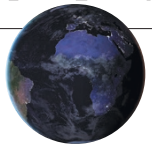
NEWS IN FOCUS



ANTONIO SORRENTINO/LUZ/EYEVINE

Ancient olive trees in southern Italy are being destroyed by a bacterial disease.

PLANT PATHOGENS

Italy rebuked in olive fiasco

European Commission audit finds repeated failures to prevent disease ravaging olive trees.

BY ALISON ABBOTT

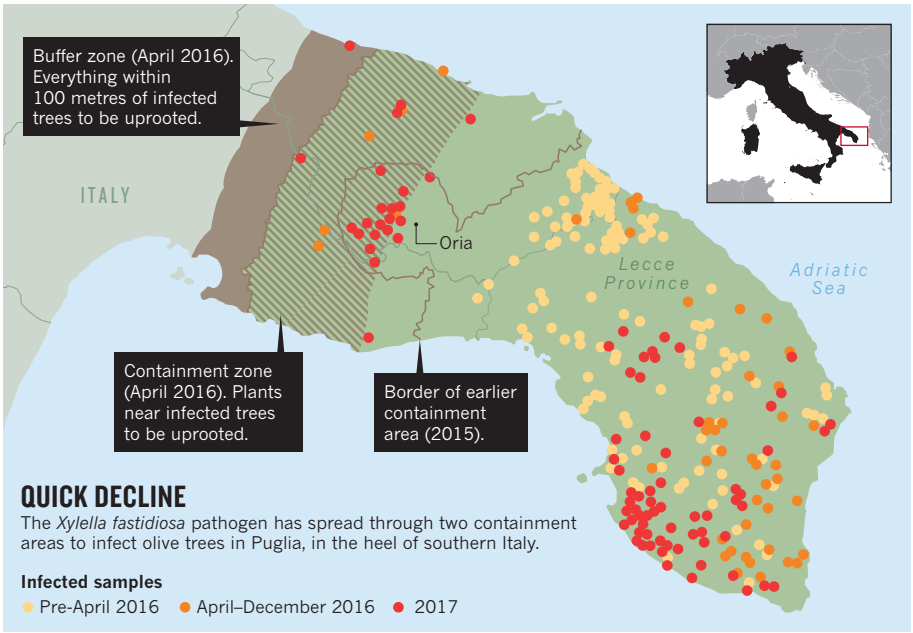
A vicious pathogen that is destroying historic olive groves in Puglia, southern Italy, is marching north and threatens to reach the rest of Europe. Yet Italian authorities last year failed to track the infection's spread, and didn't follow containment plans agreed with the European Commission, according to an audit released last week by the commission.

Scientists in the region aren't surprised by the criticism: their efforts to stop the infection have been repeatedly hampered over the past four years, since they first suspected that the disease was caused by the bacterium *Xylella fastidiosa*.

"The situation is ridiculous," says plant pathologist Giovanni Martelli at the University of Bari in northern Puglia. "The authorities have always moved too slowly, when quick action was needed," he says.

The pathogen — for which there is no cure — had never been seen in Europe before it was spotted in Puglia in 2013. It probably arrived from the Americas, where it is endemic. Researchers established that it was causing olive quick decline syndrome (OQDS) in Puglia, but protesters challenged their findings. In 2015, a local public prosecutor, prompted by angry environmentalists protesting about the felling of ancient olive trees, even opened a criminal investigation into whether researchers had actually caused the infection themselves.

The commission's audit, published on 31 May, includes a litany of failures by Italian authorities. It says that systematic monitoring of the infection began too late, and that there were 'excessive delays' in uprooting some ▶



SOURCES: EMERGENZA XYLELLA, REGIONE PUGLIA/EUROPEAN COMMISSION

▶ infected trees. And the report charges that national and regional authorities have disbursed little more than half of the €10 million (US$11.2 million) budgeted for containment measures. Data obtained by *Nature* add further evidence of a slow response. In most of 2016, Italian laboratories processed almost no *Xylella* samples — indicating that monitoring had almost ceased (see 'Lab drought'). Authorities did not respond to requests for comment.

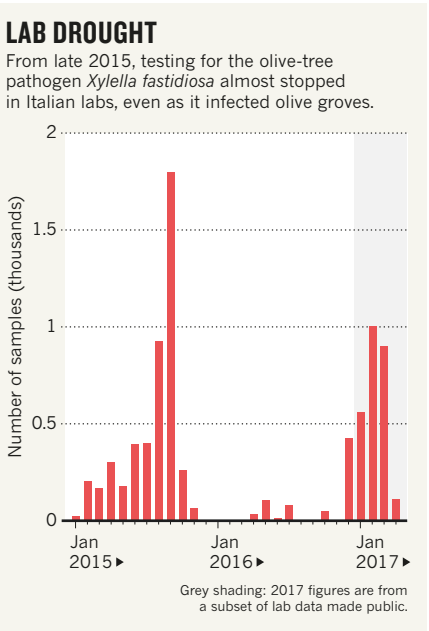
The commission is worried that *X. fastidiosa pauca* — the subspecies now known to cause OQDS — could threaten the whole of Europe's olive industry if it is not contained. But the commission also has broader concerns. New monitoring programmes that it coordinates have now identified several other subspecies of *Xylella* in other European Union countries. In May, Spanish authorities even reported that the much-feared *X. fastidiosa fastidiosa* — the cause of Pierce's disease, which periodically wipes out vineyards in California — had been spotted on a grapevine on the Spanish island of Mallorca. That infection was easily contained, but scientists are worried that as-yet-undiscovered subspecies may launch epidemics in other fruit crops.

ITALIAN TRAGEDY

The small town of Oria exemplifies the struggle to control the devastation hitting southern Italy's olive groves. Two years ago, environmentalists chained themselves to ancient trees there to prevent them being uprooted. They won a pyrrhic victory: trees all around the area are now dying and *Xylella* has been declared endemic there.

The strife in Oria started after Italy declared a state of emergency for the disease in early 2015 and appointed a military-police general, Giuseppe Silletti, to begin radical containment measures, including felling healthy trees around infected ones. Following EU regulations, Silletti drew up a map of the infected areas, outlining a 20-kilometre buffer zone that was mostly free of infection, where authorities were to monitor trees with particular care. Oria, which became a hotspot of protest, was near its northern border. Puglia's public prosecutor suspended the destruction of trees in the region as his investigation continued. Silletti resigned in December 2015, saying that his ability to implement his containment plan had been blocked at every turn. The public prosecutor did not lift his ban until July 2016, after the commission threatened to report Italy to the European Court of Justice.

Efforts to halt the infection have hit other roadblocks. Early in 2016, Puglia's regional governor, Michele Emiliano, announced that a task force would replace Silletti's emergency forces, but its exact composition and mandate have never been made public. In April, the commission defined a new, more northerly, containment zone that was initially infection-free (see 'Quick decline'), writing off the southernmost tip of Puglia — including Oria — as a region of endemic *Xylella* infection. But, as the commission's auditors noted after their visit to Puglia in November 2016, systematic monitoring of olive trees had not started until the end of August 2016 — inactivity that increased the risk of the infection's spread, their report says. Results of intense monitoring at the end of 2016 now show almost 900 *Xylella*-positive plant samples from the new containment zone, according to a subset of data that has been made public.



SOURCE: ENRICO M. BUCCI/GO.NATURE.COM/2QTJA4X

The commission has invested about €10 million in international research programmes to study *Xylella*, but the region of Puglia has not yet honoured its pledges to support local research. It announced projects worth €2.5 million last September, after a competitive call for grants the previous year, but the scientists involved have not yet received the money.

Some protestors still don't believe that *Xylella* is causing OQDS. The prosecutor's investigation into Puglian scientists will close if a prosecution is not made by next month. In mid-May, some environmentalists sent a new complaint to the prosecutor's office, saying that research programmes were unjustly ignoring other possible causes of the infection, such as a fungus (although the commission has already ruled out that possibility).

Meanwhile, widened surveillance has spotted subtypes of *Xylella* in France, Germany, Switzerland and Spain's Balearic Islands, including Mallorca, where the brisk tourism trade increases the risk of the infection spreading. "We are very concerned," says Cinta Calvet, who heads a plant protection programme at IRTA, Catalonia's institute for agricultural research and technology in Barcelona. The city is a hub for visitors to the Balearics.

Such an array of subspecies suggests that *Xylella* has been introduced into Europe many times, EU researchers say — and more introductions may yet be found. What's more, it is now clear that genes flow "relatively easily" between the different subspecies, says Rodrigo Almeida, who studies *Xylella* at the University of California, Berkeley. He and his team published their findings in March (H. D. Coletta-Filho *et al. Phytopathology* **107,** 305–312; 2017). Such gene flow increases the risk that different subspecies could recombine to create more-pathogenic versions of *Xylella*, he says — another reason to contain Italy's outbreak urgently.

There is some good news. Scientists in Puglia have identified two varieties of olive tree that are relatively resistant to the disease. Last month, the commission proposed that these could be planted in infected areas, to replace dead trees. But work to develop fully resistant trees could take a decade or more, says Martelli. ■