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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460**

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

March 14, 2005

MEMORANDUM

SUBJECT: Review of Fluvalinate Incident Reports
DP Barcode D300199, Chemical #109302

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BACKGROUND

The following data bases have been consulted for the poisoning incident data on the active ingredient Fluvalinate (PC Code:060901):

- 1) OPP Incident Data System (IDS) - reports of incidents from various sources, including registrants, other federal and state health and environmental agencies and individual consumers, submitted to OPP since 1992. Reports submitted to the Incident Data System represent anecdotal reports or allegations only, unless otherwise stated. Typically no conclusions can be drawn implicating the pesticide as a cause of any of the reported health effects. Nevertheless, sometimes with enough cases and/or enough documentation risk mitigation measures may be suggested.
- 2) Poison Control Centers - as the result of a data purchase by EPA, OPP received Poison Control Center data covering the years 1993 through 1998 for all pesticides. Most of the national Poison Control Centers (PCCs) participate in a national data collection system, the Toxic Exposure Surveillance System which obtains data from about 65-70 centers at hospitals and universities. PCCs provide telephone consultation for individuals and health care providers on suspected poisonings, involving drugs, household products, pesticides, etc.

3) California Department of Pesticide Regulation - California has collected uniform data on suspected pesticide poisonings since 1982. Physicians are required, by statute, to report to their local health officer all occurrences of illness suspected of being related to exposure to pesticides. The majority of the incidents involve workers. Information on exposure (worker activity), type of illness (systemic, eye, skin, eye/skin and respiratory), likelihood of a causal relationship, and number of days off work and in the hospital are provided.

4) National Pesticide Telecommunications Network (NPTN) - NPTN is a toll-free information service supported by OPP. A ranking of the top 200 active ingredients for which telephone calls were received during calendar years 1984-1991, inclusive has been prepared. The total number of calls was tabulated for the categories human incidents, animal incidents, calls for information, and others.

5) National Institute of Occupational Safety and Health's Sentinel Event Notification System for Occupational Risks (NIOSH SENSOR) performs standardized surveillance in seven states from 1998 through 2002. States included in this reporting system are Arizona, California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington. Reporting is very uneven from state to state because of the varying cooperation from different sources of reporting (e.g., workers compensation, Poison Control Centers, emergency departments and hospitals, enforcement investigations, private physicians, etc.). Therefore, these reports should not be characterized as estimating the total magnitude of poisoning. The focus is on occupationally-related cases not residential or other non-occupational exposures. However, the information collected on each case is standardized and categorized according the certainty of the information collected and the severity of the case.

Fluvalinate REVIEW

I. Incident Data System

Incident #175-1 California

An incident occurred in 1992 when the product was used to fog a greenhouse. Vents that were opened inadvertently allowed the product to drift to residential neighborhood. Complaints of symptoms led to 150 people being evacuated and 10 people were seen in a hospital. A family of four (3 adults and one infant) reported choking, reddened face, sour taste in dry mouth, and involuntarily dropping in one household member and transient "passing out" and dry mouth in the infant. Another household member reported choking, difficulty breathing, jumpiness, dropping things, fatigue, and dry mouth. No further information on the disposition of the case was reported.

Incident #2836-2 California follow up to report above #175-1)

A summary of the incident above, reported that people in the immediate vicinity of the greenhouse experienced coughing, nausea, and headaches. The total evacuated was reported as

200, eight sought medical attention and 17 were treated by paramedics. The greenhouse was fined for violation of California regulations. No further information on the disposition of the case was reported.

Incident #8318-5

An incident occurred in 1998, when there was the question of a finger infection and possible connection to fluvalinate exposure. The attending physician did not believe the infection was related to the use of the pesticide. No further information on the disposition of the case was reported.

Incident #8764-4

An incident occurred in 1999 when a beekeeper used the product and got a rash on his hands. He did have a medical history of allergies. No further information on the disposition of the case was reported.

Incident #9755-2

An incident occurred in 1999 when wife put box of fluvalinate strips in bedroom. For the next two weeks she reported an allergic reaction including rash, throat swelling, pain in shoulders, swollen eyes, and dry mouth. It was not clear whether the product could have been responsible for these symptoms or not. No further information on the disposition of the case was reported.

Incident #10251-2

An incident occurred in 2000, when a self-reported chemically sensitive worker was exposed to nearby spraying. His symptoms included nausea, dizziness, and difficulty breathing. No further information on the disposition of the case was reported.

Incident #10541-4

An incident occurred in 2000, when a greenhouse worker reentered a treated area. she began to cough and vomit. She also reported eye irritation, nausea, and headache. She reported not smelling the product yet had symptoms, apparently disproportionate, or unrelated to the exposure. No further information on the disposition of the case was reported.

Incident #10541-5

An incident occurred in 2000, when an adult woman had contact with surfaces treated a few hours earlier. She reported difficulty breathing, swollen eyes, and was diagnosed with burns to the lungs. No further information on the disposition of the case was reported.

Incident #10541-6

An incident occurred in 2000, when an adult male applied the product with gloves. He reported he might have gotten the product on his finger and later developed hives/welts over his body that evening. He also wondered whether earlier exposure to steroid medication might be responsible for his symptoms. No further information on the disposition of the case was reported.

Incident #10855-4

An incident occurred in 1999, when an caller use mite strips for her bees. For the past half year she has experienced allergic reactions on hands and forearms diagnosed as contact dermatitis. Allergy testing found she is highly allergic to pyrethroids and with treatment she is doing better. No further information on the disposition of the case was reported.

Incident #11992-10

An incident occurred in 2001, when a worker used the product for an hour and became nauseous and vomited. Half hour after that she became dizzy and fainted. No further information on the disposition of the case was reported.

Incident #13328-7

An incident occurred in 1999, when a woman had been using the product for her bees for three years. Yearly bloodwork revealed an abnormal liver LFT value and she called to ask whether the product could be in any way related to this finding. No further information on the disposition of the case was reported.

Too little documentation was provided in most of the above incidents to warrant any conclusions about the health effects of fluvalinate with two exceptions. Exposure to fumes from drift (Incident #2836-2 in California) can lead to coughing, nausea, and headaches. Other cases (Incident #8764-4 and Incident #10855-4) suggest the product can be responsible for rash and dermatitis

II. Poison Control Center Data - 1993 through 2001

Results for the years 1993 through 2001 are presented below for occupational and non-occupational reports involving adults and older children, and for children less than six years of age. Cases involving exposures to multiple products or unrelated outcome are excluded. Tables 1-4 present the hazard information for fluvalinate compared with all other pesticides on six measures: percent with symptoms, percent with moderate, major, or fatal outcome, percent with major or fatal outcome, percent of exposed cases seen in a health care facility, and percent hospitalized and percent seen in a critical care facility. Table 1 reports the number of cases on which the data derived in Tables 2-4 are based. Table 2 presents this information for occupational cases, Table 3 for non-occupational cases involving adults and older children, and Table 4 for children under six years of age. Note that Table 1 shows outcome was determined in only 25 or less cases in each of the three categories over the nine year period. Any conclusions based on these tables should be interpreted with caution due to the relatively small sample of cases.

Table 1. Number of fluvalinate exposures reported to the Toxic Exposure Surveillance System (AAPCC), number with determined outcome, number seen in a health care facility for occupational and non-occupational cases (adults and children six years and older) and for children under six years of age only, 1993-2001.

Subgroup	Exposures	Outcome determined	Seen in Health Care Facility
Occupational: adults and older children	17	12	11
Non-occupational: adults and older children	37	25	11
Children under age six	19	11	2

Table 2. Comparison between fluvalinate and all pesticides for percent cases with symptomatic outcome (SYM), moderate or more severe outcome (MOD), life-threatening or fatal outcome (LIFE-TH), seen in a health care facility (HCF), hospitalized (HOSP), or seen in an intensive care unit (ICU) reported to Poison Control Centers, 1993-2001 for occupational cases only.

Pesticide	SYM*	MOD*	LIFE-TH*	HCF*	HOSP*	ICU*
Fluvalinate	83.3%	16.7%	0.0%	64.7%	0.0%	0.0%
All Pesticides	86.1%	19.6%	0.681%	45.6%	6.14%	2.40%
Ratio	0.97	0.85	0.0	1.42	0.0	0.0

* Symptomatic cases based on those cases with a minor, moderate, major, or fatal medical outcome. Denominator for SYM, MOD, and LIFE-TH is the total cases where medical outcome was determined. Denominator for HCF is all exposures. Denominator for HOSP and ICU is all cases seen in a health care facility.

Table 3. Comparison between fluvalinate and all pesticides for percent cases with symptomatic outcome (SYM), moderate or more severe outcome (MOD), life-threatening or fatal outcome (LIFE-TH), seen in a health care facility (HCF), hospitalized (HOSP), or seen in an intensive care unit (ICU) reported to Poison Control Centers, 1993-2001 for non-occupational cases involving adults and older children.

Pesticide	SYM*	MOD*	LIFE-TH*	HCF*	HOSP*	ICU*
Fluvalinate	76.0%	20.0%	0.0%	29.7%	0.0%	0.0%
All Pesticides	68.4%	11.0%	0.408%	15.3%	6.89%	2.95%
Ratio	1.11	1.82	0.0	1.94	0.0	0.0

* Symptomatic cases based on those cases with a minor, moderate, major, or fatal medical outcome. Denominator for SYM, MOD, and LIFE-TH is the total cases where medical outcome was determined. Denominator for HCF is all exposures. Denominator for HOSP and ICU is all cases seen in a health care facility.

Table 4. Comparison between fluvalinate and all pesticides for percent cases with symptomatic outcome (SYM), moderate or more severe outcome (MOD), life-threatening or fatal outcome (LIFE-TH), seen in a health care facility (HCF), hospitalized (HOSP), or seen in an intensive care unit (ICU) reported to Poison Control Centers, 1993-2001 for non-occupational cases involving children less than six years old.

Pesticide	SYM*	MOD*	LIFE-TH*	HCF*	HOSP*	ICU*
Fluvalinate	36.4%	9.09%	0.0%	10.5%	0.0%	0.0%
All Pesticides	21.6	1.41	0.127	14.8	4.85	1.46
Ratio	1.68	6.45**	0.0	0.71	0.0	0.0

* Symptomatic cases based on those cases with a minor, moderate, major, or fatal medical outcome. Denominator for SYM, MOD, and LIFE-TH is the total cases where medical outcome was determined. Denominator for HCF is all exposures. Denominator for HOSP and ICU is all cases seen in a health care facility.

** Calculation based on a single case.

None of the fluvalinate exposures reported in nine years resulted in major or fatal outcome and none of cases required hospitalization or critical care. The number of symptomatic cases with moderate outcome was relatively small (8 cases out of 48 with medical outcome determined) and little weight should be placed on the calculated ratios. In general fluvalinate was as likely to cause minor symptoms as other pesticides but much less likely to cause more serious effects requiring hospitalization or critical care. Symptoms most commonly reported were dermal (rash, irritation, and erythema) and headache with infrequent reports of eye irritation, nausea, vomiting.

III. California Data - 1982 through 2002

Detailed descriptions of 77 cases submitted to the California Pesticide Illness Surveillance Program (1982-2002) were reviewed. In 28 of these cases, fluvalinate was used alone or was judged to be responsible for the health effects. Only cases with a definite, probable or possible relationship were reviewed. Table 4 presents the types of illnesses reported by year. Table 5 compares worker activity with type of illness.

Table 4. Cases Due to Fluvalinate in California Reported by Type of Illness and Year, 1982-2002.

Year	Illness Type				
	Systemic ^b	Eye	Skin	Respiratory	Total
1982-1983	-	-	-	-	-
1984	1	1	-	-	2
1985	2	2	-	-	4
1986	1	-	1	-	2
1987	-	-	-	-	-
1988	-	-	1	-	1
1989	-	-	-	1	1
1990	-	-	-	1	1
1991	-	-	-	-	-
1992	5	1	-	3	9
1993	-	2	1	-	3
1994	-	-	-	-	-
1995	1	-	1	-	2
1996	-	-	2	-	2
1997	1	-	-	-	1
1998-2003	-	-	-	-	-
Total	11	6	6	5	28

^b Category includes cases where skin, eye, or respiratory effects were also reported.

^c Category includes combined irritative effects to eye, skin, and respiratory system.

Six of the workers in the table above took days off from work, ranging from one to five days. None of the workers were hospitalized

Table 5. Illnesses by Activity Categories for Fluvalinate Exposure in California, 1982-1999

Activity Category	Illness Category				Total
	Systemic ^b	Eye	Skin	Respiratory	
Applicator	2	-	1	1	4
Greenhouse or Nursery residue	1	2	4	1	8
Greenhouse Drift	1	2	-	-	3
Drift cluster from greenhouse 1992	5	-	-	3	8
Improper storage	1	1	-	-	2
Transport of leaking container	-	1	1	-	2
Bystander sprayed	1	-	-	-	1
Total	11	6	6	5	28

^b Category includes cases where skin, eye, or respiratory effects were also reported

^c Category includes combined irritative effects to eye, skin, and respiratory system

The primary illnesses reported in California relate to greenhouse use often involving exposures to residues on foliage, especially flowers, or drift from nearby applications.

IV. National Pesticide Telecommunications Network

On the list of the top 200 chemicals for which NPTN received calls from 1984-1991 inclusively, fluvalinate was not listed.

V. NIOSH SENSOR reports 1998-2002

One report due to fluvalinate were reported out of 4,221 reports from 1998 through 2002. A case occurred during routine spraying in a Texas greenhouse in 1999 when the worker took off his respirator and the wind blew the chemical in his face. No medical treatment was sought but he did have respiratory and gastrointestinal symptoms.

VI. Scientific Literature

No scientific literature was found on the human health effects of fluvalinate.

VII. Conclusions

Fluvalinate exposure can lead to mild or moderate irritation of eyes and skin. Headache, difficulty breathing, and nausea are the more commonly reported systemic effects. Greenhouse use figure prominently in California incidents and nationwide beekeepers have reported dermal or other allergic-type reactions.

VIII. Recommendations

Persons handling fluvalinate should have protective equipment to keep the product off their skin, out of their eyes, and to prevent inhalation.

cc: Correspondence
Fluvalinate file (chemical no. 109302)
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