

## Cultural Survival Quarterly

Spraying Crops, Eradicating People

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Issue 26.4

January 31, 2003

*"We always used to have a pharmacy in the jungle. But now we can't find the trees and animals that we need. The animals and fish have disappeared. The birds, too. We have never seen anything like this before. It has to be the result of the spraying. We notice the effects immediately after the area is sprayed. Birds, animals, and fish begin to disappear within a few weeks. The health effects linger for weeks, and even longer."*

*-Indigenous Shuar leader from Sucumbíos, Ecuador*

In the past two decades, Colombia has been exposed to numerous programs of aerial spraying of coca and poppy crops by chemical herbicides. In this same time period, the country has evolved from being a mere processor of the basic paste for cocaine, using coca leaves grown in Bolivia and Peru, to the world's top producer of coca for cocaine, and second-largest producer of poppies for heroin. With the Plan Colombia-inspired goal of cutting coca cultivation in Colombia in half by 2005, aerial eradication has increased greatly since December 2000. In addition, the herbicide used was changed in the mid-1990s from the commonly used herbicide Roundup to the more toxic Roundup SL, which has not been approved for use on agricultural areas in the United States. Inhabitants of the southern departments of Colombia, where the spraying is taking place, as well as those who live across the border in Ecuador, are crying foul. They claim the new formula is harming their health, damaging their legal food crops, poisoning their drinking water, and killing or driving away birds and wildlife. For indigenous groups, who are the majority of the affected population, the effects of the aerial spraying are detrimental not only to their personal health and livelihood, but also to the survival of their cultures, as many groups have considered leaving their ancestral homes--some have already been forced to leave--or altering their traditional subsistence lifestyles.

Despite increases in the frequency and potency of the aerial spraying, the effect on coca production has been questionable. Between 2000 and 2001, coca production increased by 25 percent.[1] New coca crops planted in more remote areas after the spraying can explain most of the increase and produces a vicious cycle: Primary forest is cut to plant coca, which is then sprayed, leading to more forest being cut. The net result is the loss of hundreds of thousands of acres of primary forests with little reduction of coca plants.

Consequently, public pressure has intensified for the U.S. Congress to reassess the program. In legislation approved early in 2002, Senator Patrick J. Leahy, a Democrat from Vermont and chairman of the appropriations subcommittee that finances the operation, froze the money needed to buy the herbicide. The legislation, known as the Kenneth M. Ludden Foreign Operations, Export Financing, and Related Programs Appropriations Act, required the U.S. State Department to certify that the eradication program meets U.S. regulatory controls and Colombian law and does not threaten public health or the environment before purchasing additional chemicals. Leahy told *The New York Times* in a September 6 article: "Spraying a toxic chemical over large areas, including where people live and livestock graze, would not be tolerated in our country. We should not be spraying first and asking questions later." The State Department now must show that spraying causes no unreasonable risks or adverse effects to humans or the environment, that alternative development programs are in place in the areas being sprayed, and that a system is in place to evaluate citizens' claims of health harms or damage to legal food crops and provide compensation for meritorious claims.

The long-awaited State Department report on the toxicity of the Roundup SL herbicide mixture was published September 6, with contributions from the U.S. Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). Although the findings stated that the aerial eradication of coca crops in Colombia met U.S. regulatory standards and did not endanger people or the environment, the EPA did express some doubts regarding the herbicide. While Agriculture Secretary Ann M. Veneman reported that health risks associated with the herbicide were "minimal," the EPA portion of the report found a potential risk of acute eye toxicity from the particular formula used in Colombia. The State Department decided to switch to a less-toxic herbicide, but until that product is ordered and delivered, spraying will continue in Colombia with the more toxic herbicide. After a seven-month hiatus, eradication resumed in late July. *The Economist* reported on September 7 that since July 28, 49,400 acres of coca had been sprayed.

### What Are They Spraying?

Paul Wellstone, the late Democratic U.S. senator from Minnesota and critic of U.S. military aid to Colombia, doubted the accuracy and safety of the U.S.-sponsored drug-eradication program in Colombia. Wellstone, visiting the Colombia department of Putumayo in December 2000, was assured that the spraying, using satellite images, would target coca fields without harming food crops. However, "on the very first flyover by the crop duster, the U.S. Senator, the U.S. Ambassador to Colombia, the Lieutenant Colonel of the Colombian National Police, and other Embassy and congressional staffers were fully doused with the sticky, possibly dangerous Roundup," according to Jim Farrell, Wellstone's spokesperson, in a statement widely released after the event. The group was standing on a mountainside overlooking a coca field.

This event, in addition to providing effective media coverage against the spraying, called into question a number of concerns about aerial eradication campaigns. Wellstone found that despite satellite imaging, the spraying was imprecise--mostly due to "drift." Because the small fixed-wing crop duster airplanes that spray the herbicides often fly too high to accurately target the coca crops, crosswinds can blow the herbicide hundreds of feet to non-target areas, causing the destruction of other crops or rainforest, or the contamination of bodies of water. Wellstone knew the spraying was going to occur and had access to medical care after his glyphosate bath, but the communities being sprayed have neither luxury and are unable to find information about the ingredients, concentrations, or intended form of application of the herbicides. Although the U.S. Embassy in Bogotá warns local citizens in areas that will be sprayed and informs them of precautions to take in case of contact with the spray, the information comes too late, or not at all, for many.

The actual composition of the herbicide has been widely debated. Until recently, both the U.S. and Colombia governments did not disclose the exact ingredients or proportions being sprayed. The U.S. government stated in its recent report that the herbicide is Roundup SL, produced by chemical and biotechnology firm Monsanto in St. Louis, Missouri. Roundup SL is a stronger version of Roundup, and came into use in response to pressure from Washington, D.C., to use a more effective herbicide.

Roundup and Roundup SL are composed mainly of the chemical glyphosate. According to former U.S. ambassador to Colombia Myles Frechette, glyphosate use has been associated with problems since the mid-1990s. Sprayed as a mist, it was ineffective in windy and rainy weather, and often did not penetrate the coca leaf. Even for the less-toxic Roundup, a broad-spectrum herbicide which kills a wide range of plants, Monsanto's own warnings highlight danger to environmental and human health:

Roundup will kill almost any green plant that is actively growing . . . Take care to spray Roundup only on the weeds you want to kill--don't allow the spray to contact plants you like or they may die too . . . Roundup should not be applied to bodies of water such as ponds, lakes or streams as Roundup can be harmful to certain aquatic organisms . . . After an area has been sprayed with Roundup, people and pets (such as cats and dogs) should stay out of the area until it is thoroughly dry . . . We recommend that grazing animals such as horses, cattle, sheep, goats, rabbits, tortoises and fowl remain out of the treated area for two weeks . . . If Roundup is used to control undesirable plants around fruit or nut trees, or grapevines, allow twenty-one days before eating the fruits or nuts.[2] ,p> Although the U.S. and Colombia governments have maintained that glyphosate is less toxic than table salt or aspirin, the particular formula used in Colombia has not been approved for use in the United States, and has also been combined with surfactants, or soapy additives, in order to increase its toxicity. The surfactants include Cosmo-Flux 411F, which weighs down the glyphosate to prevent wind drift over non-targeted areas, while at the same time allowing for better penetration into

the leaves of the coca and poppy plants. The U.S. government reports that the mixture contains 55 percent water, 44 percent glyphosate herbicide product, and one percent surfactant (Cosmo-Flux 411F). But the composition of Cosmo-Flux 411F, a product registered and produced in Colombia, could not be reported by the State Department for reasons of confidentiality.[3]

According to Dr. Elsa Nivia, Colombia's Regional Director of the Pesticide Action Network, in *In These Times* in April 2001, "Cosmo-Flux substantially increases the biological activity of the agrochemicals, allowing better results with smaller doses." Although experts warn that surfactants can be highly corrosive depending on the concentration, U.S. and Colombian officials stress that the amount of surfactant used is miniscule, and say Cosmo-Flux is made of harmless ingredients. However, because the surfactants allow water and oil to mix so that glyphosate can penetrate the wax coating on plant leaves, Dr. Milton Guzman, public health director in the provincial capital of Popayán in southwest Colombia suggests it might have the same effect on human skin. Staff scientists at the Pesticide Action Network in San Francisco, California, have also expressed concern. Moreover, the Roundup SL/Cosmo-Flux mixture has not been scientifically evaluated. For their recent report, the EPA and Department of Agriculture did not have access to the mixture actually used in Colombia.

Colombian sociologist Ricardo Vargas, who has studied the aerial eradication program since the early 1990s, told the *St. Petersburg Times* in August 2001 that the new Roundup SL-Cosmo-Flux mix has a far more devastating effect on crops: "Before, the glyphosate didn't seem to be so effective. Now, when I visit areas of fumigation, it's like someone poured gasoline and lit a match." This assessment is confirmed by the government report, which states: "Glyphosate is classified as toxicity category III [category I is considered the most toxic] for primary eye irritation and toxicity category IV for acute dermal and oral toxicity, and skin irritation . . . However, the surfactant used in the formulated product reportedly can cause severe skin irritation and be corrosive to the eyes " These findings suggest that any of the reports of toxicity to the eye may be due to the surfactant, not glyphosate per se. The product has been determined to be toxicity category I for eye irritation, causing irreversible eye damage." [4] It is important to note that the herbicides used in Colombia are more concentrated and are applied in greater doses than the maximum levels recommended in the United States. The complaints of inhabitants of southern Colombia are at the center of the controversy. While the U.S. and Colombia governments repeatedly deny the harmful properties of the herbicide, local residents tell a different story. Their complaints, as well as corroboration from some scientists, have prompted the governments to reconsider their official positions.

### Who Can We Believe?

The aerial spraying program associated with Plan Colombia began on December 19, 2000. The first suspected effects on the environment and human health were soon reported in the southernmost departments of Colombia, as well as in nearby

villages across the border in Ecuador.[5] Colombia, a country of 800,000 indigenous peoples comprising 81 groups speaking 64 different languages, also possesses 10 percent of the world's biological diversity, second only to Brazil. It has 55,000 species of plants, 358 species of mammals, 15 percent of the primates in the world, and 1,721 species of birds.[6] Across the border in Ecuador, another country known to host a variety of ecosystems and species, live indigenous Cofán, Siona, Secoya, Quichua, and Shuar villages. Much is at stake in terms of biological diversity and indigenous survival in the region, and reports show spraying has had serious effects on both.

Some environmentalists have compared the effects of spraying the Roundup SL-Cosmo-Flux formula in Colombia with the use of Agent Orange during the Vietnam War.[7] Both chemicals contaminated large areas of forest and stripped them of their leaves, causing a loss of habitat for species and increased fragmentation of intact forests. The World Wildlife Fund (WWF) and Earthjustice Legal Defense Fund have both expressed concern about the environmental impacts of the spraying. According to the WWF, aquatic ecosystems are particularly sensitive to glyphosate; wildlife, especially frogs and insects, are easily affected by disruptions in their environment. Also of major concern are the Canangucha palm trees, which form oasis-like growths in the Amazon region. The palm trees not only sustain other plants and animals, but they also provide fiber for clothes and roofing, as well as food and water, to local indigenous groups. Clouds and rainwater containing glyphosate have contaminated the palm trees, leaving them without their useful sponge-like properties and causing them to dry out. Regional contamination is also a worry; much of the coca cultivation occurs along waterways in the Colombian Amazon, so much of the spraying occurs near rivers that flow into Brazil, Ecuador, and Peru. Luis Naranjo, director of international programs at the American Bird Conservancy, a U.S. advocacy group, also points to the risks from aerial spraying for the survival of Colombia's birds, including 500 species in the Putumayo region alone. An indigenous leader from Putumayo concurs: "It is strange what happens with the birds. They fall sick at six o'clock in the morning, and by six o'clock in the afternoon, they are dead. We never had anything like this before."

Aerial spraying in some cases has inadvertently drifted onto crops such as coffee, yucca, and rice. "Even our own products aren't doing well," said an indigenous leader from the Putumayo. "For example, the coffee and cocoa crops were good 15 months ago, but not any more. They don't grow. The papayas that we plant grow and flower, but the leaves die. It is strange what happens. These have to be effects of the spraying. It begins right after they spray." The effects on livestock are also severe, as pigs and chickens have died in large numbers, and cattle have suffered from hair loss and, on occasion, are found dead after contact with contaminated grass or water. According to a Shuar leader from the Sucumbíos region of Ecuador: "The animals are more sensitive to the effects of spraying, they have disappeared. The life of the Shuar is hunting and fishing, but we can't do that any more."

The September 2002 U.S. government report admits that "relative to the potential environmental effects of the spraying program based on U.S. data, phytotoxicity to non-target plants outside the application zone would be expected, since glyphosate is a broad spectrum herbicide. Given the application method . . . Offsite exposure from spray drift is probable." However, the report also claims, "This [the eradication program's] proposed use of glyphosate itself does not appear to pose a significant direct risk to terrestrial or aquatic animals, although secondary adverse effects from the temporary loss of habitat in the spray area could occur." [8] The report's data to determine anticipated effects to animals were based on North American species. The fragile species of the Amazon, however, may be more sensitive to environmental disruptions than North American species. The EPA reports that a more "refined assessment" is difficult due to uncertainty regarding the exact formulation of the spray solution. Critics such as Jim Oldham, the Amazon project director at the Institute for Science and Interdisciplinary Studies, agree. "The State Department report glosses over, downplays, or simply ignores many of the concerns and uncertainties emphasized by [the] EPA in its analysis," Oldham has said.

Effects on human health are also reported to be serious. Acción Ecológica, a non-profit environmental advocacy group based in Ecuador, completed a study in June 2001 that reported negative health impacts, including problems with the nervous system (dizziness, headaches), digestive system (nausea, abdominal pains, diarrhea), and skin (sores, ulcers). A report released by the U.S. Embassy in Bogotá in December 2001, Clinical Toxicology of Uribe Cualle: Supposed effects of glyphosate on human health, notes that a number of illnesses and other health problems in Putumayo were caused by aerial glyphosate spraying.

The report adds, however, that many other factors contributed to health problems in the region. The health department in Putumayo also published a report, based on interviews conducted with residents, health care providers, and police in the municipalities of Orito, Valle del Guamuez, and San Miguel that were targeted by spraying between December 2000 and February 2001. Medical personnel in three local hospitals reported increased visits for skin problems, abdominal pain, diarrhea, gastrointestinal infections, acute respiratory infection, and conjunctivitis following spraying in rural areas surrounding their municipalities.

An indigenous Shuar from Ecuador also mentioned during an interview that he has seen some new illnesses in his villages since the start of the spraying campaigns: "We had no experience with these illnesses before Plan Colombia. The doctors say it is dengue, or yellow fever, or malaria, but it isn't. We are familiar with those illnesses, and have always used natural medicine to cure them. Now the sickness lasts longer, with fever, headache, and stomach problems. A child can have these symptoms anywhere between four days and two weeks. They can't regularly attend classes. Children and the elderly are the most affected. Pregnant women have also been suffering from troubles that are out of the ordinary." Another indigenous leader agrees: "Illnesses are springing up that we have never seen before. The ones that we are accustomed to are stronger and last longer." This

leader points out that many coca and poppy crops are planted next to homes in his village. Targeting the coca therefore also targets the coca grower's home.

Although indigenous leaders concluded that the environmental changes and new illnesses were related to the aerial spraying, government officials from the United States, Colombia, and Ecuador have hesitated to agree. Melania Yanez, the Ecuadoran Ministry of Environment official responsible for the spraying, has said that not all problems reported by farmers are caused by spraying. "Low coffee yields and smaller mangos, for example, are not likely caused by herbicide spraying. But some of the symptoms reported by farmers are consistent with pesticide poisoning" she told the St. Petersburg Times in May 2002. Rand Beers, U.S. Assistant Secretary of State for International Narcotics and Law Enforcement Affairs, suggests that the dangerous chemicals Colombian peasants use in coca cultivation and cocaine production—including paraquat, sulfuric acid, kerosene, and ammonia—make people sick. According to the U.S. government, 600 million liters of precursor chemicals are used annually to produce cocaine in South America, and may contribute to the increased health problems. Moreover, drug traffickers use their own large quantities of herbicides and pesticides to defoliate the jungle to make way for coca fields. Beers claims that, in the past 20 years, slash-and-burn agriculture to grow coca has contributed to soil erosion and destroyed more than 9,000 square miles of rainforest, "equal to the state of Massachusetts and another 10 percent," reported the St. Petersburg Times on August 17, 2001. Critics respond that for every acre sprayed, three acres of rainforest are cut down by coca growers who are pushed into more remote areas, infringing on Amazonian indigenous territories.[9]

Beers' failure to accept the herbicide mixture spraying as the cause of indigenous health and environmental complaints has infuriated many people. The September 2002 U.S. government report also angers environmentalists who claim that, because the actual formula being sprayed in Colombia has not been tested, the results are inconclusive at best. The report does systematically analyze a number of health complaints, and says medical personnel sent to review possible links between these complaints and the herbicide found that a number of other factors led to the death or injury, including pre-existing conditions, food poisoning, and parasites. But these conclusions were, in fact, drawn from only a few extreme cases. The cases of problems such as skin irritations and stomach problems have not been examined closely.

While the U.S. and Colombia governments downplay the effects of spraying on the traditional ways of life of indigenous communities and small farmers, many indigenous peoples protest that the spraying ruins the land in their traditional territories, brings social and economic disruption, and causes massive displacement to surrounding communities, even across the border to Ecuador. In response to these perceived threats, a number of Indians from Colombia and Ecuador have taken their case to Washington, D.C., not only to speak about the effects of the spraying on their communities, but also to seek compensation for damages.

## The Indigenous Response

The disproportionate impact of the herbicide spraying on indigenous peoples led the Organization of Indigenous Peoples of the Colombian Amazon (OPIAC), with support from the Colombia government's Human Rights Ombudsman's Office, to take legal action. They filed a claim for legal protection, requesting that a Bogotá court issue a stay on the aerial spraying of herbicides in indigenous territories and arguing that glyphosate had toxic effects on the population, food crops, water sources, and local flora and fauna.[10] They claimed that aerial spraying had destroyed crops in 11 government-sponsored crop substitution and alternative-development programs that were designed to provide poor farmers with economic alternatives to coca production. OPIAC invoked Colombia's constitutional mandate that indigenous peoples have the right to participate in government decisions that affect their territories or endanger their survival. On July 23, 2001, a Bogotá judge ordered the spraying stopped. However, under pressure from the United States, the judge clarified his ruling within a week, saying that it applied only to "indigenous reserves" in the Amazon region, and that aerial eradication could resume in the rest of Colombia.[11]

Taking action on a larger scale, the International Labor Rights Fund filed suit in U.S. Federal Court on September 11, 2001, on behalf of 10,000 Ecuadoran peasant farmers and Amazonian Indians. The lawsuit charged DynCorp, a Reston, Virginia-based defense contractor, with indiscriminate torture, infanticide, and wrongful death for its role in the aerial spraying of pesticides in the Amazon jungle along the border of Ecuador and Colombia. DynCorp has been contracted by the U.S. State Department since 1991 to carry out aerial spraying of illegal crops in the Andean region. Under Plan Colombia, DynCorp was awarded a \$600 million contract to fumigate coca fields across Colombia. As of January 2002, the corporation's crop dusters had sprayed more than 14 percent of the entire land area of Colombia. In January 2002, federal judge Richard Roberts denied DynCorp's motion to dismiss the case, on grounds that the company's work in Colombia involved matters of national security.

The lawsuit against DynCorp invoked the Alien Tort Claims Act, which allows foreign citizens to sue U.S. companies in U.S. courts over actions committed abroad. The complaint alleged that DynCorp breached the U.S. Torture Victim Protection Act, among others. According to a Quichua leader whose community, San Francisco 2, was involved in the case, "The spraying came very close to us. The airplanes crossed over into Ecuadoran territory. They contaminated the water. Symptoms in our villages have included respiratory infections, eye problems, and skin sores in children. Our yucca crops have been destroyed. The leaves shrivel up and fall off. The plantain crops have also been hurt." Monsanto's own guidelines advise that, in order to minimize pesticide drift, aerial spraying not be done any higher than three meters from the tops of the tallest plants. However, Jeffrey St. Clair and Alexander Cockburn report in *Rumble from the Jungle: Ecuadorian*

Farmers Fight DynCorp's Chemwar on the Amazon that in Colombia, DynCorp's planes "routinely fly as high as 15 meters above the vegetation."

The suit sought billions of dollars in damages, as well as an immediate halt to the spraying. Although the case was initially overturned, it was appealed to the U.S. Supreme Court. The indigenous and campesino inhabitants of the region lost the case, but making it all the way to the nation's highest court was encouraging to many.

Indigenous peoples being affected by the aerial spraying are willing to put up a fight over their land and their health by forcing the companies and governments involved to take responsibility for their actions. A Shuar leader from Ecuador, whose community has been affected by the aerial eradication, insists that "We have to talk with the Ministry of Health. We need health centers, and then we need to use natural medicine. The medicine [that doctors prescribe] doesn't help. If the United States caused the problem, they should help fix it. They should give money for health centers, for development projects."

### The Latest Round of Spraying

Concerns are now widespread that drug eradication in Colombia is not succeeding. In October, the Associated Press (AP) reported that Colombia's top human rights official, human rights ombudsman Eduardo Cifuentes, had said the program should be suspended because it endangers people's health and damages the environment. Cifuentes told the AP that he had received reports from the Putumayo state that said peasants are suffering from skin irritation and respiratory problems. President Álvaro Uribe Vélez told the AP that the spraying would continue.

According to Julia E. Sweig in the September-October 2002 issue of *Foreign Affairs*, since the U.S. Congress first appropriated \$1.3 billion for Plan Colombia in 2000, coca cultivation in Colombia has increased, moved into northern Colombia, and returned to Peru and Bolivia where, "in the last decade, successful eradication programs inspired premature confidence that such programs would work in Colombia." Most experts attribute the increased coca cultivation in Peru and Bolivia to the same "balloon effect"--eradication in one place simply pushing coca-growing to another--that brought large-scale coca production from Peru and Bolivia to Colombia in the first place. As current struggles in Bolivia demonstrate, uprooting these crops will be difficult, especially given the continuing collapse of coffee prices and perennially falling prices for other legal crops.

Attempts to give coca farmers in Colombia another way to earn a living have also failed. Although 35,000 families in Putumayo signed agreements with the government to abandon coca cultivation in exchange for government assistance, State Department officials told the *Los Angeles Times* in March 2002 that small farmers have "eliminated little or none of their harvest and have no intention of doing so before a deadline later this year." Many small farmers respond that they

fulfilled their obligation, but were never compensated for uprooting their coca. Nevertheless, U.S. Embassy officials in Colombia now say they will abandon this alternative development plan and concentrate on building large infrastructure projects to provide jobs, and improve living conditions and transportation.

The U.S. and Colombia governments plan to continue with new rounds of spraying. Opponents expect more of the same results--an increase in coca production, only with the crops now being transferred further into the Amazon as well as to other countries. Aerial spraying has the full support of Uribe, who has made containment of Colombia's guerrillas his top priority. The Economist reported in September that Uribe, along with U.S. officials, "insists that fighting drugs is an integral part of tackling the illegal armies (of right-wing paramilitaries as well as left-wing guerrillas) which profit from and protect the cocaine trade." As a part of this heightened program, which aimed to spray 370,000 acres in 2002, an increase from the 207,000 acres sprayed in 2001, the U.S. government is providing more crop-dusting aircraft, as well as more helicopters to protect them. Although the U.S. and Colombia governments do not seem willing to re-evaluate their plans, many groups struggle to find alternatives to spraying, looking more at the demand for the coca crop than the supply. The Los Angeles Times has reported that a 1994 Rand Corporation study found that \$34 million spent on treatment of drug addicts reduces cocaine use by one percent. The same result costs \$360 million when coca-production interdiction methods are used.[12]

Clearly, the U.S. and Colombia governments will legalize neither the consumption nor growing of coca any time soon; critics argue that other alternatives to spraying, such as manual eradication, must be seriously considered. Finding common ground between government officials who claim that the worst possible effect of the spraying is eye irritation ("as if you had baby shampoo in your eyes"[13]) and Colombians and Ecuadorans who report much more serious effects ("a strong burning sensation in my eyes," or "granules that appear on my skin, and don't go away,"[14]) is difficult. The contradiction of many of the September 2002 U.S. government report's findings by the actual inhabitants of Putumayo put the validity of this report into question, and further fuel the debate over the true health and environmental impacts of the aerial spraying. Studies of the actual formula being sprayed in Colombia, with access to data from Colombia on actual conditions, are clearly necessary. With a number of new scientific studies set to be released, hopefully in the next year, regarding the health and environmental impacts of the aerial eradication programs, the proliferation of indigenous and campesino-led lawsuits or claims may force the true effects into the spotlight.

1. Juan Forero, U.S. to step up spraying to kill Colombia coca, The New York Times, September 4, 2002, p. 1A. These results are from U.S. estimates based on images from satellites and projections by analysts. It should be noted that the amount of coca reported to be growing in Colombia differs greatly according to the source and the technology used. As an example, the United Nations Drug Control Program, using different technology, found in November 2001 that coca production

in Colombia had fallen by 11 percent, as reported in *The Economist*, September 7, 2002.

2. These warnings can be found on Monsanto's own website for Roundup, at [www.roundup.com](http://www.roundup.com).

3. Chemical companies in the United States are required to publicize the "active ingredient" in the pesticides and herbicides on the market. However, because of the concern of corporations to protect trade secrets, they are not required to disclose the composition of the "inert ingredients," or the other chemicals that are mixed with the active ingredient to add to its potency or effectiveness.

4. "Report on issues related to the aerial eradication of illicit coca in Colombia," Bureau for International Narcotics and Law Enforcement Affairs, September 2002, <http://www.state.gov/g/inl/rls/rpt.aeicc/13237.htm>

5. The Colombia government claims that its planes do not spray any closer than 10 kilometers from the border, but Ecuadoran farmers have reported planes in their territory as recently as January 2002. See Reese Erlich, "Drug Spraying hurts us, Ecuador farmers charge," *St. Petersburg Times*, May 12, 2002, p. 16A.

6. Saavedra, Luis Ángel. *Daños Ambientales. Efectos de la Violencia y de la Política Antidrogas, Conflicto Colombia*, Lima: Asociación Civil Noticias Aliadas, May 2002, p. 13.

7. Many environmentalists, including officials from the World Wildlife Federation, have made an argument pointing to the similarities in environmental destruction and health effects caused by Agent Orange, used to defoliate the rainforests of southeast Asia during the Vietnam War, and the Roundup used in Colombia. Monsanto, the company that developed Roundup, also produced Agent Orange. See Danielle Knight, "Plan Colombia: Fumigation Threatens Amazon, Warn Indigenous Leaders, Scientists," *Inter Press Service*, November 21, 2000.

8. Bureau for International Narcotics and Law Enforcement Affairs, 2002.

9. Amazon Watch. *Civil Conflict and Indigenous Peoples in Colombia Amazon*. (2002, March). [Http://www.amazonwatch.org/megaprojects/plancol.html](http://www.amazonwatch.org/megaprojects/plancol.html).

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13. Johnson, T. (2002, Sept 6). U.S. defends herbicide use to damage Colombian coca. The Miami Herald.  
[Http://www.miami.com/mld.miamiherald/news/world/americas/4012705.htm](http://www.miami.com/mld.miamiherald/news/world/americas/4012705.htm).

14. Anonymous interview with a Shuar resident of the affected area.

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