

Caribbean Currents

Volume 8, Number 3, July 2000

EPA 220-N-00-008



United Nations
Environment
Programme



United States
Environmental
Protection Agency

Office of
Environmental
Information

INFOTERRA/USA

1200 Pennsylvania Ave. NW
MC 3404

Washington, DC 20460

UNITED STATES

Tel: 202 260 5917

Fax: 202 260 3923

Email: library-infoterra@epa.gov

Pesticides

edited by

Mary Panke and Sarah Quimby, INFOTERRA/USA

TABLE OF CONTENTS

<i>Pesticides in the Caribbean</i> , Feature Article	1
World Wide Web Sites on Pesticides	4
Bibliography	5
Pesticide Programs.....	6
Current Conferences on Pesticide Issues	7
LISTERVS.....	8
Guidelines for Submission	8
NFP Directory	9

This issue of *Caribbean Currents*, the first of two parts, deals with the issue of pesticide use in the Caribbean region. If you have any comments on any topic, would like to contribute a short article, or have a resource guide to share, please submit your contribution by following the guidelines for submission on page 8. We appreciate all comments and contributions.

The use of pesticides is becoming a particularly pressing issue for the Caribbean region. On the one hand, pesticides have allowed the agricultural sector to continue as a mainstay of the Caribbean economy in a market where growing populations, international trade and an increasing demand for higher quality food require higher crop yields, new crop varieties and more attractive produce. On the other hand, chemicals released into the environment contaminate soil and water and accumulate in animal tissue, posing a threat to once-pristine natural resources as well as to the health of living organisms all the way to the top of the food chain. Due to a complex variety of factors, including topographical features, tropical climate

patterns, and lack of baseline data, little is understood about what happens to pesticides once they enter the environment, or what long-term adverse effects they might cause. This knowledge deficit, together with increased international concern over growing evidence of environmental degradation, has spurred an interest in alternative modes of pest control. Part one of this two-part article will provide an overview of pesticide concerns in the Caribbean, tied to their use, overuse, and dispersal into the environment. The second part will look at some of the alternative agricultural practices that offer a more carefully managed approach to pest control. It will also review some of the major international, regional and sub-regional initiatives designed to promote a more integrated, cooperative and scientifically-informed approach to protecting our shared environment.

Overview/Background:

Agriculture has historically been the most productive sector of the eastern Caribbean economy (UNEP Tech. Rpt. #41, 1998). In a tropical climate where pests flourish, pesticides have played an integral role in ensuring the economic viability of the agricultural sector. Large monoculture farms, planted with banana and sugarcane crops primarily for export, predominate (UNEP #41, 1998). Subsistence farms produce a variety of crops that support local food consumption needs and thereby cut costs of expensive food imports. But rising productivity has led, in turn, to a growing reliance on pesticides. Large scale monocrop agriculture increases the source of food for pests, promoting increased pest populations and stepped-up pest control measures; high-yielding crop varieties are often more susceptible to pests, leading to an increased dependence on chemical insecticides (NRI, 2000). On

Welcome to *Caribbean Currents*, Volume Eight, Number Three. This newsletter is edited by INFOTERRA/USA in its capacity as the Regional Service Center (RSC) for INFOTERRA National Focal Points (NFPs) in the English- and French-speaking Caribbean. Although *Caribbean Currents* is assembled at INFOTERRA/USA, the content belongs to you, the readers. You are encouraged to send in any questions, comments, problems, or interesting issues relevant to the Region for inclusion in *Caribbean Currents*. Please see the "Guidelines for Contributions" on page 8 for more information.

Each issue features a directory of NFPs in the region so that anyone with international environmental questions can contact their nearest resource. Please feel free to contact one another as well as your RSC for assistance or materials.

Please don't hesitate to share *Caribbean Currents* with your friends and colleagues, and to make copies as needed. *Caribbean Currents* should serve as an informational forum for anyone who lives, works, or is involved in environmental issues in the English- and French-speaking Caribbean.

subsistence farms cultivation of vegetable crops, which are more vulnerable to pests, requires higher applications of a broader range of pesticides (Rawlins, et al., 1998). Overapplication also contributes to the growth in pesticide use. Application rates for cotton fields in the Caribbean are among the highest in the world (UNEP, 1992 as in Rawlins). Market pressures and growing populations continue to pressure farmers to boost yields (NRI, 2000), requiring ever more effective measures of pest control. As a result of this cycle, nearly all the small island developing states have significantly increased their pesticide use over the past 20 years (Rawlins, et al., 1998). But at what environmental cost? Pesticides are meant to kill or adversely affect living organisms and so most create some risk of harm to humans, animals and the environment (U.S. EPA, 2000). Although the degree and extent of harm may not always be clear, the detrimental impact of pesticides has been observed throughout the environment:

Pesticides may inhibit the development of the reproductive process of certain organisms. Herbicides may eliminate food sources of aquatic organisms. Pesticides that bioaccumulate in marine biota can be transmitted through fishery resources to humans, posing serious health and ecological hazards (Diamante et al., 1991). Excessive and careless use of agrochemicals, specifically pesticides, is one of the predominant causes of chemical poisoning in the Wider Caribbean Region (Hoagland et al., 1995). Pesticide residues present at dangerous levels in the food chain and water supply pose immediate threats to public health (UNEP #41, 1998).

In addition to documented adverse health effects, pesticides in the environment threaten wildlife habitats, degrade natural resources, and upset ecological balances by destroying nontargeted insects and other organisms. It has been reported in studies over the past 20 years that in Jamaica, where modern synthetic pesticides have been used since the mid-1940's, pesticides have contaminated plantation soils, rivers, wells, natural springs, sea coast and aquatic and marine fauna (Mansingh et al., 1997, as in Rawlins). Most recently, pesticides have been implicated as one of several agricultural pollutants threatening the health of the coral reefs worldwide. With the tourism industry in the Caribbean accounting for one quarter of foreign exchange earnings and one fifth of all jobs (UNEP, 1999), degradation of this primary tourist attraction and precious natural resource could ultimately affect agricultural practices. Perhaps inevitably, the decline of the coral reefs has begun to focus attention on sources of the problem, including non-point sources - of which agricultural pollution is a major contributor and pesticide contamination a significant component. Though increased agrochemical use would suggest a corresponding increase in pesticide contamination in the coastal zone, few studies have made a direct causal link (Rawlins, et al., 1998). One of the challenges researchers face is that agricultural pollutants are not easy to monitor. The ability to predict a pesticide's fate from the time it enters the environment is complicated by a variety of factors which fall into roughly three categories: a chemical's physical properties, characteristics of the surrounding environment, and human factors.

Physical Properties

Three primary groups of pesticides are currently used in the Caribbean: organochlorines (OC), organophosphates

(OP) and carbamates (Rawlins, et al., 1998). These pesticides are toxic to crustaceans, including economically important species such as shrimp, lobster, and crab, as well as to some fish species. (Archer, 1987 as in UNEP #41). Organochlorines are persistent pesticides, meaning they can persist in the environment for long periods of time, increasing the likelihood that they will be dispersed (UNEP #41, 1998) -sometimes at great distances from the point of agricultural application. Nearly 20 years after their banning in 1973, lindane, dieldrin and their derivatives were detected in elevated concentrations in the water around St. Lucia (Rawlins, et al., 1998). At one time OC pesticides were assumed to have low acute toxicity to mammals, but later evidence showed effects on the endocrine system, including reproductive failure in birds, feminization of male juvenile alligators and eggshell thinning and collapse in brown pelican hatchling populations (Henriques, et al., 1997). Growing concerns about the adverse effects of organochlorines led to the development of less persistent chemicals. These chemicals degrade more rapidly into inactive, less toxic and often harmless compounds. But the organophosphates and carbamates, while less persistent than the OC pesticides, are much more acutely toxic (Henriques, et al., 1997). They are designed to interfere with an enzyme essential to the proper functioning of the nervous system (Extoxnet 2000). As a result, OP pesticides pose a greater immediate risk to workers who can be poisoned through improper use and handling. Exposed wildlife suffer reproductive effects, autoimmune function changes, and direct mortality (Henriques, et al., 1997).

The more persistent a pesticide is, the more likely it will be carried away by air, water, soil or food to areas where unintended targets are exposed to its effects. Its mode of transport will be determined by specific physical properties such as its volatility, solubility, whether it binds to soil and whether it will dissolve in fatty tissue (lipid solubility). The more volatile a chemical is, the more easily it can evaporate into the atmosphere and, if persistent, travel great distances. A chemical's water solubility will determine whether it will be carried off as runoff, leach into the groundwater, or contaminate surface water where it can be hazardous to fish and other creatures. On the other hand, chemicals that are not water soluble can

*"...pesticides...threaten
wildlife habitats, degrade
natural resources, and upset
ecological balances..."*

bind to soil and be carried off through erosion and siltation to areas such as mangrove ponds and coastal zones where they can accumulate in sediment over long periods. The most persistent pesticides are also the most likely to be dispersed through bioaccumulation. In this instance, living organisms become the mode of transport, storing increasing concentrations of chemicals over time at levels "in fish, for example, (that) can be tens to hundreds of thousands of times greater than ambient water levels of the same pesticide" (Extoxnet 2000). Bioaccumulated pesticides are a particular threat to humans who, at the top of the food chain, can be exposed to elevated concentrations through consumption of contaminated fish and farm animals.

Environmental Factors

A recent analysis of agricultural pollution in the Caribbean points out the lack of baseline data on concentrations of pesticides present in water and sediments for the majority of small island developing states, or, for that matter, data on how pesticides are transported from sources to sinks where they accumulate in the coastal zone (Rawlins, et al., 1998). That data is significant because though pesticides may be imperceptible, their repeated heavy use around inland watersheds can be just as destructive as direct

industrial discharges. (Cote, 1988, as in UNEP #41). It is estimated that 90% of pesticides do not reach their targeted pests (UNEP Tech Rpt. #33, 1994), but the ability to predict whether and how a chemical might affect nontargeted organisms or resources is complicated by the fact that the physical features of the environment itself influence pesticide dispersal. In the Caribbean, the dynamics of weather conditions, topographical variability, a pesticide's behavior under various conditions, etc., can combine in unpredictable ways to influence the ultimate fate of that pesticide. Severe tropical storms and erosion, particularly on volcanic islands, have a significant effect on pesticide dispersal. Erosion is a growing problem, accelerated by deforestation and by the marginalization of small-scale farmers to less suitable land on steeper slopes (Rawlins, et al., 1998). Transport of pesticides through erosion is greatly exacerbated by intense tropical rainfall:

Storms are thought to be amongst the most important factors in the cycling of sediments through open-marine environments (Hubbard, 1992 as in Rawlins). Eroded soil particles are transported away by streams and rivers, often very rapidly during storm events. On steep-sloped volcanic islands such as St. Vincent, rivers have virtually no flood plains or estuaries and run rapidly across beaches into coastal waters delivering sediment directly into coastal ecosystems (Harrison and Rankin, 1976 as in Rawlins). In situations where runoff has a more limited capacity to transport eroded material, sediment collects in low-energy environments such as mangrove stands, harbours and semi-estuarine pools which act as sinks for nutrients and pesticides. Sediment and associated pollutants accumulate gradually until the passage of a major storm event, during which they are largely remobilised and transported into coastal waters. (Rawlins, et al., 1998)

Variable geologic conditions among the islands further complicate the predictability of a given pesticide's impact. Drinking water sources, for example, can be contaminated in different ways depending on whether an island is primarily volcanic or limestone. On volcanic islands, aquifers are small and drinking water is primarily supplied by surface water sources. On limestone islands, water from tropical storms filters into the limestone forming groundwater sources for domestic water supply (Rawlins, et al., 1998). The coastal zone of the Caribbean region is considered particularly prone to the accumulation of persistent pesticides. Not only do the sheltered inland areas act as sinks for pesticides, but on the lee shores of the islands there is insufficient mixing of pollutant-bearing waters with oceanic waters. In areas where the continental shelves are narrow, pollutants are effectively mixed and dispersed. On windward shores, significant wave energy enhances dispersal. (Rawlins, et al., 1998) Even rinsed off the coast, however, pesticides can end up in deep oceanic basins in the Caribbean that contain most of the region's water but receive very little renewal or flushing. (Atwood, 1977 as in Rawlins, et al.)

Human Factors

Human factors, such as careless handling of pesticides and improper management of agricultural activities, also play a role in the dispersal of pesticides beyond intended targets. Regional experts have identified several causes within the wider Caribbean region for pesticide contamination, most

of them linked to human behavior and practices. These include: improper application, erosion, cropping systems, improper equipment maintenance, mishandling, storage and disposal, inappropriate selection, leaching, improper water management, artificial drainage, and volatilization (UNEP #41, 1998). Unlike topographic, weather-related or physical factors that affect a pesticide's dispersal, human factors are more readily controlled. Unintended exposures, for example, can be minimized through improved handling, storage and disposal methods. And controlling the timing and amount of pesticide applications could significantly reduce the volume of chemicals introduced into the environment. According to one source, pesticide volume can be reduced by 50% without a loss of yield (Espeut 1994). Achieving such reductions presumes an understanding of the need for change and a widespread willingness to adopt site-specific environmentally sound agricultural practices. In the Caribbean, indigenous farmers have traditionally used a variety of practices and techniques designed to maximize resources, control erosion, and reduce pests (UNEP #41). But widespread adoption of these and more recently developed techniques will require education on a variety of social and institutional levels.

Conclusion

The declining health of the coral reefs is prompting scientists to take a closer look at the impacts of agricultural pollutants. Their work should contribute to a better understanding of the relationship between pesticide use and the state of the environment. It will also contribute a scientific basis toward understanding what constitutes the most environmentally sound yet economically feasible agricultural practices. Until more is understood, however, there is reason to adopt a more moderate approach to pesticide use. Even without calculating the current economic costs from pesticide overuse, such as the need to periodically replace pesticides with new, more expensive compounds when pests become resistant, or weather-related reapplication requirements, etc., the health and environmental hazards associated with toxic chemical pesticides are reason enough to consider moving more rapidly toward alternative forms of pest control. Many are already available to the agricultural community. These include organic farming and traditional indigenous techniques as well as integrated pest management (IPM), a method that employs a mix of chemical, natural, and cultural controls. The next issue of Caribbean Currents will look at some of these pest control alternatives, as well as some of the international, regional and subregional initiatives designed to pave the way for their implementation.

References:

- Atwood, D.K. (1977) *Regional Oceanography as it Relates to Present and Future Pollution Problems and Living Resources*. Caribbean American Society of Civil Engineers, New York, NY, USA.
- Cote, R.P. (1988) *The Management of Land-based Sources of Pollutants in Small Island States: The Caribbean Case*. School for Resource and Environmental Studies, Dalhousie University, Halifax, Nova Scotia.
- Diamante, J. M. Varela, B. Wood-Thomas, and P. Gelabert. (1991) *Background Paper: Land-Based Sources (LBS) of Pollution as the Dominant Marine Pollution Problem in the Wider Caribbean Region*. U.S. Environmental Protection Agency, Office of International Activities, Caribbean Field Office.

"The coastal zone...is considered particularly prone to the accumulation of persistent pesticides."

Espeut, Peter (1994) *IPM Soapbox: Slow Poison*. IPM Working for Development Newsletter, Issue #3: 11.

The Extension Toxicology Network (EXTOXNET). *Toxicology Information Briefs: Movement of pesticides in the Environment*.

At: <http://www.ace.orst.edu/info/extoxnet/>. Accessed June 12, 2000.

Harrison, A.D. and Rankin, J.J. (1976) *Hydrobiological Studies of Eastern Lesser Antillean Islands I. St. Vincent: Freshwater Habitats and Water Chemistry*. Archiv fur Hydrobiologie, Supplement 50: 96-144.

Henriques, William, et.al. (1997) *Agrochemical Use on Banana Plantations in Latin America: Perspectives on Ecological Risk*. Environmental Toxicology and Chemistry 16 (1): 91-99.

Hoagland, P., M.E. Schumacher, and A.G. Gaines, Jr. (1995) *Toward an Effective Protocol on Land-Based Marine Pollution in the Wider Caribbean Region*. Technical Report No. WHOI-95-10. Marine Policy Center, Woods Hole Oceanographic Institute, Woods Hole, Massachusetts.

Hubbard, D.K. (1992) *Hurricane Induced Sediment Transport in Open-shelf Tropical Systems - An Example from St. Croix, U.S. Virgin Islands*. Journal of Sedimentary Petrology 62: 946-960.

Mansingh, A., Robinson, D.E. and Dalip, K.M. (1997) *Insecticide Contamination in the Jamaican Environment*. Trends in Analytical Chemistry 16: 115-123.

Natural Resources Institute (NRI) *Integrated Pest Management: Pest and Disease Problems*. University of Greenwich.

At: <http://www.nri.org/Themes/ipm.htm>. Accessed June 6, 2000.

Rawlins, B.G., et.al. (1998) *Review of Agricultural Pollution in the Caribbean with Particular Emphasis on Small Island Developing States*. Marine Pollution Bulletin 36 (9): 658-668.

United Nations Environment Programme (UNEP) Caribbean Environment Programme (CEP). 1998 *Best Management Practices for Agricultural Non-Point Sources of Pollution*. CEP Technical Report #41

At: <http://www.cep.unep.org/pubs/techreports/tr41en/index.html>. Accessed June 6, 2000.

United Nations Environment Programme (UNEP) Caribbean Environment Programme (CEP). (1994) *Regional Overview of Land-Based Sources of Pollution in the Wider Caribbean Region*. CEP Technical Report #33

At: <http://www.cep.unep.org/pubs/techreports/tr33en/index.html> Accessed June 6, 2000.

United Nations Environment Programme (UNEP). (1999) Environmental problems affecting the marine and coastal environment in the wider Caribbean region. (UNEP (OCA)/CAR IG.9/INF.5)

United Nations Environment Programme (UNEP). (1999) *Global Environment Outlook 2000*.

At: <http://www.unep.org/geo2000>. Accessed June 6, 2000.

United States Environmental Protection Agency (EPA). Office of Pesticide Programs: *What is a Pesticide?*

At: <http://www.epa.gov/opp00001/whatis.htm>. Accessed June 8, 2000.

World Wide Web Sites on Pesticide Issues

WEBSITES

Centre for Pest Information and Technology Transfer

<http://www.ctpm.uq.edu.au/CPITT/Default.htm>

The Centre for Pest Information Technology and Transfer (CPITT) is a center within the University of Queensland, which develops innovative tools for training and decision support for a wide audience. CPITT's products are aimed primarily at those involved in Integrated Pest Management or Natural Resource Management.

Chemfinder.com

<http://www.chemfinder.com>

A gateway to technical chemical information on the web.

EXTOXNET (The Extension Toxicology Network)

<http://ace.orst.edu/info/extoxnet/>

The EXTOXNET InfoBase provides a variety of information about pesticides, including access to Pesticide Information Profiles (PIPs) for specific information on pesticides. Toxicology Information Briefs (TIBs) contain a discussion of certain concepts in toxicology and environmental chemistry. Other topic areas include: Toxicology Issues of Concern (TICs), Factsheets, News about Toxicology Issues, Newsletters, Resources for Toxicology Information, and Technical Information. Information in these topic areas primarily has been developed by toxicologists and chemists listed on the site.

Pesticide Management and Pollution

<http://www.fao.org/WAICENT/FAOINFO/AGRICULT/guides/subject/t.htm>

A subject guide from the Food and Agriculture Organization (FAO) of the United Nations. Provides links to pesticide use and management guidelines, international pesticide residue information, and prior informed consent databases.

U.S. Environment Protection Agency (USEPA) Office of Pesticide Programs

<http://www.epa.gov/pesticides>

An excellent resource from the USEPA for information on pesticide health effects, pollution prevention, biopesticides, integrated pest management, and other pesticide use information.

Bibliography

Food and Agriculture Organization of the United Nations. 1990. *International Code of Conduct on the Distribution and Use of Pesticides*. Rome, Italy. http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/Code/PM_Code.htm

Food and Agriculture Organization of the United Nations. 1991. *Initial Introduction And Subsequent Development of a Simple National Pesticide Registration and Control Scheme*.

Food and Agriculture Organization of the United Nations. 1998. *Pesticide Storage and Stock Control Manual*. V8966. <http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/Disposal/V8966E/01.htm>

United Nations Environment Programme (UNEP). Caribbean Environment Programme (CEP). 1998. *Best Management Practices for Agricultural Non-Point Sources of Pollution*. CEP Technical Report #41 <http://www.cep.unep.org/pubs/techreports/tr41en/index.html>

United Nations Environment Programme (UNEP). 1994. Caribbean Environment Programme (CEP). *Regional Overview of Land-Based Sources of Pollution in the Wider Caribbean Region*. CEP Technical Report #33 <http://www.cep.unep.org/pubs/techreports/tr33en/index.html>.

United Nations Environment Programme (UNEP). 1991. *Background Document for the Development of a Protocol Concerning Land-Based Sources of Marine Pollution to the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region*. Ninth Meeting of the Monitoring Committee on the Action Plan for the Caribbean Environment Programme and Special Meeting of the Bureau of Contracting Parties to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region. Kingston, Jamaica.

United Nations Environment Programme (UNEP). 1994. *Regional Overview of Land-Based Sources of Pollution in the Wider Caribbean Regions*. CEP Technical Report No. 33. United Nations Environment Programme Caribbean Environment Programme, Kingston, Jamaica.

United Nations Environment Programme (UNEP). 1996. *Guidelines for Integrated Planning and Management of Coastal and Marine Areas in the Wider Caribbean*. United Nations Environment Programme Caribbean Environment Programme, Kingston, Jamaica.

United States Environmental Protection Agency (USEPA). 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA-840-B-92-002. U.S. Environmental Protection Agency, Washington, DC.

United States Environmental Protection Agency (USEPA). Undated. *Managing Nonpoint Source Pollution from Agriculture, Pointer No. 6*. EPA841-F-96-004F. U.S. Environmental Protection Agency, Washington, DC.

United States Environmental Protection Agency (USEPA). 1993. *Guides to Pollution Prevention: Non-Agricultural Pesticide Users*. EPA-68-C0-0003; EPA/625/R-93/009. Stock Number PB94-114634. United States Environmental Protection Agency, Washington, DC.

United States Environmental Protection Agency (USEPA). *Citizen's Guide to Pest Control and Pesticide Safety*. 1995. EPA 730-K-95-001. United States Environmental Protection Agency, Washington DC.

FAO publications can be ordered from the sales agent in your country or by contacting:

Sales Sales and Marketing Group, Information Division
FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy.
FAX: +39 06 5705 3360
Email: publications-sales@fao.org
URL: <http://www.fao.org/catalog/giphome.htm>

USEPA publications can be ordered from the National Service Center for Environmental Publications (NSCEP) or the National Technical Information Service (NTIS) at:

U.S. EPA/NSCEP
P.O. Box 42419
Cincinnati, Ohio, USA 45242-2419
International: 1/513-489-8190
Fax: 513/489-8695
E-mail: ncepimail@one.net
URL: <http://www.epa.gov/ncepiphom/orderpub.html>.

NTIS
5285 Port Royal Road
Springfield, VA 22161
Tel: 1-800-553-NTIS (6847) or (703) 605-6000
Fax: (703) 605-6900
E-mail: orders@ntis.fedworld.gov
URL: <http://www.ntis.gov/ordering.htm>

When ordering from NTIS, please refer to the PB call number. NTIS accepts both VISA and MasterCard.

BIBLIOGRAPHY

PROGRAMS

Pesticide Programs*Assessment and Management of Environmental Pollution (The AMEP Programme)*

UNEP-CAR/RCU
 14-20 Port Royal Street
 Kingston, Jamaica
 Phone: (876) 922-9267
 Fax: (876) 922-9292
 Email: tjk.uneprcuja@cwjamaica.com
<http://www.cep.unep.org/programmes/amep/amep.html>

The AMEP Programme concerns the assessment and management of environmental pollution and provides regional co-ordination for the implementation of the Protocol Concerning Pollution from Land-based Sources and Activities (LBS Protocol). AMEP supports the activities required for the establishment of necessary measures to prevent, reduce and control marine pollution and to assist in the development of integrated environmental planning and management of coastal and marine areas. This Programme is responsible for the regionalization of Global agreements such as the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), Agenda 21, and the Basel Convention.

Caribbean Environmental Health Institute (CEHI)

Box 1111
 The Morne
 Castries
 St. Lucia, W.I.
 Telephone: (758) 452-2501; (758) 452-1412
 Fax: (758) 453-2721
 Email: cehi@candw.lc
<http://www.cehi.org.lc/index.htm>

CEHI exists for the purpose of ensuring that the Caribbean citizenry, both present and future are able to experience a long and healthy life. Towards fulfilling this mission, CEHI aims to provide technical and advisory services in environmental management (e.g., water supply, liquid and solid waste management, pesticides control) as well as collection and dissemination of environmental data. CEHI also offers a pesticide residue testing service, which is currently being expanded to afford wider testing capabilities.

Pesticide Action Network

49 Powell St., Suite 500
 San Francisco, CA 94102
 USA
 Telephone: (415) 981-1771 (country code 1)
 Fax: (415) 981-1991 (country code 1)
 Email: panna@panna.org (North American office)
<http://www.pan-international.org/>

Pesticide Action Network (PAN) is a network of over 600 participating nongovernmental organizations, institutions and individuals in over 60 countries working to replace the use of hazardous pesticides with ecologically sound alternatives. Its projects and campaigns are coordinated by five autonomous Regional Centers.

Pesticide Environmental Stewardship Program (PESP)

U.S. Environmental Protection Agency
 Pesticide Environmental Stewardship Program
 1200 Pennsylvania Ave NW (Mail Code 7511C)
 Washington, DC 20460
<http://www.epa.gov/oppbpd1/PESP/>

The Pesticide Environmental Stewardship Program (PESP) is a voluntary program that forms partnerships with pesticide users to reduce the health and environmental risks associated with pesticide use and implement pollution prevention strategies. The program was initiated in 1994. There are two categories of membership in PESP: Partners, which are organizations that use pesticides or represent pesticide users; and supporters, organizations that do not use pesticides, but have significant influence over pest management practices. All PESP participants make a commitment to reduce pesticide risk and develop activities to achieve risk reduction.

Reducing Pesticide Run-Off to the Caribbean Sea

UNEP-CAR/RCU
 14-20 Port Royal Street
 Kingston, Jamaica
 Phone: (876) 922-9267
 Fax: (876) 922-9292
 Email: tjk.uneprcuja@cwjamaica.com
<http://www.cep.unep.org/who/activities.htm>

A project in development from UNEP's Caribbean Environment Programme. Further work on agricultural non-point sources and the relation to Annex IV of the Land-Based Sources Protocol of the Cartagena Convention, the AMEP Subprogramme received approval for the funding under the Global Environment Facility (GEF). This project will develop national action plans for the improved management of pesticides in Nicaragua, Costa Rica, Panama, and Colombia. This project has direct implications for inclusion in the National Plans called for under Annex IV to the Land-Based Sources Protocol.

Current Conferences on Pesticide Issues

3-5 July 2000. York, UK.

European Pesticide Residue Workshop: Pesticides in Food and Drink.

Contact: Stewart Reynolds, Linda Dudley, or Richard Fussell

EPRW 2000 Secretariat

Central Science Laboratory

Sand Hutton

York

North Yorkshire

YO41 1LZ

UNITED KINGDOM

Telephone: + 44 (0) 1904 462459

Fax: + 44 (0) 1904 462253

e-mail: eprw2000@csl.gov.uk

URL: <http://www.csl.gov.uk/news/level2/eprw1.htm>

16-19 July 2000. St. Pete Beach, Florida, USA.

Florida Pesticide Residue Workshop

Contact: FPRW / FPAC

Attention: Dr. Joanne Brown

400 Capital Circle Southeast, Suite 18, #306

Tallahassee, FL 32301-3839

Telephone: (850) 488-0670

Fax: (850) 488-4226

URL: <http://doacs.state.fl.us/~fs-prw/>

27 August - 1 September 2000. Boca Chica, Dominican Republic.

CFCS 2000: Sociedad Caribeña de Cultivos Alimenticios/ Caribbean Food Crops Society/ Société Caraïbe des Plantes Alimentaires

URL: <http://www.cedaf.org.do/cfcs/entrada.asp>

11-15 September 2000. Torino, ITALY.

Symposium on Chemical And Non-Chemical Soil Disinfestation.

Contact: DI.VA.P.R.A.

Patologia Vegetale

Via L. da Vinci 44

10095 Grugliasco (TO), ITALY

Fax: 39-011-670-8541

E-mail: congress.mlg@agraria.unito.it

URL: <http://www.agraria.unito.it/news/SD2000/SD2000.html>

25-29 September 2000. Samos, GREECE.

IOBC-WPRS Working Group, Use of Pheromones and Other Semiochemicals in Integrated Control.

Contact: M. Konstantopoulou

Institute of Biology

NCSR "Demokritos"

PO Box 60228

GR-153 10 Aghia Paraskevi Attikis, GREECE

Fax: 30-1-6511767

E-mail: mkonstan@mail.demokritos.gr

URL: www.phero.net/iobc/samos/announc3.html

CONFERENCES

LISTSERVS**LISTSERVS on Pesticide Issues****Federal Register Pesticide Documents: epa-pest2**

This listerv disseminates the announcements published in the Federal Register regarding pesticide rulemaking in the United States. To subscribe, send an email to: listserv@unixmail.rtpnc.epa.gov. Leave the subject line blank, or put a period in the subject area. Type the following in the body of the message "subscribe epa-pest2 firstname lastname".

U.S. EPA Office of Pesticide Programs Electronic Updates

The Office of Pesticide Programs (OPP) has created an electronic mailing list to provide you with quick and timely updates on OPP's activities. Members of this service will receive short updates on recent regulatory decisions, press announcements, changes to the OPP website, and other information that may be of interest. OPP generally issues these updates weekly or more frequently when necessary to keep you informed. Subscribe online at http://www.epa.gov/oppfead1/cb/csb_page/form/form.html.

DRIFTERS

Drifters is an open forum for educators, trainers, regulators and industry, including applicators to share information, data and training activities on managing pesticide drift. To subscribe, send a message to majordomo@reusda.gov with the message reading "subscribe DRIFTERS firstname lastname".

Subscription address: majordomo@reusda.gov

Send messages to: drifters@reusda.gov

NAPIAP

A mailing list from the National Agricultural Pesticide Impact Assessment Program. To subscribe, send a message to majordomo@reusda.gov with the message reading "subscribe NAPIAP firstname lastname".

Subscription address: majordomo@reusda.gov

Send messages to: napiap@reusda.gov

PESTCOM

A listserv on chemical pesticide residues. To subscribe, send a message to listproc@list.uiowa.edu with the message reading "subscribe PESTCOM firstname lastname".

Subscription address: listproc@colostate.edu

Send messages to: pestcom@colostate.edu

Guidelines for Contributions to *CARIBBEAN CURRENTS***CONTRIBUTIONS**

Any organization or individual operating or involved in the English and French-speaking Caribbean Region is welcome to contribute to the newsletter. Contributions should be addressed to:

Caribbean Currents Coordinator
 INFOTERRA/USA
 U.S. Environmental Protection Agency
 Headquarters Library, 3404
 401 M Street, S.W.
 Washington, D.C. 20460
 UNITED STATES
 Telephone: (202) 260-5917; Fax: (202) 260-3923
 E-mail: library-infoterra@epa.gov

Please note that submissions should meet the following criteria:

- They are relevant to environmental issues
- They must be of interest to or directly involve the Region
- They must not endorse or recommend any product or commercial service, explicitly or implicitly
- They must be received by the posted deadline (see below)

Please feel free to contact the *CARIBBEAN CURRENTS* coordinator if you are interested in submitting an article. Write to: library-infoterra@epa.gov. Please note that once your article is submitted, it is subject to editing as needed. Final decisions on editing and inclusion of any contributions are left to the INFOTERRA/USA Manager. Caribbean Currents is available on the Internet at <http://www.epa.gov/earlink1/currents/>.

DEADLINE FOR CONTRIBUTIONS TO Vol. 8 No. 4: September 1, 2000

About the NFP Directory

This directory reflects changes and additions to the INFOTERRA Directory of National Focal Points distributed by INFOTERRA/PAC, dated November 1998. Please check this information to verify that it is correct and up-to-date. If you have any changes or corrections, please notify the RSC as soon as possible. We will be happy to relay the information to the PAC.

ENGLISH AND FRENCH-SPEAKING CARIBBEAN NFP DIRECTORY

Ms. Diann Black Layne
Conservation Officer II
Ministry of Planning, Implementation, and
Environment
Cecil Charles Building
St. John's
ANTIGUA, WEST INDIES
Telephone: (268) 463-0907 FAX: (268) 462-9338

Mrs. Lynn Holowesko
The Bahamas Environment, Science & Technology
Commission
Office of the Prime Minister
P.O. Box CB 10980
Nassau
THE BAHAMAS
Telephone: (242) 327-4691 FAX: (242) 327-4626

Mrs. Atheline Mayers
Permanent Secretary (Environment)
Ministry of Environment, Energy, and Natural
Resources
4th Floor, Sir Frank Walcott Building, Culloden
Road
St. Michael, BARBADOS
Telephone: (246) 431-7680 FAX: (246) 437-8859
E-mail: envdivn@caribsurf.com

Jaime Jeffery Villanueva
Fisheries Department, Ministry of Agriculture and
Fisheries
Princess Margaret Drive, P.O. Box 148
Belize City
BELIZE, CENTRAL AMERICA
Telephone: 501-2-44552 FAX: 501-2-32983

Mr. Ashton Lugay
Forestry and Wildlife Division
Ministry of Agriculture, Botanical Gardens
Roseau
COMMONWEALTH OF DOMINICA, WEST
INDIES
Telephone: (767) 448-2401, ext. 417 FAX: (767)
448-7999

Mr. Balgobin Parsand
IAST Building, U.G. Campus, Turkeyen
Greater Georgetown, GUYANA
Telephone: (592 22) 5784, 2277, 2231 Fax: (592 22)
5785
E-mail: epa@sdpn.org.gy

M. Dalberg Claude
Ministere de l'Agriculture et des Ressources
Naturelles et du Developpement Rural
P.O. Box 1441
Port-au-Prince
HAITI
Telephone: 509-1-21867 FAX: 509-1-23599

Ms. Yolanda N. Mittoo
Natural Resources Conservation Authority
53 1/2 Molynes Road
P.O. Box 305
Kingston 10
JAMAICA, WEST INDIES
Telephone: (876) 754-7546/52 FAX: (876) 754-7595
E-mail: nrca@infochan.com

Mr. Edsel Daniel
Physical Planning Officer
Ministry of Finance, Development, and Planning
Charlestown, Nevis
ST. KITTS AND NEVIS
Telephone: (869) 465-2521 FAX: (971 2) 466-7398

Mrs. Vanesta Moses-Felix
Government Documentalist
Government Information and Documentation
Resource Centre
Office of the Prime Minister
Castries
ST. LUCIA, WEST INDIES
Telephone: (758) 453-1951 FAX: (758) 453-1614
E-mail: docentre@candwe.lc

Regional Service Centre (RSC):

Ms. Seema Kapoor
INFOTERRA/USA
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW, MC 3404
Washington, DC 20460
UNITED STATES
Telephone: (202) 260-5917 FAX: (202) 260-3923
E-mail: library-infoterra@epa.gov

DIRECTORY

INFOTERRA/USA
U.S. Environment Protection Agency
1200 Pennsylvania Avenue NW
Mail Code 3404
Washington DC 20460
UNITED STATES