Fifth Meeting of the Latin American Association for Cotton Research and Development

Managua, Nicaragua, November 13-17, 1995

At the invitation of the Ministry of Agriculture of Nicaragua, the Fifth Meeting of the Latin American Association for Cotton Research and Development (ALIDA) was held in Managua, Nicaragua from November 13-17, 1995, hosted by the Fundación Nicaragüense para el Desarrollo Agrícola (FUNDA). Lic. Ramiro Saborío-Galo, Director General of FUNDA served as coordinator. The meeting was organized jointly by the Technical Information Section of the ICAC and FUNDA. The theme of the meeting was ''Management of Varieties with Emphasis on Fiber Quality.'' The FAO Regional Office for Latin America and the Caribbean, represented at the meeting by Dr. Sebastiao Barbosa, Senior Regional Plant Protection Officer, Santiago, Chile, was also a sponsor and helped in bringing participants from Bolivia, Brazil and Peru. Dr. M. Rafiq Chaudhry, Head Technical Information Section of the ICAC, represented the ICAC. The meeting was attended by delegates from Bolivia, Brazil, Colombia, El Salvador, Honduras, Nicaragua, Paraguay, Peru and the USA. A list of participants is attached.

The meeting was inaugurated by Ing. José Salvador Robelo-Rivera, Deputy Minister of Agriculture, Government of Nicaragua. FUNDA designated Mr. Bayardo Ruiz-Centeno, its Technical Adviser, to chair the technical sessions. The meeting included updates on cotton growing conditions and technical papers, a field visit to a cotton growing area and an executive session to discuss administrative issues regarding the management of ALIDA for the next 2-3 years.

Country Reports and Technical Papers

Nicaragua

A report on the cotton production situation in Nicaragua was presented by Ing. Manuel Esquivel. He said that for many years cotton had been the most important crop in Nicaragua, for generating foreign exchange and also for generating employment. He said that during the 1950s, Nicaragua emerged as a exporting country; some problems arose in the 1960s but until the end of the decade cotton exports comprised 50% of total exports from the country. He said that during the 1970s, cotton was the main vehicle of the national economy and that cotton production in Nicaragua had suffered in the 1980s due to lack of institutional management, problems in diagnostic technology and lack of sufficient funding for cotton production research. He said that 50% of producers still grew cotton following traditional methods which did not fit any more in modern technology and that extensive use of chemicals further complicated the problem; that insect behavior and biology had been extensively studied in Nicaragua and, accordingly, a new strategy had been designed to increase the mortality rate of spraying, alter feeding habits and induce resistance to viruses responsible for causing diseases. Consequently, insecticide use is lower in Nicaragua but still more efforts, particularly technical awareness, have to be introduced to reduce cost of production, he stated.

In his second presentation, Ing. Manuel Esquivel highlighted the extensive use of insecticides in the country. He said that higher use of insecticides did not mean higher yields and that in Nicaragua, while insecticide use was increasing, cotton yields were going down; that high interest rates and lack of research facilities also affected other crops like banana, coffee, sugarcane, etc., but cotton, being more technical, was more affected compared to other crops. Cotton production, he said, had become an accumulation of problems and required technical as well as legislative decisions on the part of the government. He also expressed concern about deteriorating soil conditions and proposed a long term plan to maintain soil fertility.

Dr. Mario A. Vaughan referred to the Nicaraguan government's present campaign to allow imports of farm machinery and spare parts, lower taxes, etc., to promote cotton production. But, he agreed, initiatives have to come from the farmers also as they need to be organized to struggle against high input prices.

Dr. Rainer Daxl stated that, unlike cereals, cotton prices were determined by quality of lint rather than weight and that, currently, efficient methods were available to readily test fiber quality and select the most appropriate cotton for a given spinning machinery. But, he said, when you select a variety for planting, to a large extent you are also setting limits for the quality of cotton you are going to produce. Varietal management during the growing process allows the best quality production out of that variety. The types of varieties grown under the current production technology cannot afford any kind of stress on the plant. Two types of factors, he said, affect the quality of cotton: natural factors, like weather conditions in the field and processing (picking/pulling, transportation, ginning, etc.); and management factors, like fertilizers, pest control, defoliation, trash, etc. But there are some natural limitations to improving yield and quality in certain growing regions of the world and also in the plant itself. Nicaragua is one region where solar energy absorption rarely exceeds 500 cal./cm^2/minute (measured with an Actinograph). In countries like Australia and Israel, energy absorption is over 700 cal./cm^2/minute. Varying degrees of self-shade within the cotton plant affect fiber quality, a fact which cannot be avoided, he stated.

Mr. Denis Tellez-González reported on the breeding process followed in Nicaragua to screen new breeding lines against different races of bacterial blight. At least 21 lines completely immune to bacterial blight have reached yield trial stages, he said.

Paraguay

Dr. Rosita Benítez presented two papers covering cotton growing problems and measures to improve fiber quality. She said that in Paraguay cotton production reached a record level of 264,000 tons in 1990/91. Paraguay used to grow Reba P-279 and Reba B-50 up until 1990/91. Due to non-availability of a sufficient quantity of seed locally, Delta and Pine Land varieties were imported into Paraguay during 1992/93. But, she said, seed quality showed little positive effect on yield and now, on recommendations from researchers, the government had decided not to import DPL varieties anymore. During 1994/95, the area under Reba types, INTA, ICA and DPL varieties was 63%, 18%, 12% and 7%, respectively. DPL leftover seed was used for planting during 1994/95. She said that it was estimated that Reba P279 was being grown on about 90% of total area during 1995/96 and that two locally developed strains, ''Bulk 38" and ''Bulk 41," had shown good performance and might be adopted for general cultivation. In the absence of nitrogenous fertilizers, insufficient rains had a pronounced effect on fiber quality, consequently affecting the reputation of Paraguayan cotton in the international market. She added that in order to improve fiber quality, current government policy decisions included providing extensive training on message transfer to 120 extension workers—out of a total of a about 500 involved in cotton growing—on information dissemination through pamphlets on growing and producing quality cotton (along with seed bags); elimination of intermediaries and facilitation of direct funding from banks; improvement of seed quality and advocacy of proper weeding. She presented the data shown on Table 1, on area, production and yield targets which have been fixed for the next five years.

In order to achieve the targets, she said, much emphasis will be given to seed quality and efforts will be made to raise plant density per unit area to 50,000 plants/ha. Appropriate weed control measures will be advocated to keep fields clean throughout the growing period. Varieties with better genetic potential will be developed, IPM techniques will be generalized among farmers, and the cotton production system will be diversified to enhance soil fertility, she reported.

In Paraguay, she said, higher plant density is considered an important step for improving fiber uniformity/quality. The current status of 30,000 plants/ha provides enough space for weeds to grow and also inflates differences in the quality of fiber picked from the same plant. Closer spacing among plants will produce more bolls closer to the main stem, reduce the cost of weed control and improve fiber quality.

Dr. Benítez said that the boll weevil was detected in Paraguay in 1991 and it was considered to be responsible for at least 30% reduction in potential yield during 1994/95. Monetary losses were estimated in the range of US$25 million as a direct loss in production plus US$7 million additional cost of spraying the crop. Frequent traffic from affected areas to other cotton growing areas led to rapid spreading of the boll weevil. All varieties are suscep-

Table 1
Cotton Production Targets in Paraguay

Year	Area (000 ha)	Production (000 tons)	Yield (kg seed-cotton/ha)
1995/96	410	533	1300
1996/97	420	612	1456
1997/98	430	701	1631
1998/99	440	804	1826
1999/2000	450	921	2046

tible, and it is a high priority to develop resistant varieties, she said.

Brazil

According to Dr. Raymundo Braga Sobrinho, perennial cotton is grown in Brazil because it is more tolerant to dry conditions. But, in the last few years, perennial cotton yields have gone down from 200 kg/ha to only 80 kg/ha thus discouraging its cultivation. The major problem for increasing production in Brazil is the lack of knowledge about growing cotton. About 95% of total farmers, particularly in the Northeast region, are not familiar with modern production technology and many of them also suffer from lack of financial support. Low local prices do not encourage farmers to produce cotton either. Cotton growing conditions are characterized by small scale growers holding 1-2 ha in the Northeast and about 15 ha in the South, with almost the same production problems.

According to Dr. Braga, in Brazil small producers could not be motivated to apply the recommended production technology. While there is a strong need to develop technology appropriate for such growing conditions, banks will neither provide seed nor extend lending facilities to growers planting less than 3-3.5 ha of cotton. Thus, small growers are indirectly shifted to other crops, he said.

Dr. Braga stated that perennial cotton was usually mixed with annual production thus affecting the overall quality of cotton produced in Brazil. Manual picking, paid on the basis of weight, mishandling or poor transportation, old ginning machinery and lack of proper care during growing are important factors affecting fiber quality in Brazil. Efforts will continue in order to improve quality characteristics of local varieties rather than to import new varieties. A new okra leaf variety may be released shortly for general cultivation, he said.

Mr. Pedro Jorge B. T. Lima said that about 250 hectares of organic cotton were grown by 150 farmers in Brazil during 1994/95 and about the same area will go into organic production during 1995/96. This organic cotton is a perennial Moco type cotton grown in the state of Ceará. Heavy boll weevil attack is limiting organic cotton production in the northeast of Brazil. Although organic certification facilities are available from the Biodynamic Institute in Sao Paulo, recognized by the International Federation for Organic Agriculture Movement, organic cotton is not formally certified. It is purchased by a company called Greens Peace, Inc., merely on confidence basis, he stated.

Bolivia

According to Mr. Daniel Durán-Parada, cotton in Bolivia is grown by two types of growers: small producers (35% of total) owning about 50 ha/ea., and large producers owning 500-1,200 ha/ea. Currently, local varieties are not available and Stoneville 132 and Guazuncho-2 are grown in separate regions, with a small area being overlapped by the two varieties. Low cotton prices affected production in the last few years but now there is a good motivation to recover the cotton area and increase production. High cost of labor continues to be a problem. Though there is a potential to increase production, any substantial increase will require expansion in ginning facilities, he said.

Dr. Braga stated that the boll weevil may have already entered into Bolivia. Dr. Sebastiao Barbosa supported this assumption and cautioned that, if control measures were not taken in a timely fashion, there was a danger of spreading this insect to more countries in the region. Mr. Durán strongly disagreed that boll weevil might be already in Bolivia. Mr. Durán said that alongside the Brazilian border, sex pheromone traps had been used and not a single boll weevil had been caught. He added that authorities were very conscious of the threat and were not only vigilant but had already taken measures to stop it from happening. As the Bolivian cotton area is not close to the boll weevil-infected area in Argentina, there are no chances of this insect entering from the Argentine side, he stated.

Mr. Durán said that Stoneville 132 has a micronaire value of 3.8 to 4.2 and a fiber strength of 26-29 g/tex against an average value of 3.2 and 29-30 g/tex, respectively, in the case of Guazuncho-2. In order to maintain the proper quality of the fiber, efforts are concentrated on growing both varieties in separate blocks, he added, and keeping them separate during all processing and handling. Abundant rains during October to February have a big impact on fiber quality, he said.

According to Dr. Jean-Luc J. G. F. Hofs of the CIRAD-CA, France (currently stationed in Bolivia and working on variety development), about 80% of total production in Bolivia measures more than 28.5 mm long. Cotton production by length and grade during 1994 is shown in Table 2.

Dr. Hofs stated that Bolivia had a problem of low micronaire, mainly due to the continuation of rains even during the harvesting period. It is difficult to predict the micronaire value because of variable rains from year to year. The target of 3.7 to 4.2 micronaire value is not met and they usually get 3.5, he said, but because maturity is good there are no complaints from buyers. He supplied data on some targets and achieved fiber characteristics in Bolivia shown in Table 3.

Dr. Hofs stated that the main factors affecting fiber quality in Bolivia are lack of labor for picking (which encourages more trash), poor ginning, manual classification and poor adaptability

Table 2
Cotton Production by Length and Grade in Bolivia in 1994

Length	% Production	Grade	% Production
26.2	5	Good Middling	Four
27.8	15	Good Ordinary	grades
28.6	35	Strict Good Ordinary	together 9
29.4	30	Low Middling	
30.2	10	Strict Low Middling	31
31.0	5	Middling	46
		Strict Middling	14

Table 3
Average Fiber Characteristics of Cotton in Bolivia

	Length (mm)	UI %	Strength g/tex	Elon. %	Micronaire	MR	Rd	+b
Target	28.0	83.0	27.0	6.0	3.7-4.2	0.85	66	10.0
Achieved	28.3	82.6	27.7	6.0	3.5	0.71	75	9.5

Table 4
Performance of a Locally Developed Variety

Variety	Yield (kg/ha)	Length (mm)	Strength (g/tex)	Micronaire	UI %	Elon. %
Stoneville 132	570	28.8	28.0	3.4	83.0	6.3
CIRAD-222	770	31.2	29.0	3.2	82.0	6.2

of varieties to local conditions. In Bolivia, cotton breeding work was started in 1992 and it will take a few more years for a locally developed variety to become available for cultivation. The strain CIRAD-222 has the potential to be adopted on commercial scale. Fiber characteristics of CIRAD-222 versus Stoneville 132, a major variety, are shown on Table 4 above.

Peru

Mr. Pedro Reyes More made a brief presentation on the cotton growing situation in Peru. Five types of cottons are grown in Peru: Tanguis, Peruvian Pima, Pima varieties, Del Cerro and Aspero. Currently, Tanguis represents about 60% of total area and takes 7-8 months to mature as against 5-6 months in the case of Pima types. Peruvian Pima fiber length measures 39-40 mm and strength value is 93-94 tppsi. Aspero also belongs to *G. barbadense* but has more white color. In Peru, he said, the tendency is to grow cotton of uniform fiber characteristics. Peru also used to grow indigenous colored cottons many years ago but stopped as there was concern about contaminating white cotton varieties. Colored cotton varieties were safe from insect pest damage and tolerant to drought conditions also. Extra-fine production comprised 27% of total production but came down to roughly 10% mainly because of privatization, i.e. banks which used to provide loans to cotton growers do not exist any more. Efforts are being made to strengthen research capabilities, improve insect pest control, provide quality seed and improve advisory services to farmers. If cotton production is extended to a larger area, close to that of the 1970s of over 170,000 ha, Peruvian Pima production will increase as cotton farmers in Peru prefer to grow it, he stated.

El Salvador

Mr. José Infantozzi informed participants that because of high losses due to insect pests and poor cotton economics his association had decided not to grow cotton until the year 2000. The Cooperativa Algodonera Salvadoreña has not closed down, rather changed its interests to other crops. Cotton has been replaced mainly with maize and sorghum. The decision was taken to break down the insect cycle, mainly boll weevil, but the Cooperativa Algodonera Salvadoreña will continue monitoring suitable conditions for cotton production and will maintain its coordination and communication with cotton producing countries in the region, he stated.

Honduras

Mr. Juan Cristobal Coello-Giron spoke about the technical aspect of cotton production while Mr. Jose Francisco Rivera-Hernández talked about plans to revive cotton production in Honduras. Cotton production was started in 1955 and area rose to over 18,000 ha during the late 1970s. Until 1987/88, area was over 5,000 ha, but due to severe attacks by the boll weevil, cotton production was stopped in 1991. In 1995/96, cotton growing has again started and initially about 1,000 ha have been grown. The crop condition is encouraging as the boll weevil has not appeared. The Cooperativa Agropecuaria Algodonera del Sur Ltda. of Honduras plans to extend cotton production to 20,000 ha by 2000. For the time being, only Stoneville 453 will be propagated. Cotton planting has been shifted from June sowing to August. In Honduras, Olancho, El Paraíso, Choluteca and Valle could produce up to 800 kg lint/ha at a production cost of not more than US$600/ha. Cotton will replace cereal crops and melons which have been affected by sucking insects in the past few years; melons have been severely damaged by whitefly also. He said that two local ginning factories were available and would be revived.

Colombia

According to Dr. Guillermo Alvarez Alcaraz, low international prices, devaluation of the Colombian peso, unfavorable weather conditions, guerilla activities, non-availability of credit facilities, high cost of production and to some extent illegal infiltration of foreign cotton in the local market are responsible for the downfall of cotton production in Colombia. Now it is planned to revive cotton production and expand the cotton area to 200,000 ha by the year 2000. A number of steps have been taken to meet targets, which include credit facilities on individual basis, reorganization of the cotton sector to meet the needs of farmers more effectively and the establishment of a fund to strengthen cotton research. Cotton production organizations will contribute money to support cotton production research activities. He said that under the current growing conditions, pink bollworm, *Pectinophora gossypiella*, was the most serious pest of cotton in Colombia.

Presenting the results of experiments on the use of growth regulators and defoliants, alone and in combination, on micronaire value, Dr. Alvarez observed that application of Prep at the rate of 1.0, 1.5 and 2.0 liter/ha resulted in a micronaire value of 4.4, 3.9 and 3.8, respectively. Application of growth regulators followed by higher doses of a defoliant further lowered the micronaire value. In order to avoid low micronaire cotton, he advised delaying first picking. But, if 70% of the bolls are already opened, application of defoliants has almost no effect on yield and fiber quality. He concluded that because the summer is dry and hot in Colombia,

application of growth regulators and defoliants, individually or in combination, showed no significant effect on boll opening and lint yield. He said that Colombia was developing a variety which will be least affected by variation in temperatures at the time of opening.

According to Dr. Angel Mendoza-Olivella, cotton research has been reorganized in Colombia at least three times, the latest revision being in 1993 when Corporación Colombiana de Investigación Agropecuaria (CORPOICA) was formed from within the Instituto Colombiano Agropecuario (ICA). However, research priorities have not changed. Any variety imported into Colombia has to go through extensive testing before it is recommended for adoption by growers. Colombia continues to encourage growing local varieties which are developed through pedigree selection methods and pass through extensive testing before release. He said that their latest search was for varieties which were consistent in performance over the years.

USA

Mr. Tom Plato and Mr. Jorge González of Plato Industries, Inc. presented a paper on the use of the ''Boll Weevil Attract and Control Tube—BWACT.'' The BWACT is an improvement over the ''bait stick,'' with modified attraction and control technology. Dr. Barbosa of the FAO, referring to the data from College Station, Texas, disagreed with Mr. Plato that BWACT can be used as an effective tool to control the boll weevil. He was supported by Dr. Braga of Brazil. Mr. Plato agreed that the performance of BWACT has been different under different situations, even within the USA, and said that they too had observed that BWACT is not effective in countries like El Salvador and Mexico and that there were almost neutral results in Texas and Oklahoma. In other areas like the Mid-South cotton growing region of the USA, Brazil and Colombia, BWACT has proved to be a very useful tool in controlling the boll weevil. But, BWACT has shown its most promising results in Nicaragua, he said. Mr. González presented the data on Table 5 to show that utilization of BWACT has proved a very economical option in Nicaragua.

Mr. Plato said that these results were one of the reasons that BWACT was used on over 95% of the total cotton area in Nicaragua in 1995. Cost benefit ratio of BWACT use is 1:5.8-13.2, depending upon the level of boll weevil population/infestation during a particular year.

FAO

Table 5
Effect of BWACT on Cotton in Nicaragua

Item	1991	1992	1993	1994	1995
No. of applications/season/ha	20.0	16.6	10.0	5.8	4.7
% application against BW	95.0	90.0	70.0	43.0	39.5
Cost of BW insecticides/ha	396.0	219.0	121.0	58.0	54.0
% of total cost for BW control	66.0	49.0	31.0	21.0	15.6

Dr. Theodor Friedrich talked about the importance of the equipment used in plant protection operations. Many problems usually related to the use of insecticides have emerged because of defective spraying equipment. The quality of equipment currently being used in spraying is very low and repair facilities are even worse. Management of equipment in general and droplet size in particular are the most important components of pesticide application technology. Pesticide use is not a long term solution to insect problem but as long as it is carried out it should be managed in an appropriate and recommended way. The FAO has undertaken a campaign to emphasize to governments, cotton sector organizations and also equipment operators the need for proper management of spraying equipment. In this regard, the FAO has already organized two international training workshops in the recent past. The FAO is considering developing a norm/parameters for the purchase of spraying equipment. Dr. Friedrich did not recommend aerial spraying for cotton and suggested using a fleet of tractors, if possible.

ICAC

Dr. M. Rafiq Chaudhry compared cost of production of cotton among countries in the region. He compared the cost of individual inputs: seed, fertilizers, herbicides, weeding, insecticides, irrigation and all other operations that followed, and concluded that it is most expensive to produce a kilogram of lint in Colombia, Brazil, Ecuador and Paraguay. Production of a kilogram of lint costs 93-97 cents and 81 cents in Argentina and Nicaragua respectively, the lowest in the region. His paper is available from the ICAC Secretariat.

Field Trip

The one-day field trip included visits to a small farmer's field growing 8.4 ha of organic cotton and to a larger plot of conventional production. In Nicaragua, about 140 hectares of organic cotton are grown under the technical advice of FUNDA staff. Ing. Julio Bustillo informed participants that the local variety CEA-21-280 had been grown at a plant to plant distance of 25-30 cm keeping the total population at about 38,600 plants per hectare. The crop was in good condition because of enough rain. Activities of lady beetles and *Seimus* spp. could be easily noticed and stink bug-damaged bolls could still be seen in the field. Organic fertilizer had been added to maintain soil fertility. In order to control insects, the crop had been sprayed five times with different materials. Fifty-one days after planting, ground garlic and chili pepper was sprayed with water depending upon insect population. Later, three sprays at 63, 71 and 82 days after planting included sulphur and soap, alone or in a mixture. An extract from the wild tropical plant *Reteveria alliasa*, locally called ''zorrillo,'' whose roots have a great potential as a pesticide and smell like insecticide, was used to control the insects. The economics of organic cotton production as explained by Ing. Bustillo are shown on Table 6.

It was estimated from current crop conditions that on the average 480 kg of lint/ha will be harvested. Ing. Bustillo further explained the net profit/ha on Table 7.

Table 6
Cost of Production of Organic Cotton in Nicaragua

Operation	US$/ha
Soil preparation	46.7
Thinning	8.3
Fertilizers	9.2
Weed control	73.3
Pest control	28.9
Technical assistance	27.4
Harvesting	55.0
Others	47.7
Total	**296.5**

The field trip also included a visit to Mr. Ramiro Saborío-Galo's farm near Leon. A block of 105 ha, DPL varieties on 94 ha and other varieties on 11 ha, were being grown under high input conditions. The crop planted between July 24-26 had been three times treated with pre and post emergence herbicides. Up to November 15 when the crop was at peak boll formation stage, 156 kg/ha of nitrogen and 35 kg/ha of potassium had been applied in addition to three foliar applications of nitrogen. The crop had been sprayed six times and at least three sprays were targeted to control the boll weevil. It was anticipated that until the crop matures it will be sprayed five more times. The estimated yield was about 880 kg lint/ha.

At the end of the meeting on November 17, 1995, there was a short visit to a farm managed by Dr. Mario A. Vaughan, the newly elected President of ALIDA. Dr. Vaughan had grown 53 ha of cotton without insecticides at about 20 kilometers from Managua. All cotton had been inter-cropped with soybeans and corn in a configuration of 12 rows of cotton and six rows of either corn or soybean or their mixture. It is not claimed to be organic cotton because normal doses of fertilizers had been added. With only one spray of 1-2% soap solution, the crop looked in good shape. About 40% bolls had already opened but at crop maturity stage it was heavily attacked by the cotton leaf worm *Alabama argillacea*, so much so that it looked as if some fields had been defoliated. It was anticipated that average lint yield would be around 450 kg/ha as against 530 kg/ha in that area under normal production practices. The visit surprised many researchers and proved that the pest problem in Nicaragua is manageable through production practices.

Table 7
Organic Cotton Net Profit/ha

	US$
Estimated price per kg of lint	2.30
Gross income/ha	480X2.3 = 1104.0
Certification and marketing costs (@ 20%)	221.0
Cost of production/ha	296.5
Net income for self cultivation/ha	586.5

Important Actions of the Meeting

- The Sixth ALIDA Meeting will be held either in Bolivia or Paraguay. Bolivia will inform the new president of ALIDA within one month if they will be able to host the next meeting. If not, an invitation will be extended to Paraguay.
- There will be no central theme for the Sixth ALIDA to be held at the end of 1997 or early 1998, in order to attract a larger number of participants. All important disciplines will be covered and one day will be devoted to each discipline.
- Funding of ALIDA activities was discussed. The need for a regular budget was presented by the outgoing President. Efforts will be made to publish the ALIDA newsletter on a regular basis.
- On a proposal made by Mr. Irving Guerrero-Monter of FUNDA, Dr. Mario A. Vaughan was elected as the new President of ALIDA. His complete address is as follows:

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- It was decided to appoint a National Coordinator of ALIDA in each country. Names of national coordinators are as follows:

National Coordinators

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Brazil	Dr. Raymundo Braga-Sobrinho (for address see list of participants)
Colombia	Dr. Guillermo Alvarez-Alcaraz (for address see list of participants)
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Country	Name and Address
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