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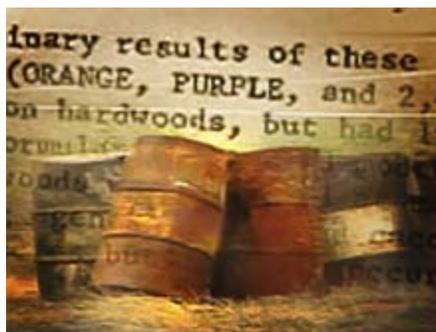
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Deadly Defoliants

June 14, 2005

[CBC News](#)



The chemical colours

The names for the chemical defoliants come from the Vietnam War where the name signified the identifying bands that were used on the 55-gallon drums that contained the products. Herbicides used in Vietnam, as well as the best-known Agent Orange, were Agent White, Agent Blue, Agent Purple, Agent Pink and Agent Green.

What are the ingredients?

2,4,-D is a white crystalline irritant compound used as a defoliant and weed killer called also *2,4-dichlorophenoxyacetic acid*; (Chemical formula $C_8H_6Cl_2O_3$).

2,4,5,-T an irritant compound used especially as an herbicide and defoliant called also *trichlorophenoxyacetic acid*. (Chemical formula $C_8H_5Cl_3O_3$).

Picloram is a defoliant and systemic herbicide designed to break down very slowly in the soil (Chemical formula $C_6H_3Cl_3N_2O_2$).

PURPLE: A formulation of 2,4,-D and 2,4,5,-T.

GREEN: Used 2,4,5-T.

PINK: Used 2,4,5-T.

ORANGE: A formulation of 2,4,-D and 2,4,5-T.

WHITE: A formulation of Picloram and 2,4,-D.

BLUE: Contained cacodylic acid.

ORANGE II: A formulation of 2,4,-D and 2,4,5-T used in Vietnam in 1968 and 1969 (also sometimes referred to as "Super Orange").

DINOXOL: A formulation of 2,4,-D and 2,4,5-T. Small quantities were tested in Vietnam between 1962 and 1964.

TRINOXOL: Contained 2,4,5-T. Small quantities tested in Vietnam 1962-1964.

Where were the herbicides used?

U.S. veterans groups have compiled lists of areas where they believe the U.S. and allied military forces used chemical herbicides and defoliants. Some of the information has come from the U.S. Department of Defence and some of it from the veterans' own research.

Areas confirmed by the U.S. Department of Defence, in which defoliants were used (in addition to Vietnam): The Korean demilitarized zone in 1968 and 1969 (extensive spraying). Fort Drum, N.Y. in 1959 (testing).

Areas U.S. veterans say were sprayed:

1. Guam from 1955 through 1960s (spraying).
2. Johnston Atoll (1970s was used for AO storage).
3. Panama Canal Zone from 1960s to early 1970s (spraying).
4. Elgin AFB (Agents Orange and Blue) on firing range and simulated Viet Cong Village.
5. Wright-Patterson AFB (Ohio) and Kelly AFB (Texas).

In May 2003, a Democratic congressman, Lane Evans, asked U.S. Defence Secretary Donald Rumsfeld to investigate possible spraying in:

Aberdeen Proving Ground, Aberdeen, Md.
Apalachicola National Forest, Sophoppy, Fla.
Avon Air Force Base, Fla.
Beaumont, Texas
Brawley, Calif.
Bushnell Army Air Field, Fla.
Camp Detrick, Md.
Dar and Prek Clong, Cambodia
Eglin Air Force Base, Fla.
Fort Gordon, Ga.
Fort Richie, Md.
Fredericton, N.B.
Guanica, and Joyuda, Puerto Rico
Gulfport, Miss.
Huntington County State College, Pa.
Jacksonville, Fla.
Kauai, Hawaii
Kingston, R.I.
Kompong Cham province, Cambodia
Laos
Las Marias, Puerto Rico
Las Mesas Cerros and La Jugua, Mayaguez, Puerto Rico
Loquillo, Puerto Rico
Mauna Loa, Hilo, Hawaii

Pinal Mountains, Globe, Ariz.
Pranburi and other locations in Thailand
Prosser, Wash.
Rio Grande, Puerto Rico
Wayside and Wilcox, Miss.
Operation PACER HO (Disposal at sea)

What are the effects of chemical defoliants?



Dr. Joel Michalek during a press briefing on the Ranch Hand Study in the Pentagon on March 29, 2000. Michalek is the U.S. Air Force health study senior investigator for the study. (Courtesy: U.S. Dept. of Defense/Helene C. Stikkel)

On March 29, 2000, the United States Department of Defence released the results of a study by the U.S. air force called the Ranch Hand Study. That study was named for the original Agent Orange spraying program, also called Operation Ranch Hand.

In 1982, the U.S. air force began studying Vietnam veterans exposed to Agent Orange. In 1997, the U.S. air force conducted physical examinations of 2,300 Vietnam veterans exposed to Agent Orange.

The executive summary of the study said that the result showed "the strongest evidence to date that herbicide exposure is associated with diabetes, and some of its known complications." But the study said there was "no consistent evidence that Agent Orange is related to cancer."

The 2000 results confirmed an earlier 1992 study that also showed that Agent Orange is associated with adult-onset diabetes. "The 1997 results suggest that as dioxin levels increase, not only are the presence and severity of adult-onset diabetes increased, but the time to onset of disease is also decreased. A 47 per cent increase in diabetes was seen in those with the highest levels of dioxin. This is particularly strong evidence, since dioxin is the component of Agent Orange linked to many health effects in laboratory animals," the air force said.

The study said that "cardiovascular disease findings were mixed."

The Vietnam veterans exposed to Agent Orange, studied in 1997, showed an overall 26 per cent increase in heart disease, but the air force study added "disease risk was not increased in Ranch Hands with high dioxin levels. However, within the Ranch Hand group, two specific measures of heart disease, the presence of high blood pressure and the percentage of veterans with evidence of prior heart attacks indicated by electrocardiogram, did tend to increase with dioxin levels."

The study said the relationship between diabetes and cardiovascular disease was statistical and noted that "the biological processes relating herbicide exposure with diabetes or cardiovascular disease have not been described" by scientists or doctors.

As for cancer, the air force doctors said in their report: "At the end of 15 years of follow-up, the Ranch Hand Study has found no consistent evidence that dioxin exposure is related to cancer." While overall, the veterans exposed to Agent Orange had a six per cent increase in the risk of cancer compared to other Vietnam veterans, the study also found that "enlisted ground crew, the subgroup with the highest dioxin levels and presumably the greatest herbicide exposure, exhibited a 22 per cent decreased risk of cancer." The study also found that veterans exposed to Agent Orange showed "a loss of sensation in the feet, which increased with dioxin levels."

Blood tests regarding liver function and lipids were slightly elevated, and did tend to increase with dioxin level of the patient.

However, these tests may be elevated for many reasons, are not a disease by themselves, and cannot be explained entirely by any other finding in the study.

There were two limitations to the study. Groups such as American veterans or Vietnamese civilians were exposed in different ways and to different levels of herbicide, so the study could not show what effect herbicides or dioxin could have at levels for people outside the Ranch Hand Study group, or from other sources such as contaminated food. It warned that groups with higher exposures may well have effects not seen in the study. The relatively small size of the study made it difficult to detect increases in rare diseases, so small increases of these diseases could have been missed.