

Paraquat and Parkinson's Disease

A Briefing to Syngenta Crop Protection by
v-Fluence Interactive Public Relations

April 2009

Overview

This report provides a top-line update of the September 2008 report v-Fluence conducted for Syngenta to detail the prevalence and visibility of online content related to paraquat and Parkinson's Disease, and the risks and opportunities this content creates for Syngenta.

Our research for this update follows the same analytical approach as our September 2008 report: We began with analytics that define how people look for the herbicide and disease online, and what they find when they do. We then compared these findings with the earlier research, and analyzed how the online environment for paraquat and Parkinson's Disease has changed in the past seven months.

Key top-line take-aways:

- In September, we noted that search interest for Parkinson's Disease was growing, and that content related to "toxin-based" causes of the disease comprised a significant portion of the visible content. Our current findings show a drop in search interest for Parkinson's—likely due to less high profile activities by Parkinson's advocate celebrities, such as Michael J. Fox. It should be noted, however, that Fox's recent appearance on "Oprah" and subsequent coverage may re-fuel consumer interest in the disease. Similarly, the linkage between "toxin-based" causes of the disease remains a risk; our current research identifies growth in content across Web 1.0¹ and Web 2.0² spaces that explores paraquat as a potential cause of Parkinson's.
- The completion of research studies by the University of California Los Angeles (UCLA) and Emory University appears to be a primary driver for the growth of online content that addresses the potential link between paraquat and Parkinson's. As detailed below, this content is currently more visible in Web 2.0 spaces, but it is encroaching into visible Google search results, driven in part by the syndication of blog and discussion group content (through networks like Twitter) and coverage of study results by advocacy and media outlets.
- Our current research reveals the ongoing efforts to ban paraquat remain visible in search results. Of note, content related to efforts to ban paraquat in Asian is more visible in Web 2.0 spaces today than in September 2008 due to bloggers and media-based blogs highlighting the re-registration of paraquat in the Philippines and news stories about associated regulatory efforts in Malaysia and elsewhere.
- Syngenta's www.paraquat.com site remains in top search results for "paraquat" searches. Given the advent of new research on the linkage between paraquat and Parkinson's, v-Fluence would recommend Syngenta take more proactive steps to position content on the site to counter the negative research findings.
- As we noted in our September 2008 report, search interest on "paraquat," "Parkinson's Disease," and "paraquat and Parkinson's Disease" is relatively low compared with other diseases and herbicides. Our current research reaffirms that search interest on Round Up and atrazine is higher, and search results on the Round Up include references to toxicity for humans.

The following sections of this report offer greater detail on the ways online consumers search for paraquat and Parkinson's, the content they see in Web 1.0 and Web 2.0 spaces when these searches occur and next-step

¹ **Web 1.0:** This is a general reference to spaces on the World Wide Web that include HTML-coded Web pages, dialogue spaces and tools. The term is mostly used to contrast the earlier days of the Web before XML-coded blogs, wikis, social networking sites and Web-based applications became commonplace.

² **Web 2.0/Consumer-Generated Media:** Each term refers to a perceived second generation of Web-based communities and hosted services, such as blogs, social networking sites, wikis, and social bookmarking, which use XML coding to facilitate collaboration and sharing between users.

recommendations Syngenta should consider to address the online risks and opportunities our research reveals. This report also includes an appendix section that includes two elements:

Search: The Current State of Paraquat and Parkinson's Disease

The language people use to come to issues online closely correlates to offline consumer interest—i.e., the terms they use to search for topics reflects how they think about them. In turn, the top results these searches generate help shape consumers' opinions and their corresponding actions.

Comparison of Search Interest (April 2009 and September 2008)

April 2009

Search Terms	Sample Number of Monthly Searches ³	Average Number of Searches in 12 mo.
Paraquat all terms	290	1,294
Paraquat & Parkinson's-related	0	0
Paraquat & other illness/ risks	0	0
Parkinson's Disease all terms	10,530	123,777
Parkinson's cause terms	72	695
Parkinson's cause specifically linked to chemical/ toxic terms	0	0
Parkinson's and litigation interest	0	0
Parkinson's support and awareness	393	7,002

September 2008

Search Terms	Sample Number of Monthly Searches ⁴	Average Number of Searches in 12 mo.
Paraquat all terms	980	11,760
Paraquat & Parkinson's-related	46	552
Paraquat & other illness/ risks	121	1,452
Parkinson's Disease all terms	18,136	217,632
Parkinson's cause terms	430	5,160
Parkinson's cause specifically linked to chemical/ toxic terms	356	4,272
Parkinson's and litigation interest	118	1,416

Analysis:

Overall, search interest has declined across the most common terms consumers use to find online information about paraquat and Parkinson's Disease. Specific findings:

- As noted in our September 2008 report, overall search interest in "paraquat" is relatively low compared with other similar products and benchmark topics. Our April research shows a drop-off in search interest on the term—a finding Syngenta might view as "temporary good news." Indeed, increased media and

³ Data numbers represent a sample of searches returned from the MSN search engine.

⁴ Data numbers represent a sample of searches returned from the MSN search engine.

blogger attention to paraquat could trigger spikes in search interest and drive attention to content that is negative toward the herbicide.

- Overall search interest in Roundup remains nearly twice that of paraquat (See Figure 1 below).
- **Consumers do not currently associate paraquat and Parkinson's together when they search.** However, when this association occurs, the content consumers find continues to be highly negative toward paraquat. (More on specific content findings in the following Web 1.0 and Web 2.0 sections of this update.) The current drop in search interest should be viewed as temporal—as attention to recent research about paraquat and Parkinson's is likely to grow across online media and other outlets.
- Interest in Parkinson's Disease, not surprisingly, is significantly greater than paraquat, but compared to interest in other illnesses and diseases, such as arthritis, the consumer interest in Parkinson's is relatively small. Within "Parkinson's Disease" searches, about 12 percent specifically address awareness, whether through foundations or celebrities, such as Michael J. Fox.
- Interest in Parkinson's-related litigation also diminished.

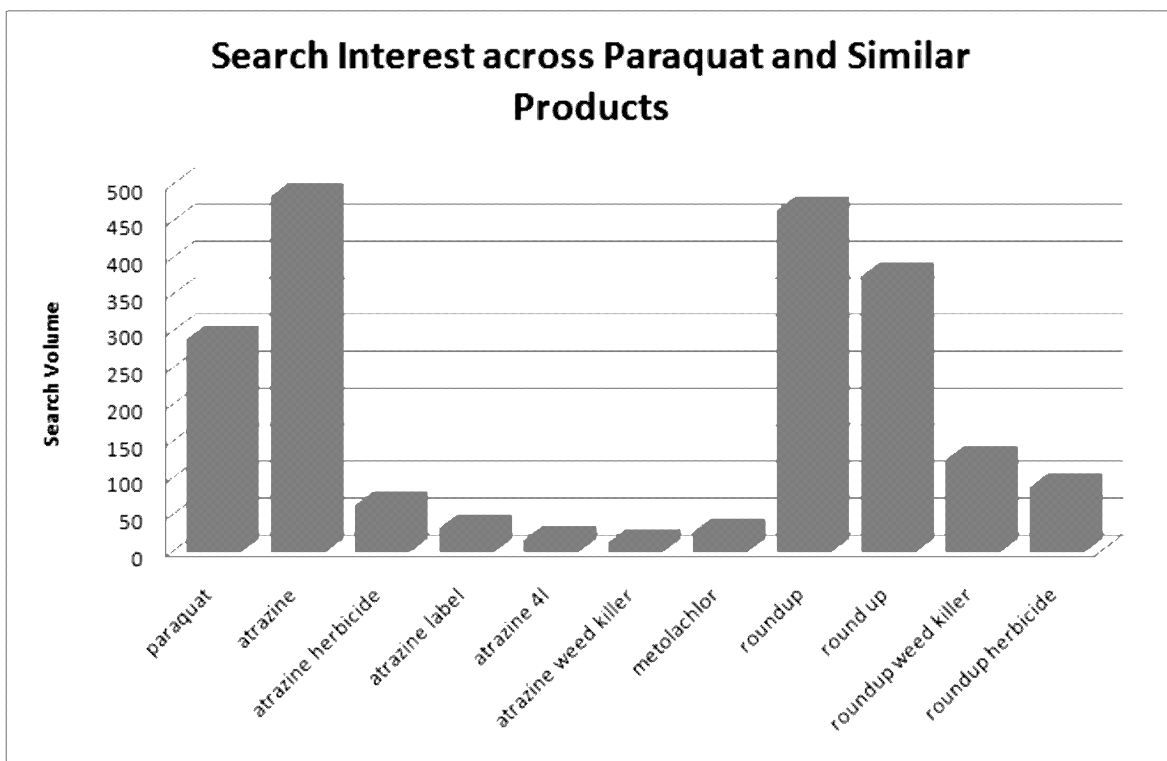


Figure 1 – Sample top search term interest surrounding paraquat and similar products



Web 1.0: What People Find When They Search for Parkinson's and Paraquat

Our current research shows that there is more content available to consumers online relating to the individual search term "paraquat" than compared to September 2008. This increase is likely due to efforts to lift bans on paraquat use in Asian countries as well as emerging research about a causal link between paraquat and Parkinson's Disease.

Meanwhile, there also appears to be less overall content indexed for the term "Parkinson's"—though our findings do show an increase in commercial page content on the disease.

April 2009

Term	All indexed pages ⁵	Advocacy pages	Government pages	Academic pages	Commercial pages
Paraquat	596,000	111,000	28,400	20,900	146,000
Paraquat Parkinson's	29,300	13,500	709	693	9,520
Parkinson's	7,080,000	1,360,000	108,000	117,000	3,710,000

Web 1.0 Content Highlights:

As we noted in our September 2008 report, the fact that consumers do not often associate "paraquat" and "Parkinson's Disease" when they search does not mean they will not find this content when they conduct these searches. Indeed, the most visible result for a "paraquat" search is the Wikipedia [entry](#) on paraquat, which specifically mentions the potential causal link with Parkinson's Disease.

Other findings from our analysis of content that appears in Web 1.0 search results:

- As noted in the search interest section, consumers do not actively conduct online searches using the term "paraquat and Parkinson's." However, when they do, the most visible search results include content from several high-profile advocacy groups, such as Pan-Germany, the Pesticide Action Network in North American (PANNA), Berne Declaration, Mindfully, Fathers for Life and Beyond Pesticides that all explore the likelihood that exposure to paraquat can be a factor in the onset of Parkinson's.
- Recent research from UCLA (released in March 2009) that explores paraquat as a cause of Parkinson's Disease among agriculture workers in California has not permeated the first page of Google search results. However, a Beyond Pesticides blog [item](#) discusses the study and appears on the second page of results—suggesting the item is likely to gain greater visibility in the future.
- The top search result for "Parkinson's Disease", the Wikipedia page on the topic, links to the research noted in our September 2008 report and names Syngenta as the herbicide's manufacturer. A [Wikipedia](#) page for paraquat not only describes the herbicide, but also discusses the chemical's toxicity and health effects, including Parkinson's Disease. The Wikipedia entry refers to a study from the [Buck Institute](#) that purports a connection between exposure to paraquat and iron and Parkinson's Disease in lab mice.
- Syngenta-sponsored [www.paraquat.com](#) appears as the fourth result in Google for searches on the term "paraquat." The site has a low visibility on the Web.
- Activists opposed to paraquat's use appear in top search results for "paraquat and Parkinson's." The Pesticide Action Network in North American (PANNA) page on the 2007 [study](#) linking paraquat and

⁵ Data numbers represent a sample of indexed pages returned from the Google search engine.

Parkinson's remains visible in the top 10 results for the term. Meanwhile, the 2007 study by Emory University's Gary Miller, titled, "Paraquat: The Red Herring of Parkinson's Disease Research," ranks highly on these searches.

- Search results for the term "cause parkinsons disease" uncovered multiple pages noting pesticides or chemical exposure as a potential cause of Parkinson's Disease. The most visible result, a [page](#) from credible health site, WebMD, lists pesticides as a form of toxin connected to Parkinson's. Paraquat isn't mentioned specifically as a cause for disease until the 16th search result, a [page](#) from Viartis, a UK site dedicated to Parkinson's research.
- While multiple pages mention the term "disease," when people search for "paraquat" only two highly visible Google results (rank 1 and 7) mention Parkinson's Disease. The first is the aforementioned Wikipedia page. The second reference appears on a [page](#) hosted by the Pesticide Management Education Program at Cornell University, which discusses the toxicology of paraquat.
- Though it doesn't specifically reference Parkinson's Disease, the ninth most visible Google result for the term "paraquat" highlights a page for the Berne Declaration's campaign to stop paraquat.
- Information on paraquat from government sources, including the [Center for Disease Control](#), the [U.S. National Library of Medicine](#), and the National Institutes of Health, list the health risks associated with paraquat exposure and poisoning, but do not mention Parkinson's Disease. These sources also appear in the top 10 results of most paraquat-related searches.
- A *NY Times* page addressing "[paraquat lung](#)" appears on page two of Google search results. The page discusses the dangers of paraquat exposure, but does not link the herbicide to Parkinson's.

Web 2.0: What People Find When They Search for Parkinson's and Paraquat

Our top-line analysis of the Web 2.0 environment follows a similar "search-term driven" methodology as our Web 1.0 review. That is, we use the most commonly used search terms to probe the Web 2.0 spaces for online opportunities and risks.

Interestingly, our findings show an increase in blog posts referencing paraquat compared with our September 2008 findings, and an increase in content linking paraquat and Parkinson's Disease. At the same time, our findings show a significant drop in Parkinson's-related content, a change that appears to result from changes in the indexing algorithms by search engines.

April 2009

Term	Blog posts ⁶	Social Network Sample ⁷	Video Sample ⁸	Discussion Group Sample ⁹
Paraquat	5,702	654	46	4,950
Paraquat Parkinson's	255	31	1	197
Paraquat litigation	17	3	0	11
Parkinson's	216,942	7973	10,600	149,000
Parkinson's litigation	21,063	207	9	1,650

Web 2.0 Highlights:

As Web 2.0 spaces are often a source of "buzz" that reflect emerging consumer interests, they can be an important indicator of potential opportunities and risks. In addition, content in these spaces carries the potential to influence more general, Web 1.0-based, search engine results.

Within these Web 2.0 spaces, our research shows a greater degree of content that skews negatively toward paraquat than elsewhere on the Web. As search interest around these topics grows, this content has the potential of becoming more visible and influential among consumers conducting searches for online content. One example: The Beyond Pesticides [article](#) on paraquat and Parkinson's research ranks highly in both blog-specific and broader Google searches.

Our work here does not comprehensively address the favorability of these spaces toward Syngenta and paraquat but, based on a sampling, it's clear that discussion forum content, and a sizable share of blog content, is negative.

Specific Web 2.0 findings include:

- Recent [attention](#) to a Michael J. Fox interview on "Oprah" in which he discusses Parkinson's Disease—an appearance that did not link paraquat and the disease.
- A variety of [academic](#) (e.g., American Journal of Epidemiology's blog), [advocacy](#) (including [interest](#) from a Firefighters with Parkinson's group), [aggregator](#), commercial entities promoting alternative [lifestyles](#) and [financial](#) news, and individual [blogs](#) highlight research from both the UCLA study and Emory University (the latter study conducted in conjunction with the Parkinson's Institute, which we noted in the September 2008 report).

⁶ Blog sample data obtained from Google Blogs.

⁷ Social network sample data obtained from highly visible sites MySpace and Friendster.

⁸ Video sample data obtained from Google Video.

⁹ Discussion group sample data obtained from Google Groups.

- Discussion of pesticide bans in both [Asia](#) and [Canada](#). The former includes a photojournalist's blog covering debate about paraquat use in Malaysia and [photos](#) of paraquat being sprayed on vegetation and an eye injury from an accidental exposure to the herbicide.
- Blog posts that highlight Syngenta statistics on the rise of paraquat use in [China](#) and its potential dangers to workers and communities.
- References Korean academic studies of kidney failure in patients exposed to paraquat on academic [blogs](#) from Oxford Journals.
- Links to medical [research](#) on determining extent of paraquat exposure in humans, and other blogs that highlight paraquat exposure/poisoning and how to [treat](#) it.
- Several [blogs](#) reference a recent Mayo Clinic study on patient reaction to drugs used to treat [Parkinson's](#) and an Emory University study that suggests Vitamin D deficiencies can contribute to the onset of the disease.

Recommendations

Our recommendations for this update track in tandem with those offered in our September 2008 report.

As our research shows, there is little consumer search interest specific to the potential linkages between paraquat and Parkinson's Disease—however, this content is “out there” and visible in the Web 1.0 and Web 2.0 results that appear when consumers and others search. While mitigating and balancing content exists, it is not currently positioned for online influence.

Syngenta's www.paraquat.com can serve as a resource for those interested in information about the product and its risks in these spaces. Other third-party supportive content that reinforces and validates Syngenta's paraquat safety information can similarly be positioned for effective online influence. And, this content can be amplified, particularly for use in Web 2.0 spaces, by existing supportive third-party destinations.¹⁰

v-Fluence suggests proactively optimizing (e.g., search engine optimization, or SEO) this site and its content to ensure that search results consumers find would include a greater degree of balance and levity relating to the linkage between about paraquat and Parkinson's Disease. Doing so would potentially accomplish two things:

- Syngenta could capture a greater share of current and future “consumer interest” in this topic and ensure the online public sees a more even-keeled overview of current research, concerns, etc. around the topic.
- Syngenta's efforts would help balance the online discussion—providing greater visibility, for example, to studies and research that suggest it takes both a genetic predisposition to Parkinson's, as well as environmental influences, for the disease to take root.

The following recommendations should be viewed as “short-term,” easily achieved and measurable approaches to addressing this issue online.

v-Fluence can assist Syngenta in executing these recommendations.

Paraquat.com and Supportive Third Party Content

¹⁰ Groups such as the Center for Global Food Issues, JunkScience.com, farming and crop protection support organizations have a range of existing Web resources, blogs and discussion channels through which paraquat safety content can be amplified.

- **Site Coding/Optimization:** v-Fluence recommends improved coding¹¹ for www.paraquat.com to better capture search interest that relates to "pesticides" as well as "Parkinson's Disease" and "causes of Parkinson's Disease." This content will be coded using communications best practices in a manner that can diffuse negative connotations. This work will also enhance the visibility of the content against keywords.
- **Link Development:** v-Fluence can assist Syngenta in enhancing the visibility of its own content, as well as favorable supportive content, by generating outside links to this content to further enhance its visibility. This effort would also balance search results for the corresponding online environment.
- **Content Creation:** v-Fluence suggests three broad recommendations:
 1. Create a page or section within the existing "What Researchers and Scientists Say" page to link to the research and other online content that addresses the potential linkage between paraquat and Parkinson's Disease.
 2. Develop documents and fact sheets that specifically address the link (or lack thereof) between pesticides and Parkinson's Disease. Documents should refer to studies that demonstrate inconclusive linkage between the two—e.g., work from Emory University's Gary W. Miller.
 3. Optimize the content, including keywords noted above to elevate its search visibility. This would include strategically placed links to additional client-owned and supportive third party content.
- **Pay-Per-Click Campaign:** v-Fluence recommends enhancing existing pay-per-click (PPC) ad campaigns¹² to support new and existing content for www.paraquat.com. These PPC ads should also be specifically purchased against high-risk searches, including those that are related to Parkinson's Disease specifically linked to pesticides, toxins and paraquat. The campaign would be designed to target opportunity and risk keywords and would include landing pages specifically designed and optimized with consumer-oriented searches to meet advertising and usability best practices v-Fluence would provide metrics on conversions and "take action" elements, such as signing up for an e-newsletter and/or RSS (real simple syndication) feeds.

Overall Online Environment

In addition to addressing how www.paraquat.com and related online advertising can play a larger role in mitigating risk and balancing the online environment for paraquat and Parkinson's, Syngenta should build on the new online monitoring services it has secured from v-Fluence and conduct the following:

- **Outreach:** v-Fluence recommends outreach to third-party supporters who can develop supportive content and place it in other online spaces. These supporters might include groups like Alan Caruba at The Anxiety Center, the Center for Global Food Issues and JunkScience.com.
- **Content placement:** v-Fluence recommends placing supportive content, such as Web wire releases, in article directories, forums and other distribution to both Web 1.0 and Web 2.0 spaces.

v-Fluence can assist Syngenta in implementing these recommendations. |

¹¹ Site coding includes the use of "meta" data and "tags" read by search engines and which can improve a Web page's visibility against certain keyword searches.

¹² Research currently shows Paraquat.com sponsored PPC ads running on Google.