



December 16, 2019

Docket ID: **EPA-HQ-OPP-2011-0855-0133**

Environmental Protection Agency
Office of Pesticide Programs (OPP) Docket
EPA Docket Center (28221T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

Subject: **“Registration Review; Availability: Paraquat Dichloride Draft Human Health and Ecological Risk Assessments”**

The Weed Science Society of America (WSSA) is a non-profit professional society promoting research, education, and awareness of weeds in managed and natural ecosystems. Our members include academic, governmental, and private industry research scientists, students and teachers, extension educators, and federal, state, county, and private land managers. We welcome the opportunity to comment on the value and uniqueness of paraquat for weed management.

Paraquat’s Combination of Characteristics is Not Found in Any Other Alternative Herbicide:

Paraquat is a very fast acting, non-selective, broad spectrum, contact herbicide. Paraquat is one of only two herbicides which are classified as photosystem I inhibitors (WSSA Group 22). The other is diquat, which is primarily used as an aquatic herbicide. As of 2018, there were only five weed species in the United States with resistance to WSSA Group 22:

- 1) American black nightshade
- 2) Dotted duckweed
- 3) Goosegrass
- 4) Hairy fleabane
- 5) Horseweed

Photosystem I inhibitor herbicides accept electrons from photosystem I that leads to a self-perpetuating chain reaction of lipid oxidation that destroys the integrity of cell membranes allowing cytoplasm to leak into intercellular spaces which leads to rapid leaf wilting and desiccation. For paraquat, rapid leaf wilting and desiccation begins within several hours of application in full sunlight and complete foliar necrosis occurs within 1-3 days. When applied with a non-ionic surfactant, paraquat is rapidly absorbed into foliage and is rainfast within 15-30 minutes. In addition, paraquat is rapidly and tightly adsorbed to soil and there is no leaching potential. All rotational crops may be planted immediately after an application of paraquat (i.e. 0 day crop rotational interval).

There are three main herbicides used for broad-spectrum burndown treatments prior to planting and in fallow and non-cropland areas: paraquat (WSSA Group 22), glyphosate (WSSA Group 9) and glufosinate (WSSA Group 10). Having the option for three different mechanisms of action (MOA) is important for weed resistance management. Herbicide mixtures utilizing two or more different MOA's applied at the same time are more effective at preventing weed resistance than a rotation of herbicide MOA's where only one MOA is applied at a time.

Besides paraquat's wide scale use as a weed burndown treatment prior to planting and in fallow, its unique combination of herbicidal characteristics (i.e. non-translocated, very fast acting, no leaching potential) make it an important vegetation management tool for the following uses:

- dormant season in established alfalfa, clover, mint, and rhubarb
- between cuttings in established alfalfa
- pre-harvest in drybeans, sunflowers, guar, potatoes, and soybeans
- post-directed in corn, sorghum, soybeans, sugarcane, pineapple, small fruits, cassavas, tanners, yams, pigeon peas, strawberries, trees and vines, guava, hops, tomatoes, and peppers
- pre-harvest desiccation of potatoes, cotton and weed control in rubber and coffee plantations
- control of existing vegetation prior to planting corn, cotton, and soybean without tillage

For vining crops such as grapes, paraquat is used for control of annual weeds once grapes are actively growing. Paraquat is also important for sucker control, such as in coffee, because it is not translocated. Paraquat can also be applied in tree fruit crops for control of weeds beneath the trees; there are few other options during the active growth cycle for trees. In railroad yards, paraquat can be used for quick knockdown of fast growing weeds that drop from railcars. It is important in these types of environments to not allow weed growth, as fires can start from the sparks underneath railcars. In other non-crop areas, paraquat can be used on pavement cracks with little concern for movement off-site or leaching following rainfall compared to other herbicides. Many of these uses of paraquat depend on backpack sprayers and other small scale hand-held equipment.

Paraquat as a Restricted Use Pesticide

The value of paraquat as a weed management tool has to be balanced with the fact that it has high acute toxicity to mammals. As such, paraquat is a Restricted Use Pesticide (RUP) that can only be purchased by certified applicators and applied by individuals under direct supervision of that certified applicator. In addition, there are no paraquat products registered for homeowner use and no products registered for application to residential areas. Paraquat labels specifically forbid this and all have this statement: DO NOT use around home gardens, schools, recreational parks, golf courses or playgrounds.

There have been multiple regulatory measures since the late 1980s to reduce the occurrence of accidental and intentional ingestion of paraquat, including labeling and the incorporation of dyes, stenching agents, emetics, and gelling agents in the formulation. However, there have been a number of incidents since 2000 where people have died due to accidental ingestion of paraquat. These cases have resulted from paraquat being **illegally transferred** to beverage containers and later mistaken for a drink and consumed.

Given paraquat's high acute toxicity to mammals and the problems with applicators illegally transferring paraquat to beverage containers, we support further education and awareness activities both on the label and through training. The paraquat-specific training materials for applicators should consist of information highlighting paraquat toxicity and the risks associated with the use and misuse of paraquat

in addition to appropriate handling, storage, disposal, and Personal Protective Equipment (PPE) requirements and instructions.

The WSSA also strongly supports that all paraquat product labels clearly and prominently prohibit pouring paraquat into food or beverage containers via the statements "NEVER PUT INTO FOOD, DRINK OR OTHER CONTAINERS" and "DO NOT REMOVE CONTENTS EXCEPT FOR IMMEDIATE USE."

In addition, all paraquat end-use product labels should further minimize any potential for exposure to residential areas such as lawns by requiring that for "Sensitive Areas - Paraquat must only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas)."

The WSSA appreciates the opportunity to provide comment on the value and uniqueness of paraquat for weed management. We strongly support further education and awareness activities both on the label and through training. However, we do have concerns about mitigation measures that would significantly increase the costs and the requirements to the operator, applicator, or owner that would essentially eliminate a unique weed control tool from the toolbox and put undue pressure on other broad-spectrum burndown treatments. The WSSA looks forward to working with the Agency on this important topic.

Sincerely,

A handwritten signature in cursive script, reading "Larry Steckel", is written over a horizontal line.

Dr. Larry Steckel
President
Weed Science Society of America