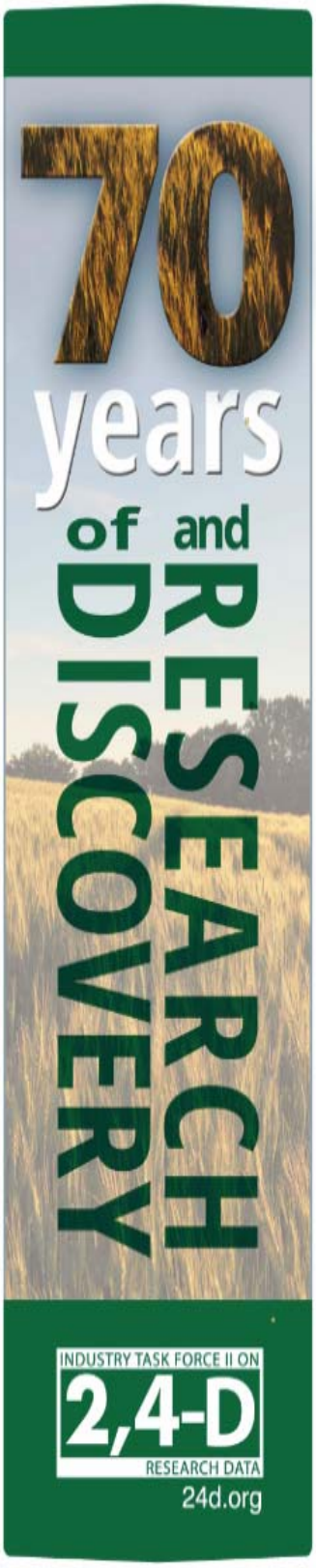


The Myth of Cancer in Dogs

Issue:

It is sometimes reported in the news media that lawn and turf herbicides containing 2,4-D are a cause of cancer in dogs. This is not supported by the simple fact that all regulatory agencies in the world that have examined the scientific data have reached the same conclusion: 2,4-D is not an animal carcinogen.

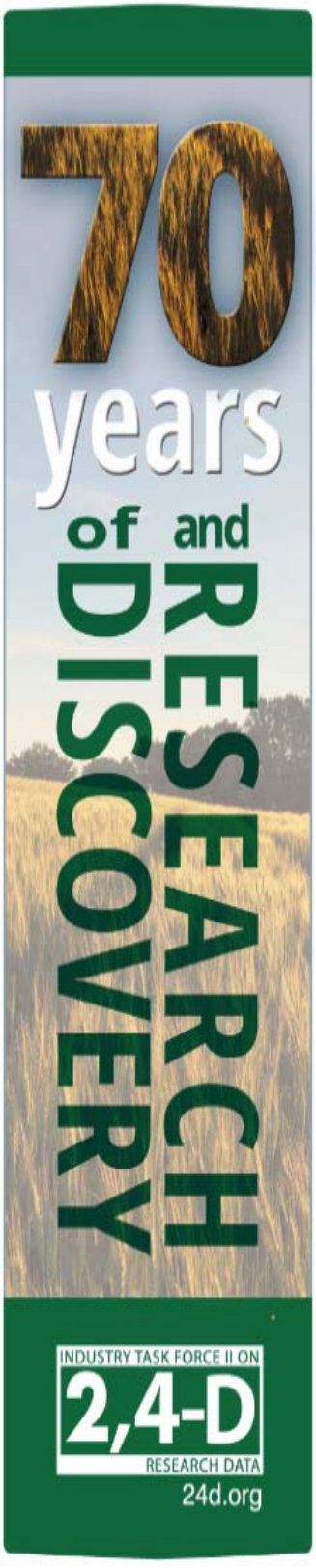
Background, NCI study:

In 1991, the Journal of the National Cancer Institute published a study which purportedly showed a positive association between canine malignant lymphoma (CML), a form of cancer in dogs, and dog owners use of the herbicide 2,4-D, (Hayes 1991)[1]. The authors claimed to have demonstrated that dogs whose owners used the herbicide 2,4-D on their lawns four or more times per year were twice as likely to develop canine malignant lymphoma compared to dogs whose owners did not use 2,4-D (please note that the maximum labeled use of 2,4-D on turf is two applications per year).

The study was immediately controversial in scientific circles since it was in direct conflict with the extensive 2,4-D toxicology database including rodent and dog feeding studies. There are also lifetime feeding bioassays in rodents (Charles, et al., 1996a)[2] and a chronic feeding study in the dog (Charles, et al., 1996b)[3] that did not indicate oncogenic effects. These animal feeding studies were done under controlled conditions by EPA/GLP qualified laboratories. The current EPA toxicology profile shows 2,4-D to be "non-carcinogenic" in animals.[4]

The Hayes study received widespread coverage by the news media, with the story being carried by almost 200 newspapers across the United States and Canada. Today, the study is often cited by anti-pesticide groups as evidence supporting the suggested relationship of 2,4-D and non-Hodgkin's lymphoma (NHL), a human disease somewhat similar to canine malignant lymphoma. Some veterinarians advise dog owners not to use 2,4-D on their lawns.

The 2,4-D Task Force was curious how the dose-response of frequency of 2,4-D use was calculated. Since the Hayes dog study was publicly funded, the data file was



given to Dr. John B. Kaneene, Director, Population Medicine Center, School of Veterinary Medicine, Michigan State University (MSU), for independent analysis. Neither the Task Force nor MSU were able to obtain additional information from the NCI investigators regarding exposure criteria or the dose response algorithm.

Dr. Kaneene, using NCI's own data, found that the data would not support the CML conclusions reached by the author, and that there was no association between 2,4-D and cancer in dogs. Dr. Hayes was offered an opportunity to defend his study, which he declined. The MSU re-analysis was then published in the peer-reviewed journal (Kaneene, et al., 1999)[5]. Subsequently, a second more recent epidemiological case-control study (Gavazza et al., 2001) [6] failed to show any association between dogs whose owners used lawn care herbicides and canine malignant lymphoma. This study concluded, "Variables describing animal care and pesticide use were either not associated with the disease [CML] or were uninformative."

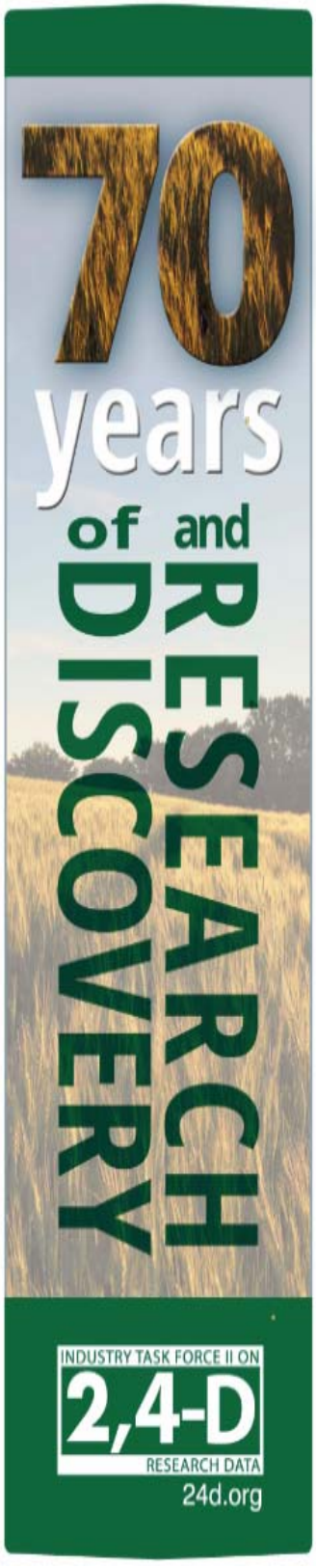
Regulatory decisions around the world confirm that 2,4-D is not an animal carcinogen (WHO 1996[7], EU 2001[8], PMRA 2005[9], EPA 2005, EFSA 2015[13]).

Reprints for "Re-Analysis of 2,4-D Use and the Occurrence of Canine Malignant Lymphoma" (Kaneene 1999), are available through this Task Force. For information on other NCI epidemiologic case-control studies involving 2,4-D, see the Epidemiology page on this web site.

Background, Scottish Terriers study

In 2004, the Journal of the American Veterinary Medical Association[10] published a study which purportedly showed a positive association between transitional cell carcinoma (TCC) of the urinary bladder in Scottish Terriers, a form of urinary tract cancer in dogs. The authors concluded the results suggest that exposure to lawns or gardens treated with herbicides was associated with an increased risk of TCC in Scottish Terriers and exposure to pesticides.

The authors speculate that "dogs with daily or weekly exposure to lawns treated with 2,4-Dmight be expected to chronically excrete 2,4-D in their urine where it would come in constant contact with bladder epithelium [cell wall]." The logical question: how could a dog in this study possibly be exposed daily? The labeled rate is maximum of two applications per year.



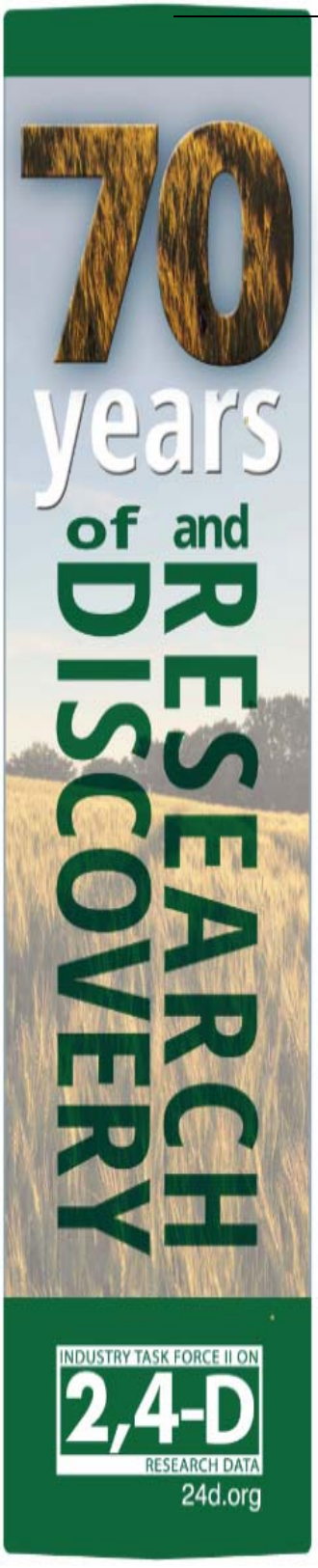
The conclusions reached by Glickman, et al. are NOT supported by the data. The results are not adequate to differentiate a risk of phenoxy herbicide from other pesticides. The exposure to pesticides is overestimated and the findings are not consistent with other studies. Further, the author's recommendation that owners "decrease their dogs' access to lawns or gardens that have been treated with pesticides, particularly phenoxy herbicides" is not supported by their data.

The 2,4-D toxicology and biomonitoring studies in dogs do not show sustained exposure or resulting cancer. There are two studies which reviewed the chronic toxicity of 2,4-D in beagles. The first fed groups of dogs between 0 and 55 ppm of 2,4-D for 2 years[11]. No cases of bladder cancer were reported. The second was conducted under Good Laboratory Practice standards[12]. Charles et al. concluded that after a year of observation, there was no indication of any immunotoxic or oncogenic response. These dogs were fed 2,4-D daily for the one or two year chronic study observations. Glickman, et al. also used a one year criteria for relevant exposure in their study.

Together these studies indicate that 2,4-D is not associated with bladder cancer or any other cancers. In addition, other phenoxy herbicide chronic dog studies show phenoxies are not carcinogenic to dogs.

About the Task Force

The Industry Task Force II on 2,4-D Research Data is organized to provide funding for the on-going Good Laboratory Practice (GLP) research studies required to respond to the US EPA registration review and PMRA pesticide re-evaluation programs. The 2,4-D Task Force is comprised of those companies holding technical 2,4-D registrations: Dow AgroSciences (U.S.), Nufarm, Ltd. (Australia) and Agro-Gor Corp., a U.S. corporation jointly owned by Albaugh, LLC. (U.S.) and PBI-Gordon Corp. (U.S.).



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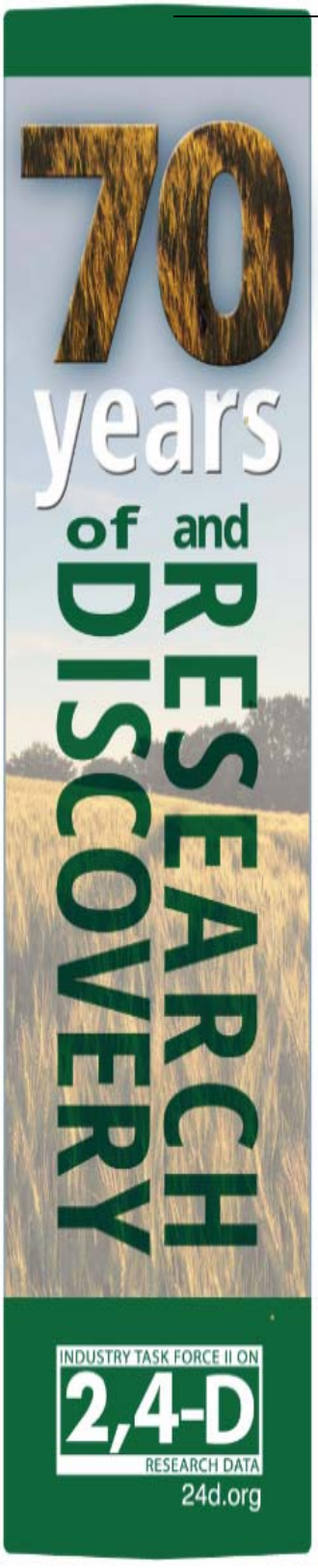

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