

Index of Signs and Symptoms

Presented in this chapter are lists of pesticides reported to have caused particular symptoms and signs, or combinations thereof, in poisoned individuals. The lists may help direct the attention of health professionals to possible toxic causes of the various disease manifestations, prompting inquiry into likelihood of exposure to the listed chemicals. If certain agents appear suspect, inquiry can then be made into the presence of additional manifestations typical of poisoning by those substances.

The limitations of this approach to diagnosis must be understood. First, all manifestations of illness have multiple causes, pesticidal and nonpesticidal. Second, there are no specific symptoms or signs that are invariably present in poisonings by particular pesticides. Third, many poisonings are characterized by unexpected manifestations.

Finally, neither route of exposure nor dosage of pesticide is taken into account in this listing. For example, effects of high-dose ingestion are not distinguished from effects of relatively low-dose dermal absorption, nor are topical effects distinguished from systemic dermal manifestations. The lists of pesticides can only be regarded as *clues* to prompt further inquiry by the interviewing professional.

The term manifestation means either symptom or sign. The word “poisoning” is used loosely in these headings to include topical as well as systemic effects. Pesticides which are relatively consistent in causing particular manifestations are listed in the middle column, headed “Characteristic of These Agents.” Pesticides that have caused various conditions with less consistency, or are less prominent features of poisoning, are listed in the right-hand column, headed “Occurs with These Agents.” Obviously, the distinction is not clear-cut.

Some symptoms (malaise, fatigue, dizziness) occur so commonly in poisoned individuals that they have little or no value in differential diagnosis, and are therefore not included in these tables.

General

| MANIFESTATION | CHARACTERISTIC OF THESE AGENTS | OCCURS WITH THESE AGENTS |
|------------------------------------|--|--|
| Rotten egg odor | Sulfur | |
| Hypothermia | Creosote Norbormide | |
| Hyperthermia (fever, pyrexia) | Nitrophenols Pentachlorophenol | Borate Thallium Metaldehyde Inorganic arsenicals Chlorophenoxy compounds Cadmium dusts Naphthalene |
| Chills | Phosphine Arsine | |
| Hot sensations | Nitrophenols Chlordimeform | Pentachlorophenol |
| Myalgia | Paraquat Chlorophenoxy compounds | |
| Thirst | Pentachlorophenol Nitrophenols Inorganic arsenicals Phosphorus Phosphides Sodium fluoride Cholecalciferol Aminopyridine | Borate Endothall |
| Anorexia | Organophosphates Carbamate insecticides Nicotine Pentachlorophenol Hexachlorobenzene Chlordimeform Cholecalciferol | Halocarbon fumigants Nitrophenols Inorganic arsenicals Aminopyridine |
| Alcohol intolerance | Thiram Calcium cyanamide | |
| Sweet taste in the mouth | Chlordimeform | |
| Metallic taste in the mouth | Inorganic arsenicals Organic mercury | |
| Salty, soapy taste In the mouth | Sodium fluoride | |
| | | |

Skin

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|--|--|--|
| Irritation, Rash, Blistering, or Erosion (without sensitization) | Copper, organotin, cadmium compounds Metam sodium Paraquat Diquat Sodium chlorate Phosphorus Sulfur Glyphosate Propargite Sodium hypochlorite Quaternary ammonia Thiram Chlordimeform Cationic detergents Hexachlorphene Ethylene oxide Formaldehyde Acrolein Methyl bromide Ethylene dibromide Dibromochloropropane Dichloropropane Endothall Aliphatic acids | Pentachlorophenol Picloram Chlorophenoxy compounds Captan Rotenone Diethyltoluamide Creosote Fungicides Herbicides with irritant properties Petroleum distillate |
| Contact dermatitis | PCP Paraquat DEET Chlorhexidine Creosote Hexachlorphine Pyrethrins Chlorothalonil Thiram Thiophthalimides | |
| Flushing | Cyanamide Nitrophenols | Thiram plus alcohol |
| Dermal sensitization | Propachlor Propargite Ethylene oxide | Anflazine Chlorothalonil Barban Captafol Formaldehyde |
| Beefy red palms, soles | Borate | |
| Urticaria | Chlorhexidine PCP DEET | Fluoride Pentachlorophenol |
| Bullae | Liquid fumigants | Hexachlorobenzene |

Skin (continued)

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|---------------------------------|--|--|
| Pallor | Organochlorines Fumigants Sodium fluoride Creosote | Coumarins Indandiones |
| Cyanosis | Sodium chlorate Paraquat Cadmium dusts Sodium fluoroacetate Strychnine Crimidine Nicotine Organochlorines | Organophosphates Carbamate insecticides Agents that cause shock, myocardiopathy, severe arrhythmias or convulsions |
| Yellow stain | Nitrophenols | |
| Keratoses, brown discoloration | Inorganic arsenicals | |
| Ecchymoses | Coumarins Indandiones | Phosphorus Phosphides |
| Jaundice | Carbon tetrachloride Chloroform Phosphorus Phosphides Phosphine Paraquat Sodium chlorate | Inorganic arsenicals Diquat Copper compounds |
| Excessive hair growth | | Hexachlorobenzene |
| Loss of hair | Thallium | Inorganic arsenicals |
| Loss of fingernails | | Paraquat Inorganic arsenicals |
| Brittle nails, white striations | | Inorganic arsenicals Thallium |
| Sweating, diaphoresis | Organophosphates Carbamate insecticides Nicotine Pentachlorophenol Naphthalene Aminopyridine | Copper compounds |

Eye

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|---|---|---|
| Conjunctivitis (irritation of mucous membranes, tearing) | Copper compounds Organotin compounds Cadmium compounds Metam sodium Paraquat Diquat Acrolein Chloropicrin Sulfur dioxide Naphthalene Formaldehyde Ethylene oxide Methyl bromide Endothall Toluene Xylene | Thiophthalimides Thiram Thiocarbamates Pentachlorophenol Chlorophenoxy compounds Chlorothalonil Picloram Creosote Aliphatic acids |
| Tearing | Organophosphates Carbamate insecticides Chloropicrin Acrolein | Pentachlorophenol Pyrethrins |
| Yellow sclerae | Nitrophenols | Agents that cause jaundice (see above under Skin) |
| Keratitis | Paraquat | |
| Ptosis | Thallium | |
| Diplopia | Organophosphates Carbamate insecticides Nicotine | |
| Photophobia | | Organotin compounds |
| Constricted visual fields | Organic mercury | |
| Optic atrophy | | Thallium |
| Miosis | Organophosphates Carbamate insecticides | Nicotine (early) |
| Dilated pupils | Cyanide Fluoride | |
| Unreactive pupils | Cyanide | |

Nervous System

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|---|--|--|
| Paresthesia (chiefly facial, transitory) | Organophosphates Cyanopyrethroids Phosphides Organochlorines Thiabendazole | Nicotine (late) |
| Paresthesia of extremities | Inorganic arsenicals Organic mercury Sodium fluoroacetate Carbon disulfide Thallium | Pyrethroids (transitory) |
| Headache | Organophosphates Carbamate insecticides Nicotine Inorganic arsenicals Organic mercury Cadmium compounds Organotin compounds Copper compounds Thallium Fluoride Borates Naphthalene Phosphine Halocarbon fumigants Creosote Diquat Cholecalciferol Cyanamide | Organochlorines Nitrophenols Thiram Pentachlorophenol Paraquat Diethyltoluamide |
| Behavioral – mood Disturbances (confusion, excitement, mania, disorientation, emotional lability) | Organic mercury Inorganic arsenicals Organotin compounds Thallium Nicotine Sodium fluoroacetate Diquat Cyanide Nitrophenols Aminopyridine Carbon disulfide Methyl bromide | Organophosphates Carbamate insecticides Pentachlorophenol Sodium fluoride Diethyltoluamide Organochlorines |
| Depression, stupor, coma, respiratory failure, often without convulsions | Organophosphates Carbamate insecticides Sodium fluoride Borate Diquat | Inorganic arsenicals Metaldehyde Sulfuryl fluoride Halocarbon fumigants Phosphorus Phosphine Paraquat Chlorophenoxy compounds Diethyltoluamide Alkyl phthalates |

Nervous System (continued)

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|--|---|---|
| Seizures/Convulsions (clonic-tonic) sometimes leading to coma | Organochlorines Strychnine Crimidine Sodium fluoroacetate Nicotine Cyanide Acrylonitrile Metaldehyde Thallium DEET Chlorobenzilate Carbon disulfide Phosphine Povidone-iodine Hexachlorophene Sodium chlorate Creosote Endothall Fluoride | Nitrophenols Pentachlorophenol Inorganic arsenicals Organotin compounds Diquat Borate Sulfuryl fluoride Methyl bromide Chlorophenoxy compounds Organophosphates Carbamate insecticides Aminopyridine |
| Muscle twitching | Organophosphates Carbamate insecticides Nicotine Sulfuryl fluoride | Organic mercury Chlorophenoxy compounds |
| Myotonia | | Chlorophenoxy compounds |
| Tetany, carpopedal spasms | Fluoride Phosphides Phosphorus | |
| Tremor | Organic mercury Thallium Organophosphates Carbamate insecticides Nicotine Metaldehyde Borates | Pentachlorophenol Nitrophenole Thiram |
| Incoordination (including ataxia) | Halocarbon fumigants Organophosphates Carbamate insecticides Carbon disulfide Nicotine Thallium | Organic mercury Organochlorines |
| Paralysis Paresis, muscle weakness | Inorganic arsenicals Organophosphates Carbamate insecticides Nicotine | Organic mercury Diethyltoluamide |
| Hearing loss | Organic mercury | |

Nervous System (continued)

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|----------------------|---|---|
| Hypotension shock | Phosphorus Phosphides Phosphine Sodium fluoride Sodium chlorate Borate Thallium Copper compounds Endothall Cyanamide | Inorganic arsenicals Nicotine (late) Creosote Alkyl phthalate Cycloheximide Formaldehyde Norbormide |
| Hypertension | Thallium (early) Nicotine (early) | Organophosphates |

Cardiovascular System

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|-------------------------------------|--|--|
| Cardiac arrhythmias | Sodium fluoroacetate Halocarbon fumigants Nicotine Sodium fluoride Ethylene oxide Sodium chlorate Thallium-ventricular Povidone-iodine Veratrum alkaloid (sabadilla) | Inorganic arsenicals Phosphorus Phosphides Phosphine Organochlorines Cyanide Acrylonitrile Fluoride |
| Bradycardia (sometimes to asystole) | Cyanide Organophosphates Carbamate insecticides | Nicotine |
| Tachycardia | Nitrophenols Pentachlorophenol Cyanamide | Metalddehyde Organophosphates |

Respiratory System

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|--|---|---|
| Upper respiratory tract irritation, rhinitis, scratchy throat, cough | Naphthalene Paraquat Chloropicrin Acrolein Dichloropropene Ethylene dibromide Sulfur dioxide Sulfuryl fluoride Acrylonitrile Formaldehyde Cadmium dusts ANTU | Dry formulation of copper, tin, zinc compounds Dusts of thiocarbamate and other organic pesticides Chlorophenoxy compounds Aliphatic acids Rotenone |
| Sneezing | Sabadilla | |
| Runny nose | Pyrethrins Inorganic arsenicals Organophosphates Carbamate insecticides | Dry formulation of copper, tin, zinc compounds Dusts of thiocarbamate and other organic pesticides Chlorophenoxy compounds Aliphatic acids Rotenone |
| Pulmonary edema (many chemicals come packaged in a hydrocarbon vehicle, well known to cause pulmonary edema) | Methyl bromide Phosphine Phosphorus Phosphine Ethylene oxide Ethylene dibromide Acrolein Pyrethroids Sulfur dioxide Cationic detergents Creosote Methylisothiocyanate Cadmium | Organophosphates Carbamate insecticides Paraquat Phosphides |
| Pulmonary consolidation | Paraquat Cadmium dusts Methyl bromide | Diquat |
| Dyspnea | Organophosphates Carbamate insecticides Nicotine Paraquat ANTU Cadmium dusts Cyanamide Sulfuryl fluoride Pentachlorophenol Methyl bromide Sulfur dioxide Chloropicrin | Nitrophenols Cyanide Creosote Pyrethrins |

Gastrointestinal Tract and Liver

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|---|---|---|
| Nausea, vomiting, commonly followed by diarrhea | Organophosphates Carbamate insecticides Nicotine Arsenicals Fluoride Cadmium compounds Organotin compounds Copper compounds Sodium chlorate Borate Cyanide Chlorophenoxy compounds Phosphorus Phosphides Phosphine Carbon disulfide Chloropicrin Halocarbon fumigants Endothall Metaldehyde Thallium Red quill Diquat Naphthalene Methyl bromide Dibromochloropropane Veratrum alkaloid Thiram | Pentachlorophenol <i>B.thuringiensis</i> Cholecalciferol Thiram Ethylene dichloride Propane Ethylene oxide Cresol Many pesticides have some irritant property |
| Diarrhea (first) | Organophosphates Carbamates Pyrethoids Borates Sulfur Nicotine <i>B.thuringiensis</i> Thiram Cadmium | Cationic detergents Cresol Hexachlorophene Chlorophenoxy compounds |
| Diarrhea (bloody) | Fluoride Paraquat Diquat Thallium Coumarins Indandiones Endothall Arsenicals | Phosphorus Phosphides Cycloheximide |

Gastrointestinal Tract and Liver (continued)

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|----------------------|---|--|
| Abdominal pain | Organophosphates Carbamate insecticides Paraquat Diquat Nicotine Methaldehyde Fluoride Borate Phosphorous Phosphides Inorganic arsenicals Cadmium compounds Copper compounds Thallium Organotin compounds | Chlorophenoxy compounds Aliphatic acids Sodium chlorate Creosote Endothall Aminopyridine Coumarins Indandiones Fumigants (ingested) Cycloheximide |
| Stomatitis | Inorganic arsenicals Paraquat Diquat Copper compounds | Thallium |
| Salivation | Organophosphates Carbamate insecticides Nicotine Aminopyridine Sodium fluoride Cyanide Cadmium compounds | |
| Ileus | Thallium Diquat | |

Liver

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|-----------------------------------|--|---|
| Enlargement | Copper compounds Sodium chlorate Phosphine Carbon tetrachloride Cholorform | Inorganic arsenicals Hexachlorobenzene |
| Jaundice – see section on Skin | | |

Kidney

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|--|---|--|
| Proteinuria Hematuria Sometimes leading to oliguria Acute renal failure with azotemia | Inorganic arsenicals Copper compounds Sodium fluoride Naphthalene Borate Nitrophenols Pentachlorophenol Sodium chlorate Sulfuryl fluoride Paraquat Diquat Arsine Ethylene dibromide | Cadmium compounds Phosphorus Phosphides Phosphine Chlorophenoxy compounds Creosote Organotin compounds |
| Dysuria, hematuria, pyuria | Chlordimeform | |
| Polyuria | Cholecalciferol | Fluoride |
| Hemoglobinuria | Naphthalene Sodium chlorate Arsine | |
| Wine-red urine (porphyrinuria) | Hexachlorobenzene | |
| Smoky urine | Creosote | |
| Glycosuria | | Organotin compounds |
| Ketonuria | | Borate |
| | | |

Reproductive System

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|----------------------|---|---------------------------------|
| Low sperm count | Dibromochloropropane | Kepone |
| | | |

Blood

| MANIFESTATION | CHARACTERISTIC OF THESE POISONINGS | OCCURS WITH THESE AGENTS |
|--|--|---|
| Hemolysis | Naphthalene Sodium chlorate Arsine | Copper compounds Cresol |
| Methemoglobinemia | Sodium chlorate Creosote | Chlordimeform Cyanide Cresol Copper Arsine |
| Hypoprothrombinemia | Coumarins Indandiones | Phosphorus Phosphides Carbon tetrachloride |
| Hyperkalemia | Sodium chlorate Naphthalene Arsine | Sodium fluoride |
| Hypocalcemia | Fluoride | Thallium Phosphorus Phosphides |
| Hypercalcemia | Cholecalciferol | |
| Carboxyhemoglobinemia | | Organotin compounds |
| Anemia | Naphthalene Sodium chlorate Arsine Inorganic arsenicals | |
| Leukopenia, Thrombocytopenia | Inorganic arsenicals | |
| Elevated LDH GOT, GPT, alkaline phosphatase, ALT, AST enzymes | Carbon tetrachloride Chloroform Phosphine | Inorganic arsenicals Phosphorus Phosphides Phosphine Sodium chlorate Nitrophenols Pentachlorophenol Thallium Organochlorines Chlorophenoxy compounds |
| Depressed RBC Acetylcholinesterase and plasma pseudochoolinesterase | Organosphosphates | Carbamate insecticides |