, WI | 500 GE trees destroyed, 10 trucks defaced | |
| 13 July | Cold Spring Harbor Lab, NY | 0.8 hectare of GE corn, greenhouses destroyed | |
| 4 June | Pure Seed Testing lab, Canby, OR | Hundreds of GE grass plots and seedlings destroyed | |
| 9–10 May | Novartis Research and Parent Seed Center, Kauai, Hawaii; Kauai Agricultural Resource Center | Test crops of corn, fruit, and flowers destroyed r | |
| 9 February | U. Minnesota, Twin Cities | GE oats destroyed | |
| 10 January | USDA Western Regional Research Center in Albany, CA | GE wheat destroyed | |
| 1999 | | | |
| 31 December | Michigan State U., East Lansing | \$400,000 fire Agriculture H | to all |



work on transgenic trees was the target of vandals (Science, 6 April, p. 34). "Their message is, 'We don't even want research, [because] it is an act against God.'"

The UW blaze gutted Merrill Hall, which housed research and office space for eight faculty members in the university's

> Center for Urban Horticulture. According to UW police chief Jon Brouelette, the fire was started in Bradshaw's ground-floor office. The Oregon fire targeted Greenwood Resources, a company that sells fast-growing poplar trees to paper producers.

Biowarfare. Director Tom Hinckley (right) views damage to the University of Washington's Center for Urban Horticulture.

According to Greenwood's president, Jeff Nuss, the company uses only traditional hybrid breeding techniques to create trees with enhanced disease resistance, better wood quality, and other beneficial traits.

Bradshaw, whose work on poplar trees was also targeted by vandals 2 years ago, says he believes the UW fire was set by someone familiar with his professional activities. As evidence, he points to a pair of boxes from his office that were found in a field outside Merrill Hall. The boxes normally house two oddly colored corn snakes that Bradshaw uses in lectures to illustrate the genetics of color inheritance. The snakes were actually at Bradshaw's home at the § time of the fire. "That wasn't just a coinci-dence," says Bradshaw about what appears to have been a misguided attempt to save the snakes from the fire.

For the past 15 years, Bradshaw has tried to pinpoint genes that control branch development, resistance to disease, and tolerance to cold temperatures, as well as other environmental stresses. In one soon-to-bepublished study, for example, Bradshaw and his colleagues identified the general region in poplar tree DNA that contains a gene that confers resistance to poplar leaf rust, a fungal infection that kills the tree's leaves and 2 stunts its growth. The group hopes to isolate the gene and learn what it produces to fight off the fungus. Bradshaw says he uses only



traditional plant-breeding methods in these and other studies. But an ELF spokesperson has criticized Bradshaw for accepting research funds from tree-farming companies, saying that the results could be used to genetically engineer trees.

The apparent attempt to snuff out Bradshaw's research claimed some of the greenest research on the UW campus. In addition to Bradshaw's work on poplars, projects at the center focus on restoring damaged wetlands, conserving rare and endangered plants, charting life's recovery following the 1980 eruption at nearby Mount St. Helens, teaching people to grow their own food in backyard gardens, and understanding the genetics of how new species develop. "All of that is collateral damage to my work on poplars," Bradshaw says.

Certain items lost to the fire were irreplaceable. One, a tissue culture collection of 100 endangered showy stickseed plants, was particularly distressing to lose, because only about 300 plants are believed to exist in the wild. In a library adjacent to Merrill Hall, about 20% of the books—many of them rare and out of print—were also destroyed, according to Tom Hinckley, an ecosystem scientist and head of the horticultural center.

Despite these losses, the university has made it clear that the attacks won't stop research and outreach efforts. Hinckley says officials have promised to "do what it takes to get us back on our feet." Merrill Hall's research and office space will be rebuilt, he adds; in the meantime, faculty members and students are moving into temporary research and office space. "Even though [the fire] was intended to slow or stop work, it won't have that effect," says Bradshaw.

As for future attacks, Brouelette says that his office will likely step up security at agricultural research sites. But he and others say that the value of additional protection must be weighed against the need for a public institution to remain accessible. "A fortress mentality doesn't serve academic freedom well," says Hinckley.

Welcome or not, such a feeling is already beginning to permeate agriculture science, says Strauss. "It's terrible. There is less openness, less willingness on the part of researchers to discuss their work, and "therefore less ability to discuss merits and concerns to others," says Strauss. Teaching suffers as well, he adds, because concerns about security have curtailed the presence of undergraduates at field sites. Still, he and others believe that the work must continue. "The alternative is to let terrorists dictate what we do," says Strauss.

-ROBERT F. SERVICE

PALEONITOLOGY New Dig at Old Trove Yields Giant Sauropod

When Allied bombers descended on Munich in the spring of 1944, they destroyed much of the city—including the Bayerische Staatssammlung museum. Among the treasures reduced to rubble were Cretaceous bones collected from Egypt by Ernst Stromer von Reichenbach. More than 50 years later, when Josh Smith, a grad student at the University of Pennsylvania in Philadelphia, was casting about for a Ph.D.

topic, he drew up a wish list—places to dig that weren't being actively excavated but had a history of interesting discoveries. Topping his list were the sites



Luck. While driving through the desert, the team came across a partial skeleton, including this 1.7-meter upper-arm bone, from a new sauropod.

discovered by Stromer.

In February 1999, Smith set out to find Stromer's sites. It required sleuthing and luck, but on page 1704, Smith and his colleagues describe the first land vertebrate to be excavated from the sites since Stromer published his last monograph in 1936. Their find, *Paralititan stromeri*, is a new genus of sauropod dinosaur, estimated from its incomplete skeleton to be the second most massive known. It also marks the first time a sauropod has been linked to a mangrove-rich habitat. The locality was highly diverse during this part of the Upper Cretaceous, about 95 million years ago. So even more important than the sauropod itself is the reopening of Stromer's sites: Experts say that having more land species from this part of Africa will help nail down ideas about the breakup of the supercontinent of Gondwana.

Stromer first arrived in Egypt in 1911. After trekking 390 kilometers southwest of Cairo by camel, his field party searched a broad expanse known as the Bahariya Oasis. During the Upper Cretaceous, the area appears to have been a coastline bordered by mangrove swamps and tidal channels. After a few field seasons, Stromer had found as many as 40 genera of fish, crocodiles, dinosaurs, and other creatures. But all of

> the terrestrial vertebrates he brought back to Germany were destroyed in World War II, except for two skulls smuggled out by curators.

Smith and his party faced a problem in trying to find the source of the fossils: Stromer hadn't left directions or even published any maps or photos of the sites he quarried. Still, they had one clue: A friend of a team member located old scientific literature in Cairo with descriptions of prominent landforms in the Ba-

hariya Oasis and geographic coordinates of one of Stromer's quarries.

Then came a stroke of luck. Smith entered the wrong coordinates into his Global Positioning System receiver. So when the scientists set out in their 1998 Toyota Land Cruiser—no camels for this group—they ended up far from the landmarks. To get oriented, Smith stuck his head out the passenger window and spotted a large sauropod bone.