Medfly Continues to Bug California

Results of eradication project look promising, but the controversy and political fallout linger on

California's campaign against the Mediterranean fruit fly is entering a winter lull. The state has apparently escaped the potentially devastating effects that a broad infestation of the Medfly could have caused through damage to fruit and vegetables and from embargoes on shipments of produce from California. However, several troublesome political, legal, and scientific issues raised by the Medfly episode remain unresolved.

- Aerial spraying tactics debated hotly last summer before being permitted are still a subject of controversy. The spraying zone covered heavily populated sections in the San Francisco Bay area and the matter produced the sharpest conflict on pest control to date between an urban population and agricultural interests.
- The political potency of the Medfly issue is indicated by public opinion polls that show that voter displeasure with Governor Jerry Brown's handling of the Medfly program apparently damaged his prospects as a senatorial candidate.
- The federal-state Medfly eradication project is under criticism from academic scientists in California who say that the project has failed to carry out the kind of systematic study of the Medfly that would provide knowledge useful in future outbreaks.
- Recently, the use of the pesticide ethylene dibromide (EDB) to fumigate fruit and vegetables for shipment has sharpened the controversy on that substance's safety. Fumigation of produce for export to Japan has triggered differences among government agencies, environmental organizations, and labor unions in both countries and given the matter an international dimension. (The EDB controvery will be the subject of a second article.)

From a public policy standpoint, a major unsettled issue is how decisions should be made in serious pest outbreaks when the principal parties involved are at odds over control measures, as was the case in the Medfly emergency.

Conflict over aerial spraying resulted in considerable delay and confusion. U.S. Department of Agriculture (USDA) officials advocated aerial spraying while some local authorities passed ordinances forbidding it. The joint federal-state eradication project suffered from divided authority.

One result of the imbroglio over aerial spraying is a move in Congress to amend the Federal Plant Pest Act, in effect, cutting out local and state government from the exercise of ultimate authority. In emergency circumstances, the Secretary of Agriculture would be empowered to order use of whatever means deemed necessary to eradicate pests. Federal law currently allows USDA overriding authority only in animal disease epidemics.

Chief sponsor of the measure is Representative William M. Thomas (R–Calif.) whose district covers the prime agricultural area of Tulare and Hern counties in southern California. His amendment is part of the agriculture authorization bill now before the House and a similar provision is in the corresponding Senate bill. In July Thomas sent a letter urging Secretary of Agriculture John Block to take immediate action to begin aerial spraying. The letter was also signed by 27 members of the California congressional delegation and added to the pressure on Governor Brown to permit spraying from the air.

> "People on the project have not had the scientific backup to do the job properly."

In California, however, differences persist on the merits of the aerial spraying program. The chief proponents of aerial spraying from the start have been USDA officials and agricultural interests that wield heavy economic and political influence in California. The antispraying position has been upheld by environmental organizations and the officials of local governments in the Medfly zone, many of whose constituents in the supersuburbs of the Santa Clara Valley are affluent, well educated, and vocal about their vehement opposition to aerial spraying.

A number of academic scientists in the area began to take an active interest in the Medfly problem in the winter of 1980–1981 when USDA proposed a program of aerial spraying with the pesticide malathion during the winter. Margaret Race, a Stanford University biologist, says that she was one of an informal group of scientists who began to keep track of the project by attending meetings and discussing developments with project staff who she says were generous about providing information.

The proposal for winter aerial spraying was rejected by Governor Brown who followed the advice of an ad hoc technical advisory committee formed by state officials. Brown at the time used emergency powers to mobilize a force of 2000 federal and state employees and to carry out a stepped-up program of fruit stripping and ground spraying where evidence of flies was found.

The crisis for the Medfly project occurred in late spring and early summer when increasing numbers of Medfly larvae were found. This was interpreted as evidence of a failure of the eradication program and seen as threatening a spread of the Medfly to the agriculturally rich Central Valley. There were reports at the time that some of a shipment of sterile flies from a commercial facility in Peru had proved to be fertile.

Pressure mounted for the governor to order aerial spraying. And after Agriculture Secretary Block on 10 July said he would impose a major quarantine on California produce unless Brown acceded to aerial spraying, Brown did indeed order it (*Science*, 24 July, p. 417).

In fact, the aerial option had the support of many of the academics who had earlier favored staying on the ground. Race explains that, in the situation that was developing, it was doubtful that the governor had the manpower and resources to carry out an effective ground program. As information came in about the new finds, says Race, it seemed that the risks of not going to aerial spraying were greater than those of using malathion from the air.

Paul Ehrlich, a Stanford biologist and nationally known writer and spokesman on ecological issues, was not in Stanford this summer, but agrees that for Brown it was a case of Hobson's choice. "They had to consider the consequences," says Ehrlich. "If the Medfly got into the Central Valley, for example, you would have heavy spraying with other pesticides, with the ill effects on farm workers that would bring." Of the aerial spraying

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he says, "I'm not happy that it had to be done but we have to live with it."

For some advocates of airborne spraying, the experience of recent months is proof that aerial spraying is effective and no threat to health. According to Dick Jackson, a USDA official and deputy director of the Medfly project, a "positive thing" about the aerial spraying is that "it opened the door to a sensible use of pesticides." He mentioned the possible deployment of aerial spraying against the gypsy moth and grasshoppers. In California, says Jackson, "We've proven that we haven't even made anybody sick and have done a hell of a lot for our credibility."

Ehrlich and other biologists disagree. He contends that the Medfly had been virtually controlled by integrated pest management techniques "when the ball was dropped." Ehrlich blames the shortcomings of USDA in its quality control of sterile flies. "It was a serious error," says Ehrlich, "which led to spraying which may or may not be successful."

Critics of USDA cite not only the suspect Peruvian flies but also mention reports of a mix-up in a Hawaiian laboratory that permitted fertile Medflies to get into a batch of sterile flies destined for California.

James Brazzel, director of the USDA's Methods Development Center in Brownsville, Texas, and chairman of the Medfly project's technical advisory committee, suggests another side to the quality control story. Brazzel, who joined the committee in a reorganization after aerial spraying began, notes that in the emergency atmosphere then prevailing project officials had to "search desperately" for sources of sterile flies. The Peruvian facility was thought to be reliable. He says the USDA has plans for a new facility in Hawaii to produce sterile insects that would be designed to prevent shipment of nonsterile flies. USDA had urged creation of such a facility for years, he says, but not until the Medfly emergency were funds forthcoming in the budget. The facility should start to operate in 1983. Brazzel and others including Race, however, say that there is still not conclusive evidence that nonsterile flies shipped in from outside were the source of the Medfly surge earlier this year.

This is one of a number of questions left open because the Medfly, although now famous, remains scientifically relatively unknown. Medfly appearance in northern California surprised biologists because it was assumed the insect could not survive the cool winters. Knowledge of the effect of winter cold on Medfly survival still amounts to "educated guesses," according to Donald L. Dahlsten, chief of the biological control division of the Department of Entomological Sciences at Berkeley. The last two winters have been fairly mild in northern California and there is speculation that this contributed to the Medfly infestation. But not much is known about the Medfly's overwintering ability or how cold it has to be to kill off the insect because "the soil provides a certain amount of insulation and we don't know the temperature in the insect microclimate," says Dahlsten.

Dahlsten and other entomologists have been critical of the federal-state project for missing opportunities for intensive study of the biology of the insect. The project has been operating in a "knowledge vacuum," says Dahlsten. "Here is an experimental situation and there is no money for population biologists." He acknowledges that emergency conditions have prevailed, but faults the project for succumbing to the atmosphere of "crisis, fear, and politics." Asked what would happen if the Medfly strikes in the future, Dahlsten surmises, "They're going to panic and run for the helicopters again."

Critics of the project's scientific dimension concede the promise of a computer-based model of the life cycle of the Medfly developed by entomologist Richard Tassen, a research associate at Berkeley. Using temperature data from soil and air probes, the Tassen model links temperature changes to variations in the insect's life cycle.

The biologists continue to be critical however, both of attitudes of the project staff and actions taken. Ehrlich says one high USDA official told him "We're in the middle of an eradication program and can't afford the luxury of research." Others noted actions that undercut efficient use of data. For example, releases of flies have been recorded on one set of map grids and recaptures on another set so that analysis of data is very difficult. Ehrlich's view is that "People on the project have not had the scientific backup to do the job properly."

As many academic biologists see it, eradication efforts are dominated by pest control specialists accustomed to relying on chemicals to do the job. They are backed by classically trained USDA entomologists who see sterile fly and ground treatment tactics as still experimental and regard aerial spraying as a tried and true remedy.

Ehrlich says part of the problem is that isolation exists between old line ento-

(Continued on page 1224)

U.S. Announces Pullout from IIASA in Vienna

The United States has served notice that it intends to withdraw from the International Institute for Applied Systems Analysis (IIASA) near Vienna, in which the Soviet Union and the United States have been the major dues payers. Citing budgetary constraints, U.S. representatives to the IIASA council meeting in mid-November said that the U.S. National Science Foundation (NSF) will cease to underwrite U.S. participation after 1982. The IIASA council responded by saying it was prepared to adjust the institute's dues structure and asked that the United States reconsider its position on membership. The council also relaxed some rules, in effect, giving the United States until mid-1982 to review the decision.

The institute was established in 1972 after 5 years of negotiation and was viewed as an early fruit of détente between the Soviet Union and the United States. IIASA was thought to be attractive to the Soviet Union and other Eastern European countries because it provided access to Western expertise in systems analysis. The institute is housed in Schloss Laxenburg, a remnant of Austrian imperial splendor, in a village about 16 kilometers from the center of Vienna. IIASA has only a small permanent staff, but at any time about 100 professionals are in residence working on projects.

The institute budget is about $10 million a year; the Soviet Union and United States each pay 23 percent. The other 15 members—Canada and Japan belong as well as Eastern and Western European nations—pay the balance in equal shares. IIASA is a nongovernmental organization. Membership is formally held by a scientific organization in each country. In the United States, the National Academy of Sciences (NAS) is the national member organization.

From the start, U.S. participation has been funded through the NSF budget. Early this year, under general budgetary pressure applied by the Reagan Administration, NSF opted for an immediate end to U.S. membership in IIASA. The agency backpedaled, however, after it was noted that, under contractual obligations, a full

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mologists and "population biologists who understand the theory, but may not be on top of the practicalities of control. There is an unfortunate division between pure and applied science that is hurting everybody." There are "no easy outs," says Ehrlich, "but a lot of groups have to cooperate."

Governor Brown seemed to have had such a consultation in mind in forming a pest response task force which is commissioned to consider better ways in the future to deal with problems like the Medfly emergency. All the major players in the present controversy—scientists, agriculture interests, public officials—are represented. And unless a better way to reach consensus is achieved the controversy, like the Medfly, will almost certainly reappear.—JOHN WALSH

New Creationism Bill Already Drafted

With a heavy emphasis on fairness and even-handedness, a new equal time bill increases the threat to science

Just as Arkansas' "Balanced Treatment for Creation-Science and Evolution-Science Act" is being put to the test in Federal District Court in Little Rock,* a new improved draft creationist bill is circulating in legislatures throughout the country. Paul Ellwanger, the architect of the draft bill, hopes the new version will avoid the problems now facing the Arkansas law. "The new draft bill is very tight indeed," he says.

The Arkansas law is being challenged by the American Civil Liberties Union (ACLU) on three counts: first, that the law violates the separation of church and state clause of the First Amendment; second, that it abridges the academic freedom of teachers and students; and third, that it is unconstitutionally vague in what it means by balanced treatment of creation-science and evolution-science.

The ACLU's argument on the first point is that creationism is not a science but a religion. The new draft can do little in detail to circumvent this challenge. It does, however, attempt to eliminate its vulnerability on the second two points.

For a start, the bill no longer goes under the title of "Balanced Treatment." Instead, it is to be known as the "Unbiased Presentation of Creation-Science and Evolution-Science Bill." Ellwanger, who heads a small independent group in Anderson, South Carolina, considers the change to be "crisper and to reflect more immediately what our objective is. Liberals have objected to bias in education," he says, "now let's see them support the removal of bias."

Virtually any phrase that might be construed as referring to a supernatural being has been modified. For instance, its definition of creation-science begins with ". . . evidences that indicate creation of the universe, matter and energy suddenly." The phrase ". . . from nothing" has been dropped. Also dropped from this section is reference to a worldwide flood.

Similarly, the words ". . . evidences for a relatively recent inception of the earth and living kinds" have been replaced by ". . . evidences for consideration of several chronometric processes that could reliably indicate the ages of the earth and of life, including both those processes that indicate a multibillion year age and those processes that indicate a relatively more recent inception."

The latest draft bill contains an entirely new section that sets out in detail what is meant by unbiased presentation, noting equality in number of hours devoted to the teaching of creation-science and evolution-science, number of pages in textbooks, number of volumes in libraries, and so on. "This should get round the specific complaint of vagueness in the ACLU suit," says Ellwanger.

Another new section in the draft concerns funding for teaching materials. "One of the biggest sandbagging tactics against unbiased presentation has been the claim of inadequate funds," says Ellwanger. "I want to give teachers legislative support." Essentially, the bill would provide that schools equip themselves with materials needed for unbiased presentation, using existing funds. In other words, no school could claim it had insufficient extra money to purchase the extra books required for giving the creation-science version of origins. So, in order to buy creation-science books, less funds would be available for other areas, including evolutionary theory.

The most extensive changes in the new draft bill come in the section on legislative findings of fact. The persistent new emphasis here is fairness and even-handedness. "We wanted to avoid being charged with being biased in our aims," explains Ellwanger.

The section begins with the unchallengeable and noble statement that, "The citizens of this State have many different philosophical, religious, scientific, ethical, and other beliefs about the origin of the universe, earth, life, and man." It notes a series of supposed deficiencies in evolution-science, such as unfalsifiability, and unacceptability to many people. But in each case the draft adds the phrase, ". . . just as creation-science is [unfalsifiable]," or whatever is appropriate. Similarly, the list of alleged deficiencies of public school presentation of evolution-science only is balanced with the phrase, ". . . just as instruction in only creation-science would [violate academic freedom]," and so on.

It is impossible to read this section and the draft bill as a whole without forming the impression that proper consideration really must be given on both sides—if creationism is a science.

Probably very few evolutionary biologists will be seduced by the anodyne wording, but the draft is likely to soothe many problems legislators might otherwise have had. The last phrase of the draft reads as follows: "The great majority of citizens . . . , whatever their philosophical or religious beliefs about origins, favor unbiased presentation of evolution-science and creation-science in public schools." Survey of public opinion in a recent Associated Press-NBC News poll confirms this claim.

In the absence of a firm ruling against creationism as a science in the Arkansas case, many legislatures will surely find the combination of public opinion and Ellwanger's skillfully crafted draft bill difficult to resist.—ROGER LEWIN

*"Creationism goes on trial in Arkansas," *Science*, 4 December, p. 1101.

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