

California's fight against the so-called Medfly, a battle which has been fought several times over the past few years, since the fly is endemic to Central America and is thought to be brought over the border in fruit and vegetables, found itself in the national headlines in July when traditional ground-based control methods, including selective spraying, biological pest control and stripping trees of fruit, appeared to be failing to stop the latest infestation.

Initially Governor Brown refused to allow aerial spraying by malathion because of the general environmental damage he thought this would cause. However, he changed his mind when the federal government threatened to place all Californian produce in quarantine unless the spraying was carried out. After some technical hitches, this began on 20 July.

So far, the massive spraying seems to have been successful in containing the infestation. Although Medfly larvae are still being found at the edges of the sprayed areas — as well as occasionally in other locations to which they are thought to have been transported by humans — none has been found in places where the spraying has been concentrated.

But if the biological battle has been won, at least temporarily, the legal and political battle may be only just beginning. Governor Brown, who draws much of his support from the environmentalist community which opposed the aerial spraying, has been widely criticized by local farmers for not acting sooner. Brown hopes to run for the US Senate when his term as governor expires, a factor said to be playing a large part in his aides' insistence that the federal government should be blamed for the Medfly outbreak, and should therefore help to cover the costs of controlling it.

However, it may prove extremely difficult to determine who is to blame. In addition to the problems with the initial quality control, there is evidence that laboratory technicians who have examined over 100,000 flies have had difficulty in distinguishing the irradiated ones — marked with a yellow dye — from local flies onto which some of the dye has brushed off.

David Dickson

The Medfly is not an aphid, as described in a recent leading article (see *Nature* 27 August, p.786), but *ceratitis capitata*, a dipteran — Editor, *Nature*.

Research in Romania Time for rethink

Scientific research and development work in Romania is being hampered by professional "discoverers" — people who put forward artificial suggestions and "pad" each other's research — according to a recent round-table discussion organized by *Era Socialista*, the theoretical journal of the Romanian Communist Party. At the same time, technologists and

engineers genuinely contributing to industrial research are overburdened with routine paperwork, and some industrial managers try to keep scientists out of their plants on the grounds that they interfere with production. Pay for research staff is too low, and the bonuses payable to those who have put forward a practical new idea often arrive three or four years late. Moreover, no bonuses are paid out on a negative result — and due recognition for negative results is of particular significance in Romania which now has a policy of "reattestation", the conferring of academic degrees not for life but on a renewable basis, depending on recent professional performance.

The round table was part of the new Romanian drive for research and development. During the past 10 years, the research workforce has expanded from 37,000 to 200,000. Since 1976, all research has had to be directly linked with specific needs of the national economy, virtually eliminating the concept of fundamental and academic research. Yet press reviews of the 1976–80 five-year plan indicate that the 12,106 new patents granted during that period earned the national economy some 8,700 million lei, barely enough to offset the state's research and development expenditure during that period.

During the current five years, research expenditure is scheduled to increase sharply. For example, the Minister of Mines, Oil and Geology, Virgil Trofim, told the *Era Socialista* round table that he had been allotted an extra 13,000 million lei for geological research alone — a figure approximately double the total allocation for all scientific research under the previous plan. Last week a decree of the State Council "released" Mr Trofim to take up "other assignments", and divided his former Ministry into three, in terms which suggested that the research funding will be increased even further.

At the end of last year, summing up the research and development shortfall under the 1976–80 plan, President Nicolae Ceausescu criticized in particular the failure to achieve set targets for "technical progress" and failures, or long delays, in introducing many of the results obtained into industry. (Such criticisms, incidentally, must cause the president some conflict between his public and domestic personae. In 1979, when the National Council of Science and Technology was reorganized to strengthen central party and government control, his wife, Dr Elena Ceausescu, was made its head, while in April 1980, two of their children, Valentin and Zoe, became council members.)

In June this year, Dr Ion Ursu, First Vice-Chairman of the National Council of Science and Technology announced a crash research and development programme to achieve over 3,000 main "targets" of national importance, 2,600 of which are to be introduced in industry before the end of the present five year plan.

Vera Rich

Pearls before swine

Bangalore

India and China are showing renewed interest in biogas production as the answer to the energy crisis "down on the farm".

The concept is simple — animal and vegetable waste are converted into methane gas and thence to workable energy. The practical problems of constructing and maintaining suitable digesters and the costs of steel and concrete fittings have, however, proved beyond the capabilities of many third-world farmers. In the Chinese province of Sichuan, for example, more than half of the 7 million digesters have fallen into disuse.

The situation may be eased with the development by the Union Industrial Research laboratory near the Taiwan capital Taipei of an almost indestructible, non-corrosive biogas digester working on pig excreta. The plant is made up of a tough pliant plastic sheet derived from blending red mud with polyvinyl chloride. It is resistant to all types of acids and alkalis, can withstand deflation and inflation 6,000 times per year and is half the cost of conventional digesters used in China. In Taiwan a unit big enough to process the manure of 30 pigs costs around \$225. An adult pig weighing 90 kg excretes about 8 litres of body waste per day; this converts to a third of a cubic metre of gas with a quarter of the heating value of petroleum-derived bottled gas.

Cow dung is the major ingredient for biogas plants in India. Here the most widely used plant, based on a design evolved by the Khadi and Village Commission, consists of an underground cement pit covered by a metal gas holder which had to come from an urban workshop. However, a drumless plant has been designed by a governmental research agency in Uttar Pradesh, which has many similarities with the Chinese biogas plants. It is also half the cost of the conventional plant and can be easily handled and maintained.

It has been estimated that India's cow dung potential could run 18.75 million family-size and 5.6 million community-size biogas plants with a daily capacity of 1.7 million and 142 million cubic metres of gas respectively. The target of 1 million family-size biogas plants, under India's sixth five-year plan, for which \$55 million has been set aside, can only utilize 5 per cent of the potential capacity.

Various new feedstocks are being tested in experimental plants: the Punjab Agricultural University is using leafy material such as tree leaves, crop residues, fruit peel, chopped paddy and wheat straw; and the Indian Agricultural Research Institute in New Delhi is experimenting with both animal and plant wastes.

Radhakrishna Rao