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PERIODIC REPORT

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International Plant

Protection Center

Periodic Report * 1985-86

International Plant Protection Center

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Consortium for International Crop Protection

through a contract with the U.S. Agency for International Development

for Pest and Pesticide Management

Project No. 936-4142

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*

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EXECUTIVE SUMMARY

The International Plant Protection Center (IPPC) of Oregon State University entered into a subcontract with the Consortium for International Crop Protection (CICP) to conduct a U.S. Agency for International Development (AID) funded program in pest and pesticide management.

During the period October 1, 1985 to September 30, 1986, 60 person-months of professional staff (18 of which were not funded through the subcontract) were dedicated to meeting the program's objectives.

Total subcontract expenditures during the period were \$380,350, of which approximately 20 percent was contributed.

There are four general areas of program activities: training, technical assistance, research, and program networking.

Major training activities conducted through the subcontract during the reporting period included: developing and conducting weed and pesticide management courses in El Salvador, Somalia, Honduras, Jordan, and Grenada; developing formal and informal weed science courses for developing country scientists at Oregon State University; serving as faculty advisers for eight OSU graduate students from developing countries; and preparing training materials for donor agencies and developing country universities.

Technical assistance was provided to USAID missions in Honduras and Grenada, to the Government of Pakistan, and to AID/Washington. A request for assistance from USAID/Panama resulted in a proposed pesticide management training course to be held in Panama in early 1987. IPPC launched a major effort to obtain agrochemical and small

application equipment industry support to conduct pesticide safety training in developing countries.

Subcontract research was primarily conducted with graduate students associated with IPPC. Research topics oriented toward small farmer weed control problems in developing countries included non-tillage production, mulches as a weed control technique, herbicide screening, and small spray equipment performance.

Publications constitute a major method of communicating and networking with the developing country pest management community. During the reporting period 2,800 copies of various publications were distributed. INFOLETTER, an award winning newsletter, was sent to over 8,500 recipients in more than 130 countries. Computer graphics-enhanced instruction modules were developed and made available to the pest management community. A chapter was written and incorporated into Weed Control in the Tropics, Vol. II, published by the Weed Science Society of the Philippines. Work continues on a manuscript for "Weed Control for Extension Agents."

IPPC continues to serve as secretariate for the International Weed Science Society (IWSS). Through IWSS, IPPC helped provide: basic weed science libraries to nine developing countries; planning for a world congress to be held in Canada during 1987; and, the recycling of technical journals to developing country scientists.

ACRONYMS

AID - Agency for International Development
AID/W - AID/Washington
CAI - Computer aided instruction
CICP - Consortium for International Crop Protection
FAO - Food and Agriculture Organization of the United Nations
IICA - Instituto Interamericano de Cooperacion para la Agricultura
IPM - Integrated pest management
IPPC - International Plant Protection Center
IWSS - International Weed Science Society
OIA - Office of International Agriculture
OSU - Oregon State University
PL480 - Public Law 480
PPM - Pest and Pesticide Management
ROCAP - Regional Office for Central American Programs
USAID - U.S. Agency for International Development (missions)

ACTIVITIES/ACCOMPLISHMENTS

I. Background

In August 1985, IPPC linked with the Consortium for International Crop Protection (CICP) to submit a joint proposal to the U.S. Agency for International Development (AID) to conduct a program in pest and pesticide management. The proposal was accepted and the program begun October 1, 1985.

CICP contracted with several other member institutions to conduct various phases of the effort. A scope of work identified four major work headings: training, technical assistance, research, and networking/communication. Division of responsibility is:

- Consortium for International Crop Protection:
 - * project coordination and administration;
 - * liaison with AID and other donor groups; and,
 - * project development.
- International Plant Protection Center:
 - * weed management;
 - * training coordination;
 - * socio-economics; and,
 - * information/networking coordination.
- University of Maryland:
 - * entomology; and,
 - * technical assistance coordination.
- University of Minnesota:
 - * plant pathology; and,
 - * research coordination.

- University of Miami:

- * pesticide residue analysis training; and,
- * agromedical consulting and training.

A project implementation workshop was held in Maryland, December 1985, to further refine the scope of work and areas of responsibility, linkages, etc. Activities for the first year are reported under the four major headings.

II. Training

1. COURSES

IPPC/PPM specialists actively participated in seven formally organized training events during the report period (Table 1).

<u>Table 1. Participation in Formal Training Activities</u>
<u>OSU Weed Science Course</u> - given each fall quarter at Corvallis, the Oct. - Dec. 1985 course had 93 students.
<u>Somalia Weed Management</u> - Dec. 2-12, 1985, first ever weed management course presented in Somalia, sponsored by FAO, 33 participants
<u>IICA/ROCAP coffee rust shortcourse</u> - Nov. 15-20, 1985, El Salvador, spray application technology presented to 26 participants.
<u>Weed Control</u> - a 3-hour credit course presented (all in Spanish) at the Escuela Panamericana, Honduras, Jan. 7-Feb. 31, 1986, to 33 students.
<u>Weed Science</u> - presented to 27 participants in Jordan during January 1986.
<u>Weed Management Strategies</u> - the first at-Corvallis shortcourse presented by IPPC, for seven participants from seven countries, during Jul. 14-Aug. 1, 1986.
<u>IPM Course</u> - participated in the Grenada IPM training series, offered to 27 participants during Aug. 14-31, 1986.

2. STUDENTS

S. F. Miller, L. C. Burrill, and M. D. Shenk served as faculty advisors for one or more graduate students. During the report period, Miller had two Ph.D. candidates (one from Algeria) successfully complete their study program. Burrill advised a student from Thailand who completed an M.S. degree. Shenk began advisory duties for an M.S. candidate from Costa Rica.

IPPC staff also served on the graduate committee for eight other Ph.D. students and two M.S. students, including five from developing countries.

3. SPECIAL PROGRAMS

Project associate A. S. Cooper developed and conducted a 3-week specialized study program for a visiting weed scientist from Pakistan, including a trip to the University of California Davis to attend the International Horticultural Congress. The program emphasized pesticide residue considerations.

4. TRAINING MATERIALS

IPPC began work on the preparation of a Field & Laboratory Guide Manual for Weed Control for the Escuela Panamericana. The work will be in Spanish.

Further refinement was carried out on the FAO-sponsored Weed Management Instructor's Guide.

III. Technical Assistance

1. ADVISORY

IPPC weed scientist M. D. Shenk continued to serve as cooperating scientist for six weed management research projects (under the PL480

program) in Pakistan managed through the U.S. Department of Agriculture. Activity included review of research, analysis of methods, and ongoing guidance.

At the request of USAID/Honduras, Shenk visited the Escuela Agricultura Panamericana at El Zamorano during November 1985 to advise on weed problems and methods of control.

At the request of AID/W, IPPC staff members Shenk and A. S. Cooper traveled to Washington, DC to serve on a panel for reviewing/formulating pesticides safety policies for AID.

Along with two other specialists from the PPM project, Shenk spent 10 days in Grenada advising local officials regarding pest management, and in organizing for a forthcoming shortcourse.

Miller and Shenk traveled to Guatemala, Costa Rica, Bolivia, and Panama to introduce the PPM project to AID personnel. A request for pesticide management training from the USAID/Panama mission resulted from the visit.

2. LINKAGE

During a visit to USAID/Panama, Miller and Shenk proposed provision of weed science training that, later in the year, resulted in a FIO/T to conduct a training course. Administrative procedures delayed the course until early 1987.

In September, Shenk was invited to attend the FAO regional weed management workshop held in Bogota, Colombia, in conjunction with a meeting of the FAO Panel of Experts on Weed Management.

3. INDUSTRY INITIATIVE

IPPC launched a program to collaborate with the agrochemical and small application equipment industry to conduct pesticide safety

training in developing countries. A series of personal contacts, followed by individual letters to most of the major firms, set forth the outlines of training and proposed that a collaborative approach would be more cost-effective and have greater impact.

A meeting with all interested entities was set for February 1987, just preceding the Weed Science Society of America annual meeting.

IV. Research

1. THESES

Two research theses supervised by S. F. Miller resulted in publications:

- a. Risk Attitudes in the Eastern High Plateau Region of Algeria: An Application of the Experimental Approach;
- b. Risk Analysis of Alternative Tillage Systems in North Central Oregon Dryland Wheat Production.

A student from Thailand, advised by IPPC staff member L. C. Burrill, completed research and wrote a thesis.

2. CURRENT RESEARCH

Four graduate students—from Uruguay via Mexico, Pakistan, Costa Rica, and Ethiopia—continued their programs with either direct or indirect linkage to IPPC.

Further research was conducted on the use of live mulch in maize production. Basic findings to date are summarized in Table 2.

A research program was launched to evaluate performance of various (configuration and material) spray nozzles provided by manufacturers worldwide.

Table 2. Sweet Clover as a Mulch in Maize Production: Findings

1. Clover interferes with and reduces yield of sweet corn.
2. In an irrigated system, early competition for light and soluble soil nutrients seem to be a major component of corn-clover interference.
3. Chemical suppression of clover may not fully eliminate interference.
4. Clover released nitrogen that became available to the corn.
5. Other factors suggested potential allelopathy and pest roles in repeated planting of corn in the same clover mulch.

Sponsored research was conducted to assess the tolerance to herbicides of various cucumber varieties.

V. Networking

1. GENERAL NETWORKING

S. F. Miller and M. D. Shenk traveled to several nations in Central and South America during April 1986 to explain the new project and the capabilities available.

Miller, CICP Deputy Director, attended the CICP Board meeting at College Park, MD, in July.

Along with Shenk and A. E. Deutsch, Miller represented IPPC at the PPM project implementation workshop held at College Park, MD, during December 1985.

I. O. Akobundu, staff weed scientist at the International Institute of Tropical Agriculture (Ibadan, Nigeria), spent a year's sabbatic leave with IPPC. He interacted with staff while preparing a

manuscript for a publication, and also advised graduate students in OSU's Crop Science Department.

During March 1986, Shenk and A. S. Cooper visited several consulting firms headquartered in Washington, DC. The PPM program and IPPC's role were explained and descriptive material given to the firms' representatives.

2. INFOLETTER

One issue of the IPPC INFOLETTER was published and distributed during the report period. It featured background and specifics of the new Pest & Pesticide Management project contracted to CICP by AID. INFOLETTER's physical size was increased by 25%. Several other design improvements were inaugurated.

The mailing list generated by CICP at Berkeley was given to IPPC for the purpose of merging with the existing IPPC master list. Since the systems used to maintain the two lists were incompatible, all checking and insertion had to be done manually. There was an estimated 41% duplication between the two lists. Many of the entries from the CICP list were old and subsequently found to be invalid. Appendix #3 shows current and previous country-by-country distribution of INFOLETTER.

A commercial mailing service was utilized for the first time to distribute INFOLETTER. The results were highly favorable with many of the now more than 8,500 recipients receiving their copy within two weeks instead of up to six months. Due to bulk shipping, there was no increase in mailing cost.

3. COMPUTER-AIDED INSTRUCTION

A program was started to create computer graphics-enhanced instruction modules for pesticide safety and application topics. These are intended to assist in the review of basic concepts in pest/pesticide management. Specific module titles include:

- A. Pesticide Handling and Safety
- B. Pesticide Application Techniques
- C. Pesticide Application Equipment Calibration
- D. Pesticide Rate Calculations
- E. Pesticide Formulations

Of these, #A is available on diskette as a computer-operated module, a 35mm slide set, and overhead projector transparencies. All formats are accompanied by a printed manual. Portions of the other modules have been completed.

The effort, conducted by A. S. Cooper, resulted in several other outputs including a campus-wide CAI workshop, a newsletter, establishment of a message area on an electronic bulletin board, and provision of teaching and technical assistance to other project staff members as well as members of the OSU Crop Science Department.

4. PUBLICATIONS

M. D. Shenk prepared a chapter entitled, "Weed Control in Maize," for a new book, Weed Control in Tropical Crops, Vol. II, published by the Weed Science Society of the Philippines.

IPPC continued to distribute a variety of publications in response to requests. Appendix #4 provides detail for distribution of publications and Appendix #5 lists numbers of papers/reprints sent out.

A summary report was prepared for the Jordan weed training course. Copies were provided to all involved entities. A summary report was also published for the IPPC Weed Management Strategies shortcourse. Pre-course brochures for both the 1986 and 1987 course were developed and published.

A report of results from the spring 1986 herbicide screening trial was published. A concluding report for the previous AID-supported weed management project was produced.

Articles by IPPC staff were published in the GIFAP Bulletin and the inaugural issue of Farm Chemicals International.

A manuscript for "Weed Control for Extension Agents" was refined and sent for review by technical experts.

4. IWSS

IPPC continued to serve as the secretariate for the International Weed Science Society (IWSS). Activities included membership transactions and other administrative duties.

IWSS collaborated with the Weed Science Society of America and IPPC to purchase/provide materials for basic weed science library sets. Nine sets have been mailed to developing countries. Each participant at the IPPC weed management strategies shortcourse received a set. Seven more sets are awaiting shipping clearance from USAID missions, or others.

IPPC supported IWSS' plans to arrange a world congress and identify an appropriate site—tentatively, Vancouver, BC, Canada.

5. OTHER NETWORKING

IPPC senior weed scientist L. C. Burrill attended the February 1986 meeting of the Weed Science Society of America (Houston, TX) where he was named a lifetime Fellow of the Society.

IPPC arranged for and carried out development of a PPM logotype.

A descriptive brochure for the PPM project was designed and written. It was in the final stages of editing and production at the end of the report period.

IPPC staff extensively reviewed a draft copy of the CICP final report for its previous project.

IPPC director Miller, and other staff, attended a series of international agriculture project directors' meetings arranged by the OSU Office of International Agriculture. Miller and Deutsch attended an OIA-sponsored one-day planning strategies meeting at Newport, OR.

Miller chaired an ad hoc committee to recommend OIA policy relative to returned overhead funds. Deutsch chaired a parallel ad hoc committee reviewing communication/information policies for OIA.

An IPPC staff member assisted the Tanzania Farming Systems Project with preparation of a slide presentation.

IPPC director Miller and OIA director E. C. Price agreed that Deutsch would assist OIA with preparation of a major periodic report. A draft format and partial manuscript were prepared and submitted to OIA for approval.

IPPC continued to upgrade and expand its extensive technical literature collection.

Arrangements were made for IPPC to resume production of Haustorium, the newsletter of the International Parasitic Seed Plant Research Group.

A program of collecting and redistributing unused/unwanted technical journals to developing countries was continued.

FINANCIAL REPORT

PROJECT EXPENDITURES: OCTOBER 1, 1985 THROUGH SEPTEMBER 30, 1986

<u>Category</u>	<u>Amount</u>	<u>Contributed*</u>
Salaries:		
Academic	\$133,732	\$15,220
Administrative	29,203	
Other Payroll Expenses (Fringe Benefits)	51,419	3,225
Services and Supplies	11,248	44,327
Travel	3,370	2,514
Indirect Costs (34%)	77,850	8,242
	<hr/>	<hr/>
Total	\$306,822	\$73,528

* Includes state funds, training fees, and non-PPM projects.

DISTRIBUTION OF PERSONNEL EFFORT

<u>activities</u>	<u>site</u>	<u>date</u>	<u>PM</u>	<u>individual</u>
<u>TRAINING</u>				
Pesticide Safety	El Salvador	Nov. 85	0.5	Shenk
Weed Science	Corvallis	Oct/Dec 85	1.5	Burrill
Weed Management	Somalia	Dec. 85	1.0	Burrill
Weed Science	Honduras	Jan/Feb 86	1.0	Shenk
Weed Science	Jordan	Jan. 86	1.0	Burrill
IPM	Grenada	Aug. 86	1.0	Shenk
Weed Control	Corvallis	Jul/Aug 86	1.0	Burrill
			1.0	Shenk
			1.0	Deutsch
			1.0	Miller
Graduate Students	Corvallis		0.5	Miller
Graduate Students	Corvallis		1.5	Burrill
Graduate Students	Corvallis		1.0	Shenk
Visiting Trainee/ Pakistan	Corvallis		2.0	Cooper*
Preparing Training Material/Honduras	Corvallis		2.0	Shenk
			3.0	Fischer*
			0.5	Deutsch
Preparing Training Material/FAO	Corvallis		2.0	Burrill
			0.5	Deutsch
<u>TECHNICAL ASSISTANCE</u>				
Pakistan PL480	Corvallis/Pakistan		2.0	Shenk
Honduras EPA	Honduras		1.0	Shenk
Safety Policy	Washington		0.5	Shenk
			1.0	Cooper*
Grenada Course Development			0.5	Shenk
PPM Project Discussion	Costa Rica/Guat. Bolivia/Panama	Mar/Apr 86	1.0	Shenk
			0.5	Miller
Industry Initiative	Corvallis		0.5	Miller
			1.0	Deutsch
<u>RESEARCH</u>				
Nozzle Evaluation	Corvallis		1.0	Burrill
Mulch Evaluation	Corvallis		3.0	Fischer*
Cucumber Evaluation	Corvallis		0.5	Burrill
Econ. Analysis	Corvallis		0.5	Miller
Screening Trial	Corvallis		1.0	Burrill
Microcomputer Appl.	Corvallis		0.5	Miller

<u>activities</u>	<u>site</u>	<u>date</u>	<u>PM</u>	<u>individual</u>
<u>NETWORKING</u>				
CICP/IPPC Admin.	Corvallis, MD, Wash.		1.0	Miller
IITA Visiting Sch.	Corvallis		1.0	Burrill
Newsletter			3.0	Deutsch
Computer Modules	Corvallis		9.0	Cooper*
Publications	Corvallis		3.0	Deutsch
			0.5	Shenk
			0.5	Miller
IWSS Activities	Corvallis		0.5	Burrill
			0.5	Miller
			1.0	Deutsch
Reports	Corvallis		0.5	Miller
			2.0	Deutsch

* Contributed

ANNEXES

Annex 1. SUMMARY OF TRAVEL

<u>date</u>	<u>traveler</u>	<u>itinerary</u>	<u>activities</u>
Nov. 85	Shenk	El Salvador, Honduras	IICA/ROCAP coffee rust course Visit EAP
Nov. 85	Burrill	Somalia, Kenya	AID weed management course Meet with REDSO
Dec. 85	Miller, Shenk, Deutsch	CICP	Project Implementation workshop
Jan. 86	Shenk	Honduras	Teach course at EAP
Jan. 86	Burrill	Jordan	AID weed science course
Apr. 86	Miller, Shenk	Guatemala, Costa Rica, Panama, and Bolivia	Explain objectives and capabilities of CICP-IPPC pest and pesticide management project
Apr. 86	Shenk, Cooper	Washington, DC	AID review of pesticide safety training materials
Jun. 86	Shenk	Grenada	Arrange details for upcoming IPM course given under the Pest and Pesticide Management Project
Jul. 86	Miller	Maryland, Washington, DC	Attend CICP Board of Directors meeting and discuss project with S&T project monitor
Aug. 86	Cooper	Davis, CA	Accompany visiting scientist and attend the International Horticultural Congress
Aug. 86	Shenk	Grenada	Conduct the IPM course under the Grenada Agr. Sector Revitalization Project
Sep. 86	Shenk	Colombia	Attend FAO regional workshop on weed management and participate as an observer in the FAO Panel of Experts on Weed Management

Annex 2. IPPC PERSONNEL

<u>Name</u>	<u>Position</u>	<u>FTE</u>
Miller, S. F.	Director, IPPC; agric. economist; CICP Deputy Exec. Director	.5
Burrill, L. C.	Weed Scientist	1.0
Shenk, M. D.	Weed Scientist-Training	1.0
Deutsch, A. E.	Communication/networking	1.0
Cooper, A. S.	Weed Scientist/Computer Specialist	*
Larson, S. G.	Office Manager/Accounting	1.0
Carr, R. M.	Word Processing/Information Assistant	1.0
Fischer, A.	Graduate Assistant	*

* Supported by non-project budgets.

Annex 3. WORLDWIDE DISTRIBUTION OF INFOLETTER

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Abu Dhabi	1	1	1	1
Aden	1	1	-	-
Afghanistan	13	12	11	20
Algeria	4	3	7	12
Angola	-	1	1	3
Antigua, W. I.	2	2	2	6
Arab Rep. of Egypt	14	16	23	47
Arabian Gulf	-	1	-	-
Argentina	141	158	179	187
Australia	68	87	110	138
Austria	6	5	6	16
Bahamas	1	1	2	3
Bahrain	-	-	-	1
Bangladesh	4	8	16	33
Barbados	3	3	2	8
Basseterre, W. I.	-	1	2	-
Belgium	28	29	31	50
Belize	7	6	10	14
Benin	2	2	1	10
Bermuda, W. I.	1	1	1	1
Bhutan	-	-	-	2
Bolivia	27	28	26	35
Botswana	3	4	11	17
Brasil	179	192	206	323
British Virgin Islands	-	-	-	2
Brunei Darussalam	3	3	3	5
Bulgaria	2	2	2	3
Burkina Faso	5	6	10	37
Burma	3	4	7	11
Burundi	-	2	2	5
Cameroon	6	7	10	21
Canada	100	138	153	242
Canal Zone	-	-	3	4

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Canary Islands	1	1	1	1
Cape Verde Island	1	1	3	6
Cayman Island, W. I.	1	1	1	2
Cent. African Rep.	1	1	1	6
Chad	5	4	2	4
Channel Islands	-	-	-	1
Chile	41	45	46	46
People's Rep. of China	2	4	7	12
Colombia	93	97	94	98
Comores	2	2	2	2
Congo	-	-	1	4
Cook Islands	-	-	3	6
Costa Rica	71	76	82	86
Cuba	2	1	3	4
Curacao	-	-	-	1
Cyprus	3	4	6	9
Czechoslovakia	10	12	12	21
Denmark	19	20	21	34
Djibouti	1	1	1	2
Dominica, W. I.	-	-	-	3
Dominican Rep.	12	15	16	18
Ecuador	47	49	52	52
Egypt	-	-	-	3
El Salvador	12	11	12	13
Ethiopia	25	27	32	61
Fiji Islands	3	5	14	20
Finland	17	18	16	18
France	69	74	84	143
French W. Indies	1	1	-	-
Gabon	1	1	1	1
Gambia	4	4	6	12
Germany (East)	4	1	1	3
Germany (West)	59	59	60	95
Ghana	24	31	41	70
Gilbert Islands	-	-	-	2
Greece	28	27	28	48

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Grenada	-	-	1	7
Guadeloupe, W. I.	-	-	1	4
Guatemala	13	15	18	19
Guinea	1	1	8	7
Guinea-Bissau	-	-	-	5
Guyana	2	4	5	14
Haiti	3	3	5	14
Honduras	18	21	31	36
Hong Kong	4	5	4	8
Hungary	7	8	7	11
Iceland	-	-	-	1
India	203	232	300	360
Indonesia	90	97	123	165
Iran	12	12	2	19
Iraq	3	3	3	5
Ireland	7	7	8	10
Israel	20	21	29	41
Italy	31	32	35	72
Ivory Coast	6	9	8	12
Jamaica	11	10	10	22
Japan	53	58	60	82
Jordan	8	8	8	13
Kenya	26	35	57	89
Korea	14	13	12	18
Kuwait	-	2	2	3
Laos	7	7	7	11
Lebanon	7	6	-	10
Lesotho	2	3	3	10
Liberia	7	7	12	23
Libya	5	5	5	12
Madagascar	-	-	1	-
Malagasay Rep.	1	1	1	4
Malawi	7	7	13	28
Malaysia	58	65	76	118
Mali	3	3	6	18
Malta	4	4	4	6

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Martinique	-	-	-	3
Mauritania	2	2	5	8
Mauritius	3	3	4	12
Mexico	63	69	88	97
Montserrat	-	1	1	3
Morocco	3	3	5	12
Mozambique	2	2	3	4
Nepal	2	2	7	9
Netherlands	29	36	44	86
New Caledonia	4	4	4	7
New Guinea	16	14	18	29
New Hebrides	2	2	2	5
New Zealand	26	26	31	60
Nicaragua	19	19	20	17
Niger	1	3	4	15
Nigeria	52	55	69	121
Niue	-	-	1	3
Norway	14	12	12	17
Oman	-	-	1	2
Pacific Islands	1	2	2	-
Pakistan	19	20	66	89
Palau Islands	-	-	-	1
Panama	16	17	21	26
Paraguay	10	11	12	12
Peru	75	77	83	73
Philippines	182	198	207	272
Poland	10	9	10	13
Portugal	10	11	14	28
Qatar	-	-	2	5
Reunion	-	-	-	4
Romania	4	4	4	10
Rwanda	-	-	-	3
St. Kitts	3	3	3	8
St. Lucia	-	-	2	11
St. Vincent	-	2	3	6
Saudi Arabia	5	6	11	17

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Senegal	20	22	24	50
Seychelle Is.	1	1	1	3
Sierra Leone	7	6	7	14
Singapore	12	10	12	19
Solomon Islands	2	3	5	7
Somalia	1	1	1	7
South Africa	3	5	8	16
South Atlantic	-	-	1	1
South Pacific	-	-	2	-
South Vietnam	11	7	-	-
Spain	22	25	26	31
Sri Lanka	18	18	26	43
Sudan	12	17	24	36
Surinam	4	6	7	8
Swaziland	2	2	4	8
Sweden	27	28	27	34
Switzerland	29	28	28	60
Syria	8	9	8	17
Tahiti	3	3	2	5
Taiwan R.O.C.	17	17	19	34
Tanzania	15	17	20	40
Thailand	48	60	96	134
Togo	2	2	4	9
Tonga	-	-	1	27
Trinidad & Tobago	19	21	27	41
Trucial States	1	1	1	1
Tunisia	5	5	7	10
Turkey	19	23	25	39
Turks and Caicos	-	-	-	1
Tuvalu	-	-	-	2
Uganda	5	5	6	25
United Kingdom	155	173	206	283
United States	1,482	1,661	1,854	2,822
Uruguay	20	23	27	24
U.S.S.R.	4	4	6	16
Venezuela	53	59	63	62

Country	Recipients as of			
	May 1979	May 1981	May 1984	Sept. 1986
Wallis-Futana Islands	-	-	-	1
Western Samoa	6	9	15	27
Yemen Arab Rep.	1	3	2	4
Yugoslavia	8	8	12	18
Zaire	3	4	4	8
Zambia	8	10	10	26
Zimbabwe	-	1	6	11
TOTAL	4,511	4,931	5,735	8,553

Annex 4. WORLDWIDE DISTRIBUTION OF PUBLICATIONS

Identification Key

<u>Symbol</u>	<u>Title</u>
B	BIBLIOGRAPHY
C	COMMUNICATION OF WEED SCIENCE TECHNOLOGIES IN DEVELOPING COUNTRIES
CPM	CROP PRODUCTION USING COVER CROPS AND SODS AS LIVING MULCHES
FM	FIELD MANUAL FOR WEED CONTROL RESEARCH
IPM	ECONOMICS OF INTEGRATED PEST MANAGEMENT
KS	KNAPSACK SPRAYERS; USE, MAINTENANCE, ACCESSORIES
LOK	LEVER-OPERATED KNAPSACK SPRAYERS
MDC	MANUAL DE CAMPO PARA INVESTIGACION EN CONTROL DE MALEZAS
MP	MIMOSA PIGRA MANAGEMENT
NT	NO TILLAGE CROP PRODUCTION IN THE TROPICS
SF	SMALL FARM WEED CONTROL
T	ALGUNOS "TRUCOS" UTILES EN ESTADISTICA/SOME USEFUL TRICKS IN STATISTICS
TWS	SEMILLAS DE MALEZAS TROPICALES I Y II/TROPICAL WEED SEEDS I AND II
WCC	WEED-CROP COMPETITION: A REVIEW

DISTRIBUTION OF PUBLICATIONS

COUNTRY	SF	WCC	KS	T	TWS	FM	MDC	B	NT	CPM	MP	C	LOK	IPM
ARGENTINA	-	1	-	1	3	-	1	-	-	-	-	-	2	1
AUSTRALIA	1	-	-	-	-	-	-	-	-	-	-	-	7	-
BANGLADESH	-	-	1	-	-	-	-	-	-	-	-	-	4	-
BELGIUM	-	-	-	-	-	-	-	-	-	-	-	-	1	-
BELIZE	-	-	-	-	-	-	-	-	-	-	-	-	1	-
BOLIVIA	-	-	-	-	-	-	-	-	-	-	-	-	1	-
BOTSWANA	-	1	1	-	-	1	-	-	-	-	-	-	1	-
BRASIL	-	1	2	-	-	-	1	1	2	-	-	1	3	1
BRUNEI	-	-	-	-	-	-	-	-	-	-	-	-	1	-
BURKINA FASO	-	1	1	-	-	-	-	-	-	-	-	-	2	-
CANADA	-	3	2	-	1	1	-	1	1	4	-	2	10	-
CANARY ISLANDS	-	-	-	-	-	-	-	-	1	-	-	-	-	-
CHINA, PEOPLES REP. OF	-	1	1	-	-	1	-	-	1	-	-	1	1	1
COLOMBIA	-	-	-	-	-	-	-	1	-	-	-	-	2	-
COSTA RICA	1	-	-	5	1	1	5	3	-	-	-	-	-	-
CUBA	-	-	-	-	-	-	1	-	1	-	-	-	1	-
CYPRUS	-	-	-	-	-	-	-	-	-	-	-	-	1	-
CZECHOSLOVAKIA	-	1	-	-	-	-	-	-	-	-	-	-	1	-
DENMARK	-	1	-	-	-	-	-	-	-	-	-	-	1	-
DOMINICA, W.I.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
DOMINICAN REPUBLIC	-	1	1	-	1	1	-	-	1	1	-	2	3	1
ECUADOR	1	2	-	3	1	-	1	-	1	-	-	2	1	-
EGYPT	-	-	-	-	-	-	-	-	-	-	-	-	3	-
EL SALVADOR	-	-	-	10	-	-	10	-	1	-	-	1	-	-
ETHIOPIA	2	18	16	-	18	2	-	16	1	1	-	17	17	1
FEDERAL REP. OF GERMANY	-	2	-	-	2	1	2	-	1	-	-	2	4	-
FRANCE	-	-	-	-	-	-	-	-	-	-	-	-	1	-
GAMBIA	-	1	1	1	1	31	1	-	1	-	-	1	31	-
GHANA	-	4	3	-	18	2	-	-	-	-	-	31	8	-
GRENADA, W.I.	-	-	-	-	-	-	-	-	-	-	-	-	13	-
GUATEMALA	-	-	-	-	-	-	-	1	1	-	-	-	3	-
GUYANA	-	-	-	-	-	-	-	-	-	-	-	1	-	-
HONDURAS	-	-	-	2	2	-	2	-	-	-	-	2	4	-
HONG KONG	-	3	1	-	-	2	-	-	-	-	-	1	-	-
INDIA	2	12	3	-	6	6	-	-	7	1	-	7	9	1
INDONESIA	1	6	2	-	1	3	-	1	2	2	1	1	10	-

DISTRIBUTION OF PUBLICATIONS (CON'T)

COUNTRY	SF	WCC	KS	T	TWS	FM	MDC	B	NT	CPM	MP	C	LOK	IPM
IRELAND	-	-	-	-	1	1	-	-	-	-	-	1	-	-
ISRAEL	-	-	-	-	-	1	-	-	-	-	-	-	2	-
ITALY	-	46	-	-	-	16	-	-	-	-	-	-	1	-
JAMAICA, W.I.	-	1	-	-	1	1	-	-	1	-	-	1	1	-
JAPAN	-	-	-	-	-	-	-	-	-	-	-	-	1	-
JORDAN	-	30	30	-	-	30	-	-	-	-	-	35	-	-
KENYA	-	-	-	-	-	100	-	-	-	-	1	-	-	-
LIBERIA	-	-	-	-	-	-	-	-	1	-	-	-	-	-
MALAWI	1	1	-	-	1	-	-	-	-	1	-	1	2	1
MALAYSIA	-	6	4	-	9	9	-	-	5	-	-	6	2	16
MAURITIUS	-	-	-	-	-	-	-	-	-	-	-	-	1	-
MEXICO	-	2	150	103	3	360	202	-	1	-	2	2	101	-
MONTSERRAT, W.I.	-	1	1	1	1	1	-	-	-	-	-	-	1	-
MOROCCO	-	-	-	-	-	-	-	-	-	-	-	1	-	-
NETHERLANDS	-	1	-	-	1	1	-	-	1	1	-	-	2	-
NEW GUINEA	-	-	3	1	3	5	-	-	1	-	-	2	6	-
NEW ZEALAND	-	3	1	-	1	6	-	-	-	-	-	4	2	-
NIGER	1	1	1	-	1	1	-	-	1	-	-	1	1	-
NIGERIA	2	8	2	-	4	6	-	-	4	1	1	7	9	1
PAKISTAN	1	5	4	-	2	5	-	3	6	-	-	5	7	3
PANAMA	-	-	-	-	-	-	-	-	-	-	-	-	1	-
PERU	-	1	1	2	3	2	-	1	1	2	-	2	2	-
PHILIPPINES	-	9	0	-	1	5	-	3	3	-	-	5	17	3
POLAND	-	1	-	-	-	1	-	-	-	-	-	-	1	-
PORTUGAL	-	1	2	1	1	2	2	-	1	1	-	1	2	-
SIERRA LEONE	-	-	-	-	-	-	-	-	-	-	-	-	2	-
SINGAPORE	-	-	-	-	-	-	-	-	-	-	-	-	1	-
SOLOMON ISLANDS	-	-	-	-	-	1	-	-	1	-	-	1	-	-
SOMALIA	-	3	33	-	-	33	-	3	8	-	-	8	5	3
SOUTH AFRICA	-	-	-	-	-	-	-	-	-	1	-	-	3	-
SPAIN	-	-	-	1	1	-	-	-	-	-	-	1	1	-
SRI LANKA	-	-	2	-	-	-	-	-	1	-	-	1	2	-
SUDAN	-	1	1	-	1	1	-	-	1	-	-	1	1	-
SWEDEN	-	-	-	-	-	-	-	-	-	-	-	1	-	-
SWITZERLAND	-	1	3	-	-	1	-	-	-	-	-	-	1	-
SYRIA	-	-	-	1	1	-	-	-	-	-	-	1	1	-

DISTRIBUTION OF PUBLICATIONS (CON'T)

COUNTRY	SF	WCC	KS	T	TWS	FM	MDC	B	NT	CPM	MP	C	LOK	IPM
TANZANIA	1	3	-	-	-	-	1	-	-	-	-	4	3	-
THAILAND	-	2	3	1	3	4	-	-	2	-	-	2	6	-
TRINIDAD & TOBAGO, W.I.	1	3	2	-	1	2	-	1	3	1	-	4	1	-
UNITED KINGDOM	1	3	2	-	1	-	-	-	1	-	2	1	19	-
UNITED STATES	3	130	52	5	9	46	29	9	21	13	5	19	99	8
URUGUAY	-	1	1	-	-	1	1	1	-	-	-	-	-	-
VENEZUELA	-	-	-	2	1	-	-	-	-	-	-	-	-	-
WESTERN SAMOA	-	-	56	-	-	-	-	-	-	-	-	-	-	-
ZIMBABWE	-	1	1	-	1	1	-	-	1	1	-	1	3	1
TOTALS	18	325	396	140	107	696	259	45	87	31	12	191	456	41

Annex 5. WORLDWIDE DISTRIBUTION OF IPPC PAPERS

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