Florida citrus

Burning bugs sole defence

Washington

WITH the discovery last week that citrus canker has spread to four new nurseries in Florida, drastic measures to halt its further spread seem unavoidable. State agricultural officials have been granted authority to burn all infected trees as well as all trees standing within 125 feet of any tree originating from one of the five infected nurseries. The nursery where the outbreak was first discovered, and which appears to be the source of the other outbreaks, has shipped 89,000 trees since January this year.

Meanwhile, a handful of scientists in Florida and at the Department of Agriculture (USDA) Beltsville laboratory, as well as its Animal and Plant Health Inspection Service, are struggling to discover where the infection originated and whether controls more sophisticated than burning can be effective. According to Dr Ed Civerolo of Beltsville, who has studied citrus canker since 1978, the bacterium responsible for the Florida outbreak appears to differ from those found in recent years in Mexico, Brazil, Argentina and Japan. Although of the same species (*Xanthomonas campestris citri*), the bacteria in different areas exhibit different host preferences and virulence. The Florida bug is the most virulent, attacking all citrus species. Significantly, the Florida strain does not resemble the Mexican, which is a relatively mild version and which is specific for key lines. Initial studies by Civerolo over the past few weeks indicate that unlike all other known strains, the Florida version contains no plasmids; it also differs in fatty-acid composition and is serologically distinct.

Citrus canker last appeared in the United States in 1912, when it took 15 years to eradicate. On that occasion, the bacteria were carried on rootstocks imported from Japan.

Surprisingly, burning is still the only effective control measure. Bactericides have been singularly ineffective in fighting bacterial plant diseases of all sorts; under favourable environmental conditions (such as a hot moist climate and extensive acreages of suitable hosts), the bacteria simply grow faster than they can be wiped out. Bacterial resistance to antibiotics is also a problem.

An epidemiological study is now beginning to trace the source of the latest outbreak. Contaminated growing stock is the most likely source. Although the United States forbids importation of growing stock except for research (and then only under strict quarantine which requires isolation and propagation in greenhouses for a matter of years), USDA officials say they believe a certain amount of stock circumvents the safeguards, entering the country illegally. Since the bacteria infect stems, leaves and fruits, it is also possible that they were carried in on contaminated fruit or other debris that somehow came in contact with the Florida trees.

The United States has maintained quarantines against the importation of citrus fruits from other countries where the disease is present. So far, none has reciprocated following the Florida outbreak. The US Government has, however, imposed an interstate quarantine; only fruits from inspected groves will be permitted out of Florida, and then only if they are dipped in a chlorine disinfectant and if the destination is a non-citrus-producing area. (Texas and California are the other major citrus-growing states.) The most immediate economic effect on the Florida growers, however, is likely to be that of the eradication programme. Compensation is not being provided to those whose trees are destroyed, and the US Secretary of Agriculture could order compensation only after declaring an "extraordinary emergency", which has never been done for a plant disease.

If the infection should become established in Florida, that would not mean the end of the Florida citrus groves. The immediate consequence of infection is disfiguration of the fruits by raised brown spots and a decline in vigour of the trees and of their yield. But in severe cases, substantial defoliation and premature fruit drop can occur, and the trees may ultimately die.

Stephen Budiansky

Danube environment

Hungarians seek outside support

Budapest

THE Hungarian Government has an environmental battle on its hands over a controversial hydroelectric scheme which, among other things, would entail the diversion of the Danube. Ironically, while the fourth environmental engineering exhibition was being mounted last week, an unofficial Hungarian group called the "Danube Circle" began soliciting Austrian support for its opposition to the project.

The project, which includes the diversion of the major part of the Danube waters through a canal to a power station at Gabcikovo in Czechoslovakia, and the construction of a dam at Nagymaros which would flood the most scenic stretch of the Danube, has been undertaken jointly by Czechoslovakia and Hungary. Hungarian environmentalists fear that the dam would cause irreversible damage to the water table of northern Hungary, endangering the water supply of up to 8 million people, and could lead to the disappearance of many species of flora and fauna from the river and its banks. The agreement between the two governments was signed in 1977, but was based on plans drawn up much earlier, when the long-term environmental consequences were little understood.

Between 1978 and 1983 there was considerable criticism of the scheme in the Hungarian media. Political considerations made it impossible for the Kadar government to withdraw unilaterally from the scheme; nevertheless, in 1981, all work on the Hungarian side stopped, allegedly due to lack of funds. Last autumn, moreover, while signing a new agreement reiterating Hungarian commitment to the scheme, the Kadar government managed to reschedule the completion date from 1990 to 1994.

At this point, the Danube Circle launched a petition, signed not only by Hungary's small community of "dissidents" but also by a number of leading environmentalists, some of whom had actually worked on the official survey of the hazards.

The protesters were particularly irate that the Hungarian public had never been allowed to express an opinion about the project, and that, furthermore, no proper survey had been made to establish the global effects and risk factors. The government responded by clamping down on all media discussion of the project — a somewhat unusual response for Hungary, which in general prefers to stimulate public discussion of environmental issues, so as to bring fears into the open and then allay them with a concerted press campaign.

Upstream, meanwhile, an Austrian proposal to build a similar dam at Hainburg provoked a protest petition with more than 150,000 signatures. Presumably in response to this, the Austrian Government proposed an arrangement by which it would partially finance the construction of the Nagymaros power station in return for a supply of power in the future. But according to the Danube Circle, the whole concept of the scheme, which is to top up electricity supplies at peak hours, is impractical, since the Danube is at its lowest in winter.

It is rumoured in Hungary that the government has had second thoughts on the affair and is trying to find a diplomatically acceptable way of withdrawing. (This view is perhaps substantiated by the fact that the International Danube Commission, based in Budapest, is likewise unwilling to comment on the situation, implying that some kind of negotiations are taking place.) If, however, Mr Kadar has been using the excuse of lack of funds to postpone construction works until such a solution can be established, the Austrian proposal to contribute to the construction costs could prove embarrassing.

Vera Rich