Plant researchers eager for genome programme

- \$500 million US project proposed
- Agricultural competitiveness seen at issue

Washington and Tokyo

Now that the US programme to coordinate the mapping and sequencing of the human genome is up and running, plant researchers are building momentum to launch a programme of their own. At the end of this month, the US Department of Agriculture (USDA) will hold a meeting to sketch out a proposal for a \$500 million project to study plant genomes, steered by the agency's newly created plant genome office. Enhancing US economic 'competitiveness' will be one of the arguments for spending such large sums, but international plant genome efforts are still fragmentary, and it is not clear with whom the United States is meant to compete.

The idea for a USDA plant genome programme was championed by Orville Bentley, who recently retired as head of USDA's research branch. Bentley's successor, Charles Hess, a plant physiologist from University of California-Davis, is likely to support increased funds for plant research, an area that has been chronically poor. The programme will benefit from a call for the USDA to spend ten times more on competitive research grants — or roughly \$500 million per year — included in a report to be released next month by the US National Academy of Sciences' National Research Council.

Jerry Miksche, head of the USDA plant genome office, hopes to receive \$50 million per year for ten years — roughly the amount the USDA has spent on research outside the agency each year for the past ten years. The exact research agenda will be set by the committee meeting at the end of the month, but Miksche says he "wants to avoid" competition between researchers studying different plants. Rather than putting all of its money into one plant species, USDA will concentrate on mapping agriculturally important genes, such as those conferring drought and disease resistance, in several species at once. Miksche estimates that at first 20 per cent of the money will go into developing databases of genetic information, that may or may not be linked to human genome databases.

Under a smaller project, the US National Science Foundation (NSF) is already considering financing a concerted effort to map and sequence the weed *Arabidopsis*. The agency may spend \$35 million to map the weed, which has a genome a little smaller than an average human chromosome. *Arabidopsis* has less repetitive DNA than most other plants,

and is easier to manipulate genetically.

The theme of 'competitiveness' runs strong through the report prepared by USDA officials at the end of last year on the necessity of setting up a USDA plant genome programme. It points out that Japan spends \$200 million on rice genetics and molecular biology, and that Britain has begun to develop a map of the wheat genome, through a consortium of seed companies.

Japan has a tiny project to sequence the rice genome at its Tsukuba science city, with ¥70 million (\$500,000) from the Ministry of Agriculture, Forestry and Fisheries. The project is highly touted, and many hope it will develop into a major

HIPPARCOS

Bad day for astronomers

Kourou, French Guiana

AFTER a perfect launch in French Guiana on 8 August, the European astronomy satellite Hipparcos ran into trouble when the apogee motor failed three times to respond to commands to fire. The motor is responsible for lifting the satellite into geostationary orbit around the Earth. As *Nature* goes to press, there are still hopes that the motor will eventually fire.

Two more attempts to fire the motor are planned for 15 and 16 August. For the moment, the satellite remains in an elliptical orbit moving between 208 kilometres and 35,000 kilometres from the Earth. As a last resort, the motors used to orient the satellite will be used to push it into a higher orbit. Many of the experiments could still be carried out, but using the fuel for this purpose would leave the satellite with a much shorter working life.

The Ariane rocket left the launch pad

The easy part: the 9 August lift-off from Kourou went well (AP).

initiative, but researchers involved with the project complain that they barely have enough money to work out the technological hurdles that must be overcome. A more significant effort is represented by Plantech Research Institute, a private joint venture of Mitsubishi Chemical Industries Ltd and Mitsubishi Corporation, that has an annual budget of ¥400 million (\$3 million), much of which it spends on rice genetics.

The British consortium — organized by Agricultural Genetics Company Ltd in Cambridge — consists of five companies spending a total of around £1.5 million to produce rough maps of the genomes of wheat and barley. The UK Agriculture and Food Research Council (AFRC) has a three-year £14 million programme on plant molecular biology, part of which will involve mapping and sequencing. AFRC's John Innes Research Institute is working on mapping *Arabidopsis*. But no major initiative has yet been announced by Britain or the European Community.

Carol Ezzell and David Swinbanks

carrying a West German direct broadcasting television satellite, TV-SAT 2, as well as Hipparcos. The first launch attempt was stopped seven seconds short of ignition by an overzealous computer. But then the mission got off to a good start with the perfect positioning of Hipparcos and TV-SAT 2 in their transfer orbits. Just 37 hours later the problems began.

Hipparcos, named after the Greek astronomer who drew up the first star catalogue during the second century BC, is the world's first astronomy mission, designed to measure the precise positions, parallaxes and proper motions of stars. During its two and a half years of life, the satellite is expected to measure the positions of 100,000 stars with a precision of 0.002 arc seconds. The results, as well as those of the Tycho experiment, designed to measure 400,000 stars with an accuracy of 0.03 arc seconds, should be ready by 1995. And the data should be 50 times more accurate than the best available today, according to Michael Perryman of the European Space Agency (ESA).

The satellite is a 23-year-old dream of a French astronomer, Pierre Lacroute, who was one of the guests at the launch last week along with the French minister for research and technology, Hubert Curien. It was built by the French company Matra and the Italian company Aeritalia at a cost of about \$360 million, and is not insured, according to Roger Bonnet, director of ESA's scientific programmes. A spokesman for Matra said that to build a replacement would take more than three years.

Ricardo Bonalume Neto

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