

Q&A

“Paraquat: A unique contributor to agriculture and sustainable development” December 12, 2003

1. What is paraquat?

Available since 1962, paraquat is a non-selective contact herbicide used to control annual and perennial weeds in a wide variety of crops, including corn, soybeans, wheat rice, potatoes, fruit, coffee, tea, cocoa, cotton and others. It is used in more than 120 countries, including those with the most demanding regulatory systems—the US, Canada, European Union, Australia and Japan included.

2. When is paraquat up for re-registration in the US?

Paraquat was re-registered for use in the US in 1997 under the stringent guidelines of the Food Quality Protection Act. No additional information is required by US EPA for paraquat's continued registration.

3. What are the benefits of paraquat?

- Paraquat is a contact herbicide. It is rainfast and therefore particularly well adapted to tropical agriculture.
- In rotation with other herbicides, it can help prevent weeds becoming resistant to a particular herbicide.
- It leaves no residues in food.
- Any excess paraquat does not run off the surface or leach through soil to contaminate surface or ground water.
- Paraquat does not affect the roots of plants and therefore helps reduce the risk of soil erosion by wind and rain as plant roots hold soil stable.
- It eliminates the need for arduous and costly hand labor and, in some cases, plowing.
- By replacing mechanical weeding, it helps avoid soil erosion, particularly in hilly terrain and in many cases results in higher crop yields by maintaining good soil structure and moisture.
- Paraquat is the ideal herbicide for use in conservation tillage and no-till farming.

4. Is this report peer-reviewed?

Yes, the study was extensively reviewed by a variety of experts.

5. Why are you releasing this now?

This comprehensive review has been in progress over the last 12 months and is now ready for release. Syngenta believes in the importance of making balanced and credible information available to consumers, users, regulators and all stakeholders.

6. How much did you pay Mr. Srinivasan to write this report?

The author was commissioned by Syngenta to provide a balanced assessment of the benefits and risks of pesticides in general and paraquat in particular. Mr. Srinivasan was paid a nominal fee of \$5000 to complete the assessment and retained full editorial control over the published work.

Use of independent experts to evaluate complex scientific issues in human and ecological risk assessment is an accepted practice.

7. How can you claim the report to be independent when Syngenta paid for it?

The author retained full editorial control over the published work, which involved an assessment of available scientific and economic studies as well as other relevant literature. In compiling the report, Mr. Srinivasan sought the input of various stakeholders, including farmers, regulators, agricultural scientists, occupational health specialists and industry professionals. The study is endorsed by organizations ranging from conservation groups to governments to growers – a full list of sponsors can be found on the back cover of the study.

Finally, the report was independently reviewed, and the comments of these reviewers are included.

8. What influence did Syngenta have over the way the research was reported?

Mr. Srinivasan retained full editorial control over the published work. He is a recognized expert in the field of economics, policy and regulatory development and specializes in the impact of global environmental treaties on developing countries. You may also wish to pose this question to Mr. Srinivasan himself, who we believe would not be compromised in his research endeavors.

9. Many of the most serious issues surrounding paraquat deal with its toxicity to humans. The author of this study is not a scientist or a medical expert, so where is the relevance?

First, paraquat is safe to users, the environment, consumers and wildlife when used for its intended purpose as an herbicide. Its safety has been confirmed by its registration for use in over 120 countries across the world, including those with the most stringent regulatory requirements such as the U.S. and more recently, in October 2003, the EU.

Second, the author is a recognized expert in the area of balancing the benefits and costs of technology and making recommendations on what is appropriate, which is clearly relevant to the debate on paraquat as well as the larger issue of regulation of pesticides.

Finally, the study did review all available scientific data, and experts in other fields, such as occupational health, were indeed consulted.

10. You claim this is a balanced study. If this is true, what critical NGOs were consulted in its development?

The author reviewed the written materials generated by the groups who have been most critical of paraquat specifically, and pesticides in general, in developing his comprehensive study. (I think we should name the groups here, if pressed.)

11. How can you make an academic cost/benefit assessment when paraquat is killing people, especially in developing countries?

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Millions of farmers around the world rely on paraquat as an economical, effective and safe means of crop protection. In fact, in many parts of the world if an affordable, effective solution such as paraquat were not available, the lifestyles of many smallholder

farmers would be adversely affected. The withdrawal of technology such as paraquat—would have a serious and detrimental impact on smallholders, and those in the developing world in particular, which cannot be ignored.

12. Is there any new information contained in this study?

This research demonstrates that paraquat is a fundamental contributor to agriculture in supporting sustainable food production, an improving the quality of life of farmers and their families throughout the world.

13. Isn't paraquat the product that was used to kill dogs in the Oregon area earlier this year?

In July, approximately 12 dogs in the Portland area were euthanized and a number of others became sick following consumption of poisoned meat in Portland's Laurelhurst Park. This was a tragic and illegal misuse of this product. Syngenta continues to cooperate fully with authorities to help them find the person or persons involved.

Syngenta takes the stewardship of all its products very seriously. We teach applicators, farmers and their families how to handle this and other agricultural chemicals safely. Paraquat is a restricted product for sale and use only by certified applicators or persons under their direct supervision. These licensed professionals include specialized agricultural retailers, farmers, farm workers and licensed applicators.

14. Isn't paraquat harmful to the soil and the environment?

No. Paraquat is non-systemic, meaning that it acts only by killing green vegetation that has been sprayed; unlike systemic herbicides, it does not move within the plant to kill the roots or to other healthy green parts of the plant. It does not kill roots when it reaches the soil since it ceases to be active by attaching itself to soil particles such as clays and organic matter. This protects soil structure and prevents the acceleration of erosion by wind or rain. Soil organisms are also protected, preventing irretrievable or radical alteration to their populations. Long-term field studies demonstrate the rate of paraquat biodegradation in soil prevents it from even getting near to the deactivation capacities of soils. Hence microflora and other soil organisms will not be affected.

15. What about groundwater?

According to the US Environmental Protection Agency in its 1997 review of paraquat, "paraquat is not expected or considered to be a groundwater concern from normal paraquat dichloride use patterns." Paraquat rapidly and strongly attaches to soil particles, so it does not persist in a state where it could be leached into groundwater or have effects on plants and soil organisms.

16. Is paraquat safe for operators?

Under normal use conditions (i.e. as recommended on the label and in minor predictable deviations) the product is safe to the user and the bystander. When spraying Gramoxone, Syngenta recommends the operator does not need any special protective clothing. Normal clothing e.g. a long sleeved shirt, long trousers and waterproof shoes are generally advised for spraying all pesticides including Gramoxone. In addition, Syngenta has for many years run extensive stewardship programs in both developed and developing countries, teaching farmers and their families how to handle agricultural chemicals safely

17. In developing countries with hot climates, the protective clothing you describe is often impractical. How are farmers supposed to protect themselves from paraquat exposure in these situations?

Results from more than 40 years of field use and many worker exposure studies show that paraquat can and is being used safely by millions of farmers in both the developed and developing world. This includes circumstances where minor and predictable deviations from the label are taken, such as not always wearing gloves and mask. In fact, the safety record of the product in the developing world matches that in other regions.

We advise normal work wear for spraying Gramoxone: long trousers, long-sleeved shirt and waterproof boots. For mixing and loading, the addition of nitrile gloves and a face shield is also recommended. Some regulatory authorities recommend gloves and facemask on the label).

The skin is actually an excellent barrier to paraquat, and the product has no vapor pressure to allow it to be inhaled.

18. Isn't paraquat highly toxic to humans?

Like many readily-available chemicals, paraquat is toxic and can be fatal if swallowed in sufficient quantity. Over the years, Syngenta has taken several precautions intended to prevent accidental ingestion of Gramoxone, including the additions of a bright blue dye, a strong stench and an emetic to induce vomiting. Clearly marked as a poison with skull and crossbones, the label also states that the product should always be kept in its original container and never stored in food, drink or other containers. Furthermore, the product is for sale to and use only by certified applicators or persons under their direct supervision.

Paraquat is not considered to be a carcinogen or a neurotoxin.

19. Isn't paraquat a popular method for suicide in certain parts of the world?

Paraquat is safe and effective when used for its intended purpose as an herbicide. Suicide is a tragic and regrettable social problem that has multiple and complex causes. The misuse of pesticides for this purpose is as unavoidable as any other means of suicide. Regrettably, removing one means of suicide from a huge range would have no effect on overall suicide levels.

Syngenta cooperates with local authorities and distributors to help ensure that *bona fide* users purchase its products. We have long-standing relationships with poison control centers and international bodies such as the WHO International Programme on Chemical Safety. The results of this work are made available to set up specific projects in suicide prevention and treatment of poisoning.

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18. What role does paraquat play in Parkinson's Disease?

There is no scientific or reliable epidemiological evidence to link paraquat with Parkinson's Disease. Previous studies have demonstrated that paraquat does not cross the blood-brain barrier easily, meaning that it does not reach to specific location in the

brain necessary to produce Parkinson's symptoms. Epidemiology studies in areas of high and long-term paraquat usage have shown no increase of neurotoxic incidents. The current EPA registration document for paraquat (the EPA 'RED' issued August 1997) clearly indicates that the EPA does not consider neurotoxicity to be an issue with paraquat.

Experimental laboratory studies are extremely valuable in understanding the intrinsic hazards of any chemical. As in this case, however, their results may have little or no relevance in establishing direct risks to farm workers or consumers. Syngenta will continue to monitor this and other studies which examine effects mimicking Parkinson's Disease.

Background: An article in *The Journal of Neuroscience* (edition 20/24) described a previously unknown effect similar to Parkinson's Disease when mice were exposed to high doses of paraquat and maneb (a fungicide). In summary, the study appears to show that maneb, if injected in high doses, can induce immediate neurological effects that are not seen with paraquat alone. However, if paraquat is injected at a high dose *together with* maneb, the neurological effects appear to increase.

Because paraquat and maneb are diluted and sprayed in the field during regular use, the study is not representative of real-world exposure encountered by applicators. Further, although both paraquat and maneb are registered for use on a number of crops in common, the use patterns are much different, and the two products would not be applied together.

It has also been stated that the similarity of Paraquat to MPTP (a chemical known to cause Parkinson's Disease) makes a link between paraquat and Parkinson's Disease likely. However, this similarity is superficial. Paraquat has markedly different chemical and physical properties from MPTP.

19. Why has paraquat been banned in some countries, including Switzerland, where Syngenta is based?

Gramoxone has received regulatory approval in more than 120 countries around the world, including those with the most demanding regulatory systems—including the US, Canada, European Union, Australia and Japan.

The Swiss regulatory authorities have never banned the use of paraquat. In 1989, Syngenta decided not to renew the provisional registration for paraquat in Switzerland, balancing the resources required for re-registration against the market potential. As with any product, re-registration decisions may vary according to agronomic and climatic conditions.

The decision by Malaysia not to renew paraquat registrations once they expire was taken without consulting with industry or user groups. We are working with the Malaysian government to address any concerns and to provide evidence of paraquat's cost-effectiveness and safety. Paraquat has a long history of safe use in Malaysia and received strong support from large-scale and smallholder farmers alike.

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