UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

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MEMORANDUM

SUBJECT: Discussion of Additional Information on Glyphosate Use in Colombia for Coca and Opium Poppy Eradication for 2003 [DP Barcode - not assigned]

FROM: Virginia Werling, Biologist
Herbicide and Insecticide Branch

Timothy Kiely, Economist
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

THRU: Arnet W. Jones, Chief
Herbicides and Insecticides Branch

David Widawsky, Chief
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

TO: Jay Ellenberger, Acting Director
Field and External Affairs Division (7501C)

BEAD PEER REVIEW: May 21, 2002

INTRODUCTION: The Biological and Economic Analysis Division (BEAD) in the Office of Pesticide Programs within the Environmental Protection Agency (EPA) has been asked to augment its 2002 assessment and description of the use of glyphosate in the United States as a basis for comparison to glyphosate use in Colombia for coca eradication with a discussion of changes in the program for 2003. This request has come from the Department of State which is required to consult with the Environmental Protection Agency before reporting to Congress on the use of glyphosate for the Andean Counterdrug Initiative. This year the Department of State is required to include glyphosate for control of opium poppy in its consultation. This document compares the described use on opium poppy and coca to use within the United States.

SUMMARY: The use of glyphosate for control of opium poppy is conducted at 1 lb ai/acre (0.8 lb a.e/acre) and at a spray mixture (product + water diluent + Cosmoflux 411F surfactant) volume of about 5.5 gallons per acre (50 liters/hectare). This application rate is within the label recommendations for the amount of concentrated formulation per acre and the amount of total spray volume per acre for application for glyphosate products registered for use in the United States.

BACKGROUND: Glyphosate is the most widely used herbicide in the United States (1). It is non-selective in action and is used where total vegetation control is desired. It is used on a variety of sites including agricultural crops, lawns, gardens, forests and utility grounds. Application is made to the target plant's foliage, and after being absorbed, glyphosate circulates within the plant, exerting herbicidal activity systemically. Glyphosate and its use within the United States were described in the 2002 EPA assessment. In its assessment report, EPA described the use of glyphosate in the United States in the following paragraph:

> "Glyphosate may be used on over 400 crop and non-crop sites. The largest agricultural use sites include soybeans, cotton and field corn. In addition to agricultural use, EPA estimates that 16-22 million pounds of the technical grade active ingredient were applied to non-agricultural sites in 1999 (this is the most recent year for which adequate data are available). This estimate includes both home owner and professional applications as well as use on forested lands. Based on EPA data for 1999, an estimated 1-2 million pounds of glyphosate was applied to forest acres, with more than 650,000 forest acres treated."

In 2002, a description of the use of glyphosate in forestry sites in the United States was included since the use for coca eradication would be the use most similar to the US labeled use for broad-spectrum post-emergence weed control for forestry site preparation and utility rights-of-way. For coca eradication, glyphosate is sprayed from fixed wing aircraft at speeds around 165 mph at 4.4 pounds active ingredient (isopropylamine salt) per acre in about two gallons of spray mixture per acre.

Aerial application of the glyphosate product to non-crop, non-timber, industrial and rights-of-way areas in the United States is allowed using fixed wing aircraft and helicopter to control annual and perennial weeds and woody brush and trees. Although application may be made at up to 10 lb ai/year per acre in the United States, the typical use rate per application is much lower, averaging less than one pound per acre on major agricultural sites (EPA has no data on average application rate to forest sites). In addition, product labeling recommends application at 3 to 15 gallons of total spray mixture volume per acre for aerial application to forestry sites.

OPIUM POPPY ERADICATION: Glyphosate used for the opium poppy eradication program is also applied aerially, however its use differs in several ways from the coca eradication program:

1. Total area sprayed is much smaller for poppy eradication. The State Department explains that:

> "Because Colombia cultivates much less opium poppy than coca and spray resources are limited, aircraft spray much more coca than poppy, therefore expending more spray chemicals in coca growing areas than in areas where opium poppy is cultivated. For example, in 2002, eradication aircraft sprayed totals of 122,700 hectares of coca [about 303,000 acres] and 3,000 hectares [about 7400 acres] of opium poppy."

2. Individual poppy spray sites are smaller and located at higher elevations. The State Department states:

> "While difficult to quantify precisely, opium poppy fields generally range from 0.5 to 5 hectares. Opium poppy is ordinarily cultivated at a higher altitude than coca, and thus opium poppy often is cultivated and sprayed in hilly to mountainous terrain."

3. The rate (or dose) of glyphosate for poppy eradication is lower than that for coca eradication. The State Department states:

> "Because the opium poppy is not a woody, hard-to-control species like the coca bush, opium poppy eradication uses a spray mixture with a substantially lower glyphosate content than the spray mixture used for coca eradication."

The Department of State described the concentrate formulation for use in 2003 as containing 41 percent glyphosate salt and 59 percent inert ingredients. The same concentrate formulation is being used for both coca and opium poppy eradication (1). Other similar products with this proportion of active to inert ingredients are registered with the United States Environmental Protection Agency for use in the United States on forestry and utility rights-of-way sites. A surfactant is added to the diluted spray mixture prior to spraying. This practice improves absorption of the herbicide by the plant and is standard practice for applying glyphosate to forestry sites in the United States.

For opium poppy spraying, water, formulated glyphosate, and surfactant are combined in a spray mixture in the following percentages: 94 percent water, 5 percent glyphosate formulation, and 1 percent surfactant. This diluted spray mixture is applied to opium poppy at the rate of 50.0 liters/hectare (or 5.5 gallons per acre) (1). This is equivalent to 1 lb ai/A isopropylamine salt (or 0.8 a.e./acre as illustrated in the calculation below.

Calculation of rate of application for opium poppy:

(50 liters spray mixture/1 hectare) (5% glyphosate product/1 liter spray mixture) (4 lbs. ai isopropylamine glyphosate salt/1 gallon formulated product[1])(1 gallon/3.78 liter) (1 hectare/2.47 acres) = 1.1 lb ai/acre

In contrast, the Department of State reports glyphosate use for coca eradication at 10.4 l/ha of glyphosate product which is equivalent to 4.4 lb a.i./acre of glyphosate isopropylamine salt (3.3 a.e./acre) as illustrated in the calculation below.

Calculation of rate of application for coca eradication:

(10.4 liter spray mixture/1 hectare) (4 lbs ai isopropylamine glyphosate salt/1 gallon glyphosate product[1]) (1gallon/3.78 liter) (1 hectare/2.47 acres) = 4.4 lb ai/acre

Although glyphosate is applied aerially to wooded sites, the rate of application is more similar to that for agricultural uses than for forestry uses. Agricultural use of glyphosate is common at rates lower than 0.5 lb ai/A. In contrast, product labels for the use of glyphosate for forestry sites start at rates of 2 lbs ai/A.

CONCLUSION: This application rate for opium poppy eradication is within the glyphosate manufacturer's label recommendations for both the amount of concentrated formulation per acre and the amount of total spray volume per acre . The Department of State informed EPA that the coca use is the same as described in the 2002 assessment, except for a change in product.

REFERENCES:

(1) Department of State Updated Report on Chemicals Used in the Columbian Aerial Eradication Program. Attachment to a letter from Secretary of State, Colin Powell, to Environmental Protection Agency Administrator, Governor Christine Whitman, dated April 9, 2003.
(2) Donaldson, D., T. Kiely, and A. Grube. Pesticide Industry Sales and Usage, 1998 and 1999 Market Estimates. June 2002. Biological and Economic Analysis Division, Office of Pesticide Programs, U.S. Environmental Protection Agency.
(3) Agricultural Chemical Usage - 2000 Field Crops Summary. May 2001. United States Department of Agriculture. National Agricultural Statistics Service.