South-East Asian toxins

Is yellow rain simply bees' natural excreta?

Washington

THE startling suggestion that "yellow rain" may simply be the excrement of bees was put forward at a meeting last week in Boston, Massachusetts. The discovery of large quantities of pollen in yellow spots found on leaves in Thailand (see *Nature* 17 March, p.200) had already prompted speculation that the yellow rain — said by the US State Department to be evidence of Soviet use of toxin weapons — may in fact be of natural origin.

The idea that bees might be implicated in the story was put forward by Professor Howard Meselson of Harvard University speaking at a meeting held last month at Tufts University, sponsored by the Institute for Foreign Policy Analysis. The spots became a focus for scientific investigations of yellow rain when they were discovered, in February 1982, in Thailand along the Kampuchean border. A team of Canadian medical investigators who were then in the area reported an outbreak of an unidentified ailment among villagers at the time the spots appeared, and analyses since carried out by the US government and other countries confirm the presence of trichothecene mycotoxins in the spots. These are the toxins that the State Department has accused the Soviet Union of manufacturing for use as a weapon in South-East Asia and Afghanistan.

The finding that the spots also contain vast amounts of pollen came to light more recently. Last summer, Australian government scientists found pollen in samples obtained in Thailand, said to have come from within Laos. The Australians concluded that the presence of pollen was so bizarre that the samples had to be "fakes", the spots having been painted on the leaves (see *Nature* 24 March, p.282).

But reports from the Canadian investigators of the widespread appearance of yellow spots in the Thailand border region, and the discovery of pollen in these samples, has made most investigators doubt that all could be deliberate fakes.

Meselson was among the first to suggest that the presence of pollen in the spots might imply a natural phenomenon at work. According to participants at the Boston meeting (which was closed to reporters), Meselson's hypothesis is based on the known habit of bees to excrete large amounts of pollen at certain times of the year. Meselson suggested that this could explain the pollen spots on leaves; if the spots were then attacked by the right species of *Fusarium* fungus, then the presence of mycotoxins could be explained as well.

Predictably, many objections were raised to Meselson's idea. According to Joan Nowicke, a palynologist at the Smithsonian Institution who has looked at several of the samples, the spots contain pollen from many different families of plants. "It's hard to imagine that any one bee would collect this tremendous diversity of pollen", she said.

Another puzzle, according to Dr H. Bruno Schiefer of the University of Saskatchewan, is why, if it is a natural occurrence, it has only been reported in the past two years. Similarly, he questioned why there were no medical records of mycotoxin poisoning if mycotoxins are naturally produced in the region.

He added that although reports of yellow rain attacks appear to be seasonal — a point in favour of a natural explanation — the season in question is January to March, a dry period when pollen production is low.

Schiefer, a toxicologist who specializes in mycotoxins, last summer prepared a report on yellow rain for the Canadian Government after a visit to Thailand.

Schiefer ticked off several other possible explanations for the presence of pollen in the spots.

- Yellow rain contains a sticky substance; after it falls on vegetation, wind-borne pollen adheres to the spot.
- Pollen is used in the manufacture of the toxins, either as growth medium for the fungi or — as the State Department has suggested — to provide a carrier for the toxin that could be readily inhaled.
- Pollen was mixed into the substance sprayed in the Thailand "attack" as a diversionary tactic to confuse Western investigators.

The Boston discussions, while on the one hand adding to the long list of questions about yellow rain, may also have dashed early hopes that the discovery of pollen in the samples might help to provide some answers. Nowicke explained that since it is often difficult to identify a pollen grain's family, let alone its species, it is virtually impossible to determine whether the pollen is native to the region.

Nowicke said that apart from finding a wide diversity of families in the samples she has looked at, the only other detail she could report was the size of the pollen the grains. She said that the most common size was 40 μm, although there was a large number of very small grains of roughly 10 μm. The State Department has argued that these very small grains, which are able to penetrate the lungs deeply, would be an ideal carrier for the toxins.

A report on the US government's analyses of the pollen found in its samples is expected from the Army Chemical Systems Laboratory in a month or two.

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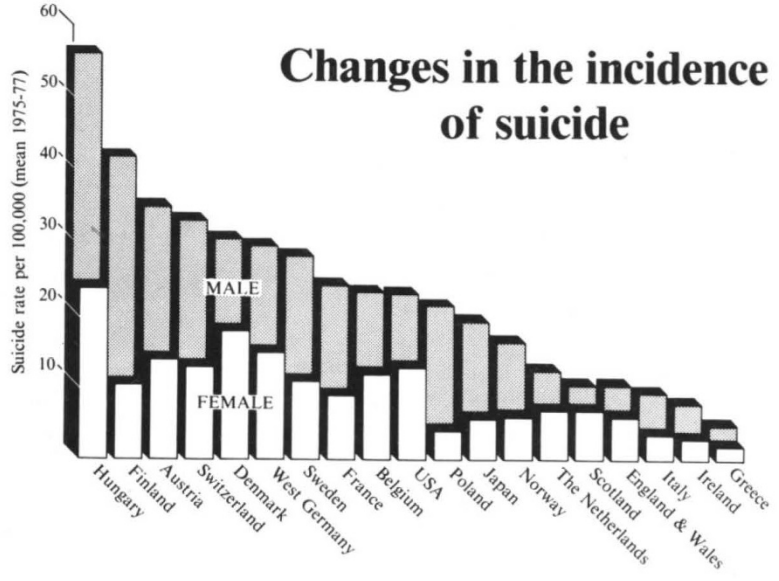

SUICIDE is on the increase, particularly among women and the young, according to a report published by the World Health Organization (WHO). Variations in absolute rates have done little to change the rank order of registered countries during the course of this century, although Britain has been an interesting exception to this rule, showing a 34 per cent decrease in suicide rate since 1960, as opposed to a 49 per cent increase in Hungary and a 34 per cent increase in Poland during the same period. WHO claims that this apparent discrepancy can be at least partly explained by the introduction of nontoxic natural gas supplies which made suicide by domestic gas poisoning impossible. Until 1960 this was the most common method of suicide in Britain. Source: *Changing Patterns in Suicide Behaviour*, WHO, Copenhagen.

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