



**PAN AMERICAN HEALTH ORGANIZATION**  
*Pan American Sanitary Bureau, Regional Office of the*  
**WORLD HEALTH ORGANIZATION**



***PAN AMERICAN FOOT-AND-MOUTH DISEASE CENTER***

**SITUATION OF THE  
FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS  
SOUTH AMERICA, 1998**



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**May 1999**

## **1. SITUATION OF THE FOOT-AND-MOUTH DISEASE ERADICATION PROGRAMS IN SOUTH AMERICA, 1998**

The situation of the foot-and-mouth disease programs in South America must be assessed in the light of events in the world and regional scenarios with regard to agricultural and livestock productivity, international trade in animal products, and the availability of food for human consumption. All of this ought to be viewed in the context of the agreements underwritten by the countries in the World Trade Organization (WTO) concerning the application of plant and animal health measures, the economic, commercial and trade integration blocks, and the political policies prevalent in the public-health sector.

The animal-health problems, like foot-and-mouth disease, caused serious commercial and trade setbacks among the countries of the region, considering that within the current world economic order, the economies of those countries having strong primary sectors saw themselves considerably harmed. This was especially so when health risks of that type affected their plant and animal productivity, raised health barriers that restricted free access to international markets and, above all, impacted on the availability of food for their human populations.

The elimination of foot-and-mouth disease in the Americas was of utmost importance, at the moment in which the world recorded a trend toward higher grain prices, a situation that will probably persist on the horizon over the next few years. Likewise, subsidies to agricultural and livestock production were reduced in the developed countries, a fact which will push up the real costs of producing animal-origin foods in those countries. For the South American countries, whose production was almost exclusively carried out on prairies and meadows, this brings a comparatively important advantage.

Moreover, the size of the cattle herd declined in North America and Europe, while meat production stabilized in the developed countries and the countries of Asia's emerging economies joined the ranks of the meat-consuming market. Consequently, the eradication of foot-and-mouth disease was of singular importance; its presence in the South American countries was a factor that limited their access to international markets and thus affected the price of their products.

The Hemispheric Plan for Foot-and-Mouth Disease Eradication (PHEFA) got underway at the end of the 80's and coped with the overall situation by applying strategies targeted on structural factors. Among its main pillars, the Plan fostered social mobilization by incorporating community participation, thereby creating in the livestock-production sector a mode of zonal and local organization that proved to be of great present and future usefulness in veterinary health attention. The Plan also bred the use of the characterization of both the production systems and the disease ecosystems in designing the health strategies that support the countries' programs.

Among PHEFA's achievements, it can proudly be affirmed that by the end of 1998, there was no more foot-and-mouth disease in Argentina, Chile, Paraguay or Uruguay, or in Brazil's southern zone comprising the states of Rio Grande do Sul and Santa Catarina.

In accordance with the terms of the Animal and Plant Health Code set by the International Office of Epizootics (OIE), Chile and Uruguay were recognized as free without vaccination, while Argentina, Paraguay and Brazil's states of Rio Grande do Sul and Santa Catarina were classified as free with vaccination.

On the other hand, Brazil's central states reflected that effort and recorded clinical absence of the disease for more than two years in the states of Espirito Santo, Goiás, Mato Grosso, Minas Gerais, São Paulo and the Federal District.

In the countries composing the Andean Area, the presence of vesicular stomatitis, plus the difficulties of obtaining a laboratory diagnosis in all the reported cases, clouded a clear perception of the situation. Nevertheless, on the whole, those diseases remained stable and posted a low level of incidence.

In those Andean Area countries that updated their programs and made evident progress in the organization of those programs, that situation began to bear fruit, as reflected in the coverage of the action developed. The tendency was to consolidate the local level in order to increase community and inter-sectorial participation, thereby providing new space for discussions and conclusions leading to unified interaction to improve the effectiveness of the programs' decisions and activities.

The inclusion of Bolivia within the River Plate Basin Project, because of its geographic location, the characteristics of its production systems and their interrelationship with the systems of Argentina, Brazil, Paraguay and Peru, was of vital importance in achieving the objectives of the Southern Cone and Andean sub-regions.

The zonal projects developed on the Colombia-Venezuela border —Atlantic Coast of Colombia-Lake Maracaibo Basin and Colombian-Venezuelan Plains— achieved a mutual coordination and cooperation that led to maintaining the epidemiological surveillance in the zone, an important increase of vaccination coverage in unified periods of time, and the strengthening of the veterinary attention system in the field.

## **1.1. SOUTHERN CONE**

### **Argentina**

Preserved its position as a country free of foot-and-mouth disease with vaccination, as acknowledged at the 65<sup>th</sup> General Session of the OIE.

Vaccination against foot-and-mouth disease will be stopped throughout Argentina after 30 April 1999, by Presidential Decree number 1324.

A prevention plan based on an epidemiological surveillance system has been implemented in order to reduce the risk of foot-and-mouth disease reintroduction, and an emergency plan is in place and ready to be activated in the case of suspicions or confirmation of occurrences. On the other hand, bio-safety standards were also revised and updated. The capability now exists of conducting diagnostic tests like EITB and ELISA 3ABC, based on non-structural antigens, to support the epidemiological surveillance.

## **Brazil**

In accordance with the terms of the international animal health code, the 66<sup>th</sup> General Session of the OIE, held in 1998, approved and recognized the states of Rio Grande do Sul and Santa Catarina as a zone free with vaccination.

With the purpose of maintaining the described condition, a survey of foot-and-mouth disease viral activity was conducted in the area. VIA-IDGA diagnostic tests like screening and EITB were utilized to eliminate false positives. The results evidenced the absence of viral activity. 86 properties were tested following the alleged suspicion of vesicular disease cases. In Santa Catarina, Indiana type vesicular stomatitis virus was diagnosed in 16 of the 83 reports received within the jurisdiction. The epidemiological surveillance system had to activate the emergency systems, which made this activity more costly.

In view of the health situation achieved in this region of the country, the resolution passed by the Ministry of Agriculture and Food Supplies to create the International Plant and Animal Surveillance Program was of major importance. The program encompasses the plant and animal surveillance posts and services linked to the federal agriculture delegations at State level assigned to oversee points of entry at airports, ports, and border stations. Its active and functioning coordination commission of the southern livestock-production circuit, under the direction of the Director of the Animal Defense Department, is composed of representatives from the official services and the private sector who are members of that circuit.

A plan to study and characterize the behavior of vesicular stomatitis and review the present strategies for controlling the disease in this jurisdiction is being developed.

## **Chile**

The foot-and-mouth disease prevention program is included in the exotic diseases epidemiological surveillance project Chile maintains the country's free condition achieved in 1981.

This program rests on the following bases:

- *characterization and surveillance of risky places and events*: buildings that house animals on borders, quarantines, international barriers, waste and garbage dumps, feeding garbage and offals to animals, genetic animals imported, diagnostic and research laboratories, illegal entry of animals, products and biologicals;
- *early detection plan*: monitoring of animal populations in risk areas, attention to reports and suspicions of the disease, and
- *emergency plan*: health alert plan, emergency control and eradication plan.

The border control of animals in 1998 detected 11 illegal attempts to enter the country. In compliance with existing health policies, all the illegal animals were sacrificed.

The health policy governing importations was one of *controlled risk*, which implies the determination of the risk of introduction of diseases associated with the entry of livestock or animal-related goods and merchandise. In some cases a quantitative risk analysis was conducted.

The country maintained 69 international border control posts with adequate infrastructure and trained personnel.

## **Paraguay**

No episodes of foot-and-mouth disease have been reported since September, 1994. Based on that achievement, the OIE in May 1997 recognized Paraguay as a country free with vaccination upon complying with the requirements set forth in the animal health code.

On-going serological monitoring was maintained to detect eventual foot-and-mouth disease virus activity, utilizing the cattle that entered cattle for auctions and shows and also the sera forwarded to the laboratories for other purposes. In 1998, a total of 11,829 blood samples collected on 197 properties were analyzed; 171 proved positive to the EITB test (1.44%). Using this information, an epidemiological tracking based on serology was conducted. The results of those studies were then utilized to determine the action to be taken at those properties, such as official vaccinations, control of exiting animals, and follow-up serology.

On the other hand, an active surveillance system with veterinary inspection has been implemented at packing houses and slaughter houses, in order to collect samples from bovine tongues and hooves suspected of having vesicular disease sequelae. Also, all the information on the origin of such animals is likewise collected for a retrospective study conducted in the field.

Paraguay was incorporated into the River Plate Basin regional information system, the continental vesicular diseases epidemiological surveillance system of the Pan-American

Foot-and-Mouth Disease Center (PANAFTOSA), and the world system of the International Office of Epizootics (OIE).

45 notifications of suspicions of foot-and-mouth disease were checked. The respective blood samples, collected and processed at the laboratory, yielded negative results. 73.3% of the notifications were made by the ranchers and producers themselves, 6% by third parties, and 20.7% by the official services.

The average time elapsed between the notifications of the outbreaks and the first visit to the property, as well as between the processing of the sample and the lab results, was 24 hours.

Blood samples were taken on all the visits to suspicions of disease. VIA and/or EITB tests were conducted and, when negative results were yielded, the samples were submitted to differential diagnosis.

Vaccination was conducted in 45-day periods, but another 15 days were allowed to notify the proper authorities that the vaccination had been done. Personnel of the National Animal Health Service (SENACSA) provided the direct supervision of the vaccination. Also regarded as supervised are the vaccinations conducted by authorized persons and animal-health commissions

The strategic vaccination plans led to the following vaccine coverage rates: Eastern Region, 5,407,875 doses (89%), and Western Region, 2,331,782 doses (86%).

An interdisciplinary committee composed of technical personnel from the SENACSA and the Under-Secretariat of Livestock Production was formed and, is in charge of analyzing the import requests, in conformity with the OIE animal-health code and the manual of procedures for the importation of animals and animal-origin products and by-products from the MERCOSUR.

Paraguay conducted a Workshop on the Quantitative Analysis of Risks to Strengthen its Systems to Prevent Foot-and-Mouth and Other Exotic Diseases. Concomitantly, the inspection services at airports and ports were strengthened with incinerators and teams and equipment to detect organic material.

Epidemiological surveillance and foot-and-mouth disease prevention measures were activated in the zones bordering Bolivia and Brazil.

## **Uruguay**

Maintains its condition as a country free of foot-and-mouth disease recognized by the OIE in 1996. Uruguay has set up a national animal-health emergency system that is activated in emergency situations. Every notification of disease suspicion with symptoms that might be confused with foot-and-mouth disease was promptly checked and the

suspicion was regarded as being foot-and-mouth disease until the contrary was determined by means of the appropriate epidemiological, clinical, anatomo-pathological and laboratory studies.

Uruguay's national epidemiological information and surveillance system features an organization that permanently follows and assesses all the changes that may affect or do affect animal health. The system thus monitors the animal-health situation by following internal factors inside the country and evaluates the world situation by assessing external factors outside the country. Its source of in-country information is based on the official veterinary services that act in coordination with the private sector and other official structures.

The system of epidemiological surveillance oriented toward the external situation is based on the reception, analysis, processing and distribution of the information received in the country from the following sources:

- Plate Basin Project (weekly, monthly, and immediately)
- Continental information on vesicular diseases, from PANAFTOSA
- Information generated by the OIE
- Bilateral reports from countries with which it has commercial ties
- Reports from the nation's embassies, via the Ministry of Foreign Relations
- Public reports taken from the press, oral, printed or televised
- Internet

Uruguay processed 10,500 sera by means of the ELISA technique; no positive reaction was found in animals under three years of age.

Nine properties were visited in response to the suspicion of vesicular disease: diagnosis indicated that three were affected by viral bovine diarrhea, one by infectious bovine rhinotracheitis, and one by infectious pododermatitis.

The specific objective envisioned by the Hemispheric Plan for the Southern Cone sub-region was to keep it free of foot-and-mouth disease, focusing on some lines of action in conformity with the situation achieved:

- maintain in full operation a program for prevention of foot-and-mouth disease and other exotic diseases;
- prioritize the existence of surveillance systems active and sensitive to foot-and-mouth disease and other exotic diseases, by maintaining or creating local animal-health committees with social participation; and, likewise, fostering the possibility of identifying the priority attention needed in the livestock-raising sector; and emphasizing the utilization of information at the local level;



- consolidate the use of molecular biology techniques to characterize viral strains with great precision and to identify infected animals regardless of their vaccination status, by means of the ELISA- 2ABC/EITB system;
- conduct seminars on the methodology for epidemiological characterization of the risks of introducing and/or spreading foot-and-mouth disease and other exotic diseases;
- make known and circulate the content of prevention and emergency plans, keeping them updated and in good legal standing;
- implement periodic workshops with the participation of producers, private veterinarians and other social actors related to livestock raising, for the purpose of encouraging the prompt notification of any sign or symptom that may be regarded as foot-and-mouth disease; and
- plan vesicular stomatitis research that addresses the characterization of its epidemiological behavior, diagnosis and immunization, preferably in cooperation with other countries and with the technical collaboration of international agencies.

## **1.2. ANDEAN AREA**

### **Bolivia**

The foot-and-mouth disease eradication project was totally updated with the technical and financial support of the FONPLATA and the PANAFOSA/WHO. Concomitantly, a review was made of the present and future role to be played in its implementation by the public and private actors, and the international cooperation agencies. The Santa Cruz de la Sierra Agreement led by the region's Livestock Raisers Federation and the Governor's office of the department was consolidated and strengthened.

With respect to epidemiological surveillance, 50 seminars and courses were held for veterinarians, cattlemen, mid-level technical personnel and non-governmental organizations. This system of information was implemented through 180 information-gathering units located in all the departments.

Regarding the number of weeks reported with the presence of foot-and-mouth disease, as indicated in the grid squares of the continental vesicular diseases epidemiological surveillance system, 13 grid squares showed a low frequency (1 to 7 weeks of presence) and only one grid square indicated a middle range frequency (8 to 15 weeks of presence).

Visits were made to 29 properties that reported suspicion of foot-and-mouth disease. The largest presence was plotted in Santa Cruz (16) and Beni/Pando (12). The results of the laboratory diagnoses revealed foot-and-mouth disease virus type O (1) and type A (6).

Bolivia declared the existence of 6,041,393 cattle and the utilization of 1,430,717 doses of vaccine. Vaccination was conducted in a random and unsystematic fashion, and did not take place twice a year.

In comparison with 1997, a slight decline was noticed in the grid squares and in the number of properties affected. Nevertheless, no progress was observed in setting up an effective organization, preferably local committees that would foster increased vaccination coverage, implement strict control of livestock transit and provide a system of timely attention in the field, for the suspected outbreaks. All of those elements are basic components of a program to cover the first stage of eradication, which was to eliminate endemism or sporadic presence.

Attention is drawn to the need to review the vaccination strategy and to set priorities (the primary endemic zones) in accordance with the available resources. Also, the program's legal framework must be updated in order to benefit from greater institutional support. When coupled with increased social and community participation, this will enable the desired goals to be obtained.

## **Colombia**

With the momentum derived from the integration of the Colombian Agriculture and Livestock Institute (ICA), the National Federation of Livestock Producers of Colombia and the United States Department of Agriculture (USDA), the eradication program was consolidated. Through the National Livestock Fund, the livestock-producing sector maintained financial inputs that, coupled with the official budget and USDA cooperation, provided the financial support commensurate with the goals established by the program.

The modality of setting up local projects was transformed into a working strategy, achieving a large component of social participation and efficiency in the activities accomplished. But that type of effort must be constantly evaluated in order to optimize its functioning and extend the experience until it covers the entire country.

Thanks to the modality adopted in the program's administration, vaccination records show an increase in comparison to 1997 (49.7%, compared to 76% in 1998) for the entire nation. It is worth highlighting the Atlantic Coast (106%), Plains (80.6%) and South Central (72.5%) sub-projects. In the case of the Atlantic Coast, the ledgers should be verified and/or it should be remembered that there are livestock-fattening systems that cause a high turnover of the bovine population.

In 1998, the country posted the presence of vesicular disease outbreaks and observed an increase in recent years. 1080 outbreaks were reported, with the largest number

of occurrences in the area of the Atlantic Coast Subproject (397 outbreaks), on the Colombian-Ecuadorian Border (154), East Center (289) and West Center (134).

Nevertheless, if taken individually, vesicular disease predominated (480 outbreaks) over foot-and-mouth disease (103 cases). During the period in review, 75% of the foot-and-mouth disease episodes were concentrated on the border between Colombia and Ecuador, a region that posted a 100% increase in the number of occurrences, when compared to 1997.

Priority was given to the Atlantic Coast Subproject, resulting in high vaccine coverages and in a 71.4% drop in episodes, in comparison with 1997. Of substantial importance was the episode identified in Sucre, which activated the Emergency System and brought the stamping - out policy into play.

Colombia revised and strengthened the diagnostic attention systems, incorporated new techniques for the viral study of foot-and-mouth disease in its genetic and antigenic diversity, and established non-structural antigen tests like EITB and ELISA 3ABC.

The veterinary attention systems' increased coverage in the field was of significant importance for Colombia, to prevent secondary episodes and to maintain the rise in periodic and systematic vaccinations in order to eliminate endemism. Also important was the characterization of the behavior of vesicular stomatitis in investigating the impact of utilizing vaccine to fight it. On the other hand, the Colombia-Ecuador zonal subproject ought to be subjected to a review of its strategy and its tactical and operational systems, due to the high presence of the disease currently being recorded in the area of that subproject.

## **Ecuador**

The foot-and-mouth disease eradication project in Ecuador receives support through the cooperation agreement involving the Ecuadorian Agriculture and Livestock Health Service, the Federation of Livestock Raisers of Ecuador and the PAHO/WHO. Additionally, further support is provided from the National Commission for the Eradication of Foot-and-Mouth Disease, composed of private and official representatives.

Several of the program's major activities are: review and implementation of the epidemiological surveillance system; design for investigation of the degree of foot-and-mouth disease viral activity at the slaughterhouse; systematization of the mechanisms of follow-up and evaluation of the execution of the project. The usefulness of the Conventions of the Local Committees ought to be stressed as a mechanism to instruct, revise health strategies, promote and assess the development and results of the project's implementation.

The system of accrediting private professional personnel and the participation of the livestock raisers themselves enabled Ecuador to set up 129 local committees which, added to the 53 units operated by the official service, yielded the infrastructure needed to implement the Project.

In 1998 vesicular diseases clinically affected 230 herds, distributed throughout the country with the exception of the Island Province of Galápagos, which recovered the disease-free status it had originally attained in 1997. The episodes increased some 26% over the total in 1997.

Of the total number of vesicular episodes recorded, blood samples were taken from 61% (141 cases) for diagnosis. In 98 cases (69%), examinations yielded positive results, of which 81 (83%) indicated foot-and-mouth disease and 15 (15%) vesicular stomatitis. With respect to foot-and-mouth disease, 67 herds were affected by virus type O, 14 by virus type A. For vesicular stomatitis, 14 were attributed to New Jersey virus and one to Indiana virus. There were also diagnoses of infectious bovine rhinotracheitis.

The Colombia-Ecuador border subproject, one of the three that make up the Foot-and-Mouth Disease Eradication Project, recorded comparatively the highest number of vesicular occurrences 74 (32%) and, especially, of virus type O foot-and-mouth disease (34% of the country's total diagnoses), the same as observed on the Colombian side of the border. That situation produced the taking of coordinated action by the two countries, with technical support from the PANAFTOSA/PAHO and from the APHIS/USDA. Measures included the prohibition of animal mobilization, suspension of auctions and cattle shows, and perifocal vaccinations, among others.

The health condition of the Ecuador-Peru border subproject has apparently deteriorated in comparison with 1997, when no herds were reported affected by vesicular diseases; but 15 episodes were recorded in 1998. The Ecuador-Coast subproject notified 37 properties with clinical diagnosis, of which 9 were diagnoses of foot-and-mouth disease and 1 of vesicular stomatitis.

The rest of the country showed the highest number of properties affected by vesicular diseases, with 104 episodes that exceeded the 1997 total of 72 cases; laboratory diagnoses yielded 37 positive results of foot-and-mouth disease and 7 of vesicular stomatitis.

Vaccination was conducted mainly by administering a single dose (1,593,751) and, on a smaller scale, two doses (341,518).

In the process of eradication, the first stage was the elimination of the disease's endemism or occasional presence. Of primordial importance in that stage were the high vaccination coverage and early control of outbreaks in order to prevent spreading by the appearance of secondary outbreaks. In this regard, Ecuador revised the tactical and operational strategy and mechanisms of vaccination, and the work to establish timely sanitary attention in the field, for the control of the episodes of vesicular diseases. The observation made to Colombia about the component of the Colombia-Ecuador zonal subproject was valid.

## **Peru**

A Project of a High Decree for the Regulation on Foot-and-Mouth Disease Control and Eradication was drafted and submitted for consideration, to provide an updated legal basis for the country's existing program. Meanwhile, the National Agriculture Health Service is preparing a review of the organization and procedures of the animal-health surveillance system.

In 1998 the record of vesicular-diseases occurrences indicated a considerable drop in relation to the preceding years, and, for the first time in the last 10 years there was no positive diagnosis of foot-and-mouth disease. Again, the number of vesicular stomatitis diagnoses (15) was proportionally the same predominance in relation to the total episodes of vesicular diseases (18) recorded in 1998.

The country's report indicated a low foot-and-mouth disease vaccination coverage at the national level, where the application of a single dose per year is predominant.

The setting up of 352 local animal-health committees indicated the work that is underway to create a new support infrastructure for development of that important level in the structure of the program's overall organization.

The available information enables analysts to infer that the revision of the program's strategy was timely, built on the characterization of the production systems, on studies of the history of the disease and on sero-epidemiological surveys, to orient the activities of vaccination, epidemiological surveillance and transit control, as well as the joint programs in the border regions.

## **Venezuela**

The Autonomous Agriculture and Livestock Health Service (SASA) continued its efforts to consolidate the functioning of a national commission, 19 state commissions and 91 local committees, for the implementation of its foot-and-mouth disease eradication program. The program proceeds in a first stage to eliminate the clinical presence of the disease, its priority actions seeking to reach high levels of vaccination coverage and early control on the properties where the disease first occurs in order to prevent its spreading.

The Official Record nr 5757 dated 31 August 1998 contains a Ministerial Resolution that updated the legal framework of the foot-and-mouth disease eradication program in Venezuela. The state governments provided political and financial support and also promulgated decrees that supported the activities established by the official service.

Massive, systematic vaccination periods were predetermined throughout the country, and those vaccinations were scheduled, executed and evaluated mostly by local committees coordinated by the SASA. The impact of that activity drew considerable attention, and the highest rates of coverage reached were in states whose characterization

indicated a primordial component of primary ecosystems. The national vaccination coverage was 61,64%; however, other states also reached important rates of coverage, like Portuguesa (81.04%), Táchira (66.6%), Barinas (65.1%), and Trujillo (62%). Although 1998 was the first year in which systematic periodic vaccination was implemented, the result was encouraging.

The number of properties checked for suspicion of foot-and-mouth disease (184 cases) in 1998 was three times higher than in the five previous years (52, 67, 78, 70 and 71 cases). With particular respect to the federal entities, the states that recorded a greater occurrence of vesicular diseases were Zulia (69), Mérida (121), Monagas (15), Táchira(15), Trujillo (15) and Bolívar (14). Laboratory diagnoses identified 17 cases of foot-and-mouth disease virus type A, 34 episodes of New Jersey vesicular stomatitis and 4 cases of Indiana virus.

The state of Bolívar posted four years without any record of the occurrence of foot-and-mouth disease. A serological survey conducted in 1996 yielded results which led analysts to infer the absence of foot-and-mouth disease viral activity. However, the introduction of cattle from the state of Monagas provoked an outbreak of foot-and-mouth disease.

Semi-annual evaluations were conducted by the regional commissions in order to be continuously cognizant of the progress of the vaccination periods. Those evaluations benefited from the participation of livestock producers, governments, vaccine importing or producing laboratories, animal and plant research institutes, veterinary sciences schools, the Federation of Colleges of Veterinary Doctors, and the official services.

That program directed its efforts to achieving better vaccine coverage and strengthening health attention in the field in order to control animal transit and the occurrence of vesicular diseases in a timely fashion. The characterization of vesicular stomatitis and the study of the impact of the use of the vaccine against that disease should be considered by the Ministry of Agriculture and Livestock as a future strategy.

In the Andean Area, in accordance with the degree of progress of its programs, efforts remained focused on the specific goal of creating new areas free of foot-and-mouth disease while protecting and expanding the already existing free areas, and reducing the frequency of occurrence in the areas still affected. With their degree of progress in mind, the programs' operating plans will focus on actions to:

- consolidate the participation of the producers, professional entities and associations, and private and official institutions related to the sector;
- give priority to constituting and/or implementing local committees as program implementation and evaluation cells;
- train service professionals in how to promote the program, make agreements and obtain the support of institutions and make known the achievements of an eradication program;
- increase the training of personnel for in-the-field activities for attention to foot-and-mouth disease outbreaks;

- revamp the existing epidemiological surveillance system in order to direct it toward acquiring the sensitivity needed to detect and register the presence of vesicular diseases, based on broad community participation at the local level;
- utilize the existing border agreements among the countries of the subregion as support instruments in conducting the zonal subprojects that are part of the subregional foot-and-mouth disease eradication program;
- utilize the indicators proposed by PANAFTOSA to evaluate the zonal projects in the evaluation of the national programs, and incorporate them into the COSALFA reports, to engender a better evaluation of the health strategies in the epidemiological surveillance system; this is of vital importance in eliminating the disease endemism and preserving the advances already achieved in the existing plan;
- update the vaccination strategy in accordance with the particular epidemiological characteristics of each area, thus rendering this activity more efficient;
- encourage research on the genetic relationships between field and vaccine strains, and correlate the genetic changes with the vaccines' degree of protection;
- develop research work on the mechanisms of transmission of vesicular stomatitis, on its diagnosis and on the utilization of vaccines, preferably in coordination with countries and with the cooperation of international agencies in the sector;
- strengthen the utilization of the indirect potency tests in the control of foot-and-mouth disease vaccine, and
- give full attention to the areas of small producers, seeking to strengthen the weak points identified in the characterization of their production system and to introduce health practices in accordance with the program's purpose.

### **1.3. AMAZON BASIN, NON-AMAZONIAN BRAZIL AND GUIANAS**

#### **Amazon Basin**

This area encompasses the department of Pando in Bolivia; the states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima and part of Tocantins in Brazil; the departments of Amazonas, Guainía, and Vaúpes in Colombia; departments of Loreto and Madre de Dios in Perú; the states of Bolívar and Amazonas, in Venezuela; and the countries of Guyana, French Guiana and Suriname.

In the Amazon Basin of Brazil 28 properties were reported affected by vesicular diseases; the laboratory diagnoses in Acre yielded two virus type O and, in Roraima, one each of virus type A and type O.

The Venezuelan component of the subproject the record posted 14 episodes, Bolívar with 13 and Amazonas with 1. Laboratory tests yielded two virus type A and 4 New Jersey

virus. With respect to the federal divisions in Colombia and Peru, no report was made of the presence of vesicular diseases.

### **Non-Amazonian Brazil**

346 cases of vesicular diseases were reported in 1998 in this region, a slight increase in comparison with 1996 (188) and 1997 (192), but still considerably less than the more than 1000 cases reported annually from 1992 to 1995.

The decline in the occurrence of vesicular diseases was noticed in all the livestock producing circuits except in the southern circuit. Of the total number of episodes, 10 were notified as foot-and-mouth disease. The remaining notifications involved vesicular stomatitis (mainly in equines), viral bovine diarrhea associated with infectious bovine rhinotracheitis, intoxications and traumatisms.

The states in which foot-and-mouth disease was not reported, together with the last reported date of occurrence, are: Bahia (May, 1997), Federal District (May, 1993), Espírito Santo (April 1996), Goiás (August, 1995), Mato Grosso (June, 1996), Minas Gerais (May, 1996), Paraná (May, 1995), São Paulo (March, 1996), Rio de Janeiro, (March, 1997), Sergipe (September, 1995) and Tocantins (May, 1997).

Special attention is called to the fact that Paraná reported 132 episodes of Indiana type II vesicular stomatitis, as well as to the appearance in January-February of two episodes of foot-and-mouth disease virus type O in Mato Grosso do Sul, where 2691 bovines, 14 pigs and 64 sheep were sacrificed. That state had not reported any occurrence of the disease for more than two years. The proper actions to eradicate the outbreaks were promptly taken by the animal health authorities.

In the light of the progress being made in the Amazon Basin and Non-Amazonian Brazil zones, it was recommended that in the east and central-west circuits, emphasis be put on increasing the awareness of the significance of an eradication process, and that strategies be outlined to impart greater sensitivity to the epidemiological surveillance systems. On the other hand, the behavior of vesicular stomatitis must be characterized for a revision of the animal-health strategies utilized in fighting it.

### **Guianas**

The absence of vesicular diseases was maintained in Guyana, French Guiana and Suriname.

The political desire to implement a joint program in Guyana, the state of Roraima, Brazil, and in the states of Amazonas and Bolívar, in Venezuela, was materialized. To this end, a project was drafted and submitted for consideration for financing from the central and regional governments and international cooperation agencies.



## **2. CONTINENTAL VESICULAR DISEASES INFORMATION AND SURVEILLANCE SYSTEM**

A series of events occurring in South America in recent years have brought new challenges to the epidemiological surveillance systems, ensuing from the progress in the creation of countries and areas free of foot-and-mouth disease, and from the new horizons in the international scope of animal trade. The cornerstone of the creation of free areas has been the regional characterization of the disease's presence in ecosystems, determined in accordance with the special endemism of the agent, through the utilization of the Continental Foot-and-Mouth Disease Epidemiological Surveillance System.

Considering the spatial viewpoint, the historical records of the disease's behavior led to conceptual advances in building and verifying suppositions about the geographic distribution and the differential epidemiological association, in the light of the ecological, productive, and social factors.

Presently, the sub-regions have drawn apart with regard to their varying information needs in terms of quality, content and timeliness. Thus, in the Southern Cone, the needs for information are directed toward preventing the virus' reintroduction into free areas or preventing its spreading when it does occur, or toward feeding the processes of risk analysis intended to facilitate or permit the commercial trade of animal products. This was partially valid for the free areas that Brazil has been projecting in its central-west livestock-producing circuit. In the Andean and Amazonian sub-regions, and in the rest of Brazil, the information gathered is needed to assess and prove the worthiness of the strategies outlined, to measure the disease's endemism, to know the dynamics and tendencies of the populational flows and of the relations of the market of livestock inputs and products, and to identify the risk levels in the different areas. In the free areas comprising the countries of the Caribbean, Central America and North America, information continues to be utilized in fostering the development and/or maintenance of efficient epidemiological surveillance systems for the prevention of foot-and-mouth and other exotic diseases.

Concomitantly with PHEFA's advances, PANAFTOSA has applied new molecular techniques of foot-and-mouth disease virus detection and characterization that have enabled researchers to achieve the exact characterization of the active virus, as well as the epidemiological tracking of the active variants, with the objective of establishing the possible origin of an outbreak. On the other hand, the development of techniques to detect antibodies against antigens indicative of viral replication, in addition to resolving the problem of biosafety, have led to reliable evaluation of the viral activity in the population.

The system based its development and functioning on the field and laboratory structure existing in the national animal-health services. The geographic coverage of the information generated in the field is represented on a grid map according to geographic coordinates, which are numbered to refer to the epidemiological information.

The countries feed weekly and monthly reports into the system and forward vesicular disease samples to the PANAFTOSA reference laboratory. In turn, the system

provides feedback to the countries in the form of weekly, monthly, and annual reports, plus epidemiological alerts or warnings from the border zones or taken from national grid squares that may show a very occasional presence of the vesicular diseases.

## 2.1. INFORMATION COVERAGE

The information coverage is expressed as the number of provincial, state or departmental units sending information to the central national unit divided by the total number of units existing during the epidemiological weeks. An excellent level was maintained in 1998 during the 52 weeks by Bolivia, Colombia, Ecuador and Peru. But this was not true for Brazil and Venezuela, even when it is acknowledged that the latter country improved greatly after the period of the 21<sup>st</sup> to the 30<sup>th</sup> weeks.

### Coverage of the vesicular disease informing units, by weeks and countries, 1998

Weeks Period	Countries					
	<i>Percentage of the Coverage</i>					
	Bolivia	Brazil	Colombia	Ecuador	Peru	Venezuela
01-10	89	26	90	100	100	46
11-20	100	26	91	100	100	56
21-30	100	37	97	100	100	63
31-40	100	44	98	100	100	76
41-52	100	85	97	100	100	83

## 2.2. ATTENTION TO THE EPISODES

Although only two indicators of attention to episodes have been requested, the majority of the countries have not provided this information. Because evaluating the attention to the episodes is fundamental in this stage of the eradication process, the countries should hone the mechanisms of the information system in order to have indicators of the recorded time spans (average duration) of: onset of the episode and its notification, promptness of the attention, collecting the sample and sending it to the laboratory, dispatch of the sample and response from the laboratory, sources of the notification, episodes with collection of samples, episodes with collection of unsuitable material, delivery of the closing report, and list of secondary episodes.

**Percentage of sources of notifications of suspected vesicular diseases out breaks, by countries, 1998**

Country	Source of notification		
	Owners	Third parties	Official service
Bolivia			
Brazil	34.20	23.47	42.31
Colombia*			
Ecuador*			
Peru*			
Paraguay	73.3	6.0	20.7
Venezuela	19.00	31.00	50.00

\* The countries failed to provide information.

**Time elapsed between onset-notification and notification-visit to suspected vesicular diseases out breaks, in days**

Country	Onset-notification	Notification-visit
Bolivia	5	7
Brazil*		
Colombia*		
Ecuador*		
Peru*		0.63
Paraguay	1	-
Venezuela	3	1

\* The countries failed to provide information.

**2.3. TIMELINESS OF THE WEEKLY FLOW FROM THE CENTRAL SURVEILLANCE UNIT TO THE CONTINENTAL SYSTEM**

An improvement in the promptness of the flow of weekly information to the Continental System was observed, when compared to the behavior in 1997. With regard to Brazil and Venezuela, the information continued to arrive late even when better compliance was identified. Ecuador fell farther behind in complying with the promptness required in providing this information.

### Percentage of notifications

Country	Timely 1997-1998	Late 1997-1998
Bolivia	82 100	18 0
Brazil	42 63	58 37
Colombia	90 100	10 0
Ecuador	84 80	16 20
Peru	100 100	00 0
Venezuela	42 57	58 43

#### 2.4. GEOGRAPHIC DISTRIBUTION OF THE RECORD OF WEEKS WITH THE OCCURRENCE OF VESICULAR DISEASES, PRESENCE BY VIRUS TYPE AND COORDINATES

Suspicious of vesicular disease in 1998 were reported in 151 grid squares. The frequency of weeks with disease recorded for each grid square is represented on map 1, in three classes:

- . Low frequency: from 1 to 7 weeks of presence (74.17%);
- . Average frequency: from 8 to 15 weeks of presence (12.58%), and
- . High frequency: over 15 weeks of presence (13.25%).

75% of the grid squares showing more than 15 weeks of presence were recorded in Colombia, and 20% in Ecuador.

The number of grid squares showing the presence of vesicular diseases in the frequency range of 1 to 7 weeks denotes an increase in Venezuela, and in Brazil's central west production circuit, and a decline in the rest of the geography of the countries. In the range of 8 to 15 weeks and over 15 weeks, also in comparison with the 1997 records, there was an increase in the squares showing the appearance of these diseases in Colombia, Ecuador and Venezuela. This latter country emphasized in its report that as the intensiveness of the program increases, its surveillance system has also become more sensitive (see map 1).

Foot-and-mouth disease virus type A showed a greater presence of grid squares in Colombia, Ecuador and Venezuela; in this last country the disease was diagnosed in an area of the state of Bolivar, which had not reported any episode of the virus since 1994. The virus was the most present in Ecuador and also appeared in the state of Roraima (Brazil), an area with very sporadic occurrence (see map 2).

Virus type O of foot-and-mouth disease occurred with greater frequency in Ecuador and attention should be called to its appearance in Mato Grosso do Sul, Brazil, a zone that had reported no episodes of foot-and-mouth disease for more than two years. Its activity in the rest of South America declined (map 3).

Finally, it is timely to mention that FMD virus type C has not been diagnosed in South America since May 1995.

Map 4 shows the distribution of virus types by subtypes.

The number of grid squares showing the appearance of New Jersey vesicular stomatitis virus increased with regard to Colombia, Venezuela and Peru. The frequency in Colombia has remained high over the last five years. The presence of Indiana vesicular stomatitis virus increased in Colombia, Brazil, and in the Southern Livestock Circuit—specifically, Paraná and Santa Catarina—and in the Central-West Livestock Circuit in Mato Grosso (maps 5, 6).

## **2.5. LABORATORY COMPONENT IN THE EPIDEMIOLOGICAL SURVEILLANCE OF VESICULAR DISEASES**

During 1998 the PANAFTOSA molecular biology laboratory continued developing the projects of optimization of diagnostic methods, which included activities oriented toward the application of molecular tools that make it viable to utilize tests to evaluate the level of viral activity and to establish, with high exactitude, the degree of homology among strains.

Work proceeded on the evaluation in cattle of the level of antibodies against replication antigens by means of the EITB test using 1900 and 1500 sera provided, respectively, from regions of Brazil and Venezuela with known epidemiological situations. Also evaluated was the level of antibodies against the recombinant 3ABC protein, by means of the indirect ELISA on 4000 bovine sera from Brazil, Colombia and Venezuela.

In support of the countries' needs, 55,500 nitrocellulose strips containing recombinant antigens were delivered, as well as control and blocking sera for execution of the EITB test in Brazil (13,000), Argentina (5,000), Paraguay (28,000) and Colombia (9,000). Likewise plates sensitized with 3ABC recombinant antigen and other reactives for the execution of 12,000 indirect ELISA tests were sent to the official laboratories of Argentina, Colombia, Paraguay and Venezuela.

South America forwarded 25 samples of vesicular diseases for characterization tests: from Brazil (virus O<sub>1</sub> and Indiana-2); Bolivia (O<sub>1</sub> – A<sub>24</sub>) and Colombia O<sub>1</sub> – A<sub>24</sub>). Costa Rica in Central America sent in 25 samples, which yielded 22 positives to the New Jersey vesicular stomatitis virus.

## **2.6. SURVEILLANCE IN BORDER AREAS**

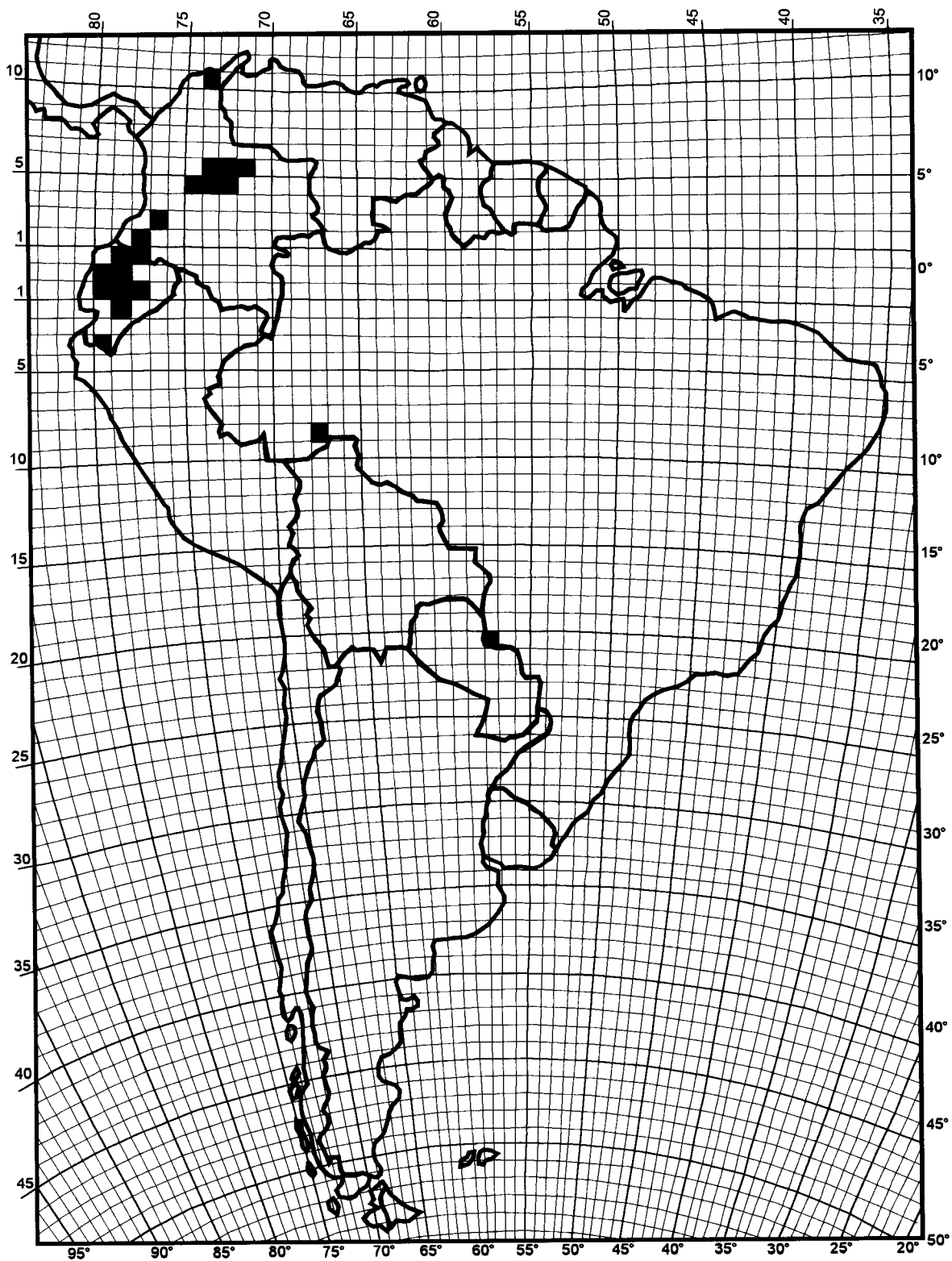
The origin and orientation of the organization of the bilateral animal-health agreements in the South American countries has evolved parallel to the development of the foot-and-mouth disease control programs. Consequently, a tendency currently exists to form subregional agreements like that of the Southern Cone, which has produced substantial success and has led to the consideration of forming one of like organization for the Andean subregion.

The bilateral border agreements have strengthened their action by utilizing information systems on the occurrence of vesicular diseases in the border zones, plus semi-annual or annual evaluation meetings, and the preparation of zonal subprojects for joint execution in the areas within their jurisdictions.

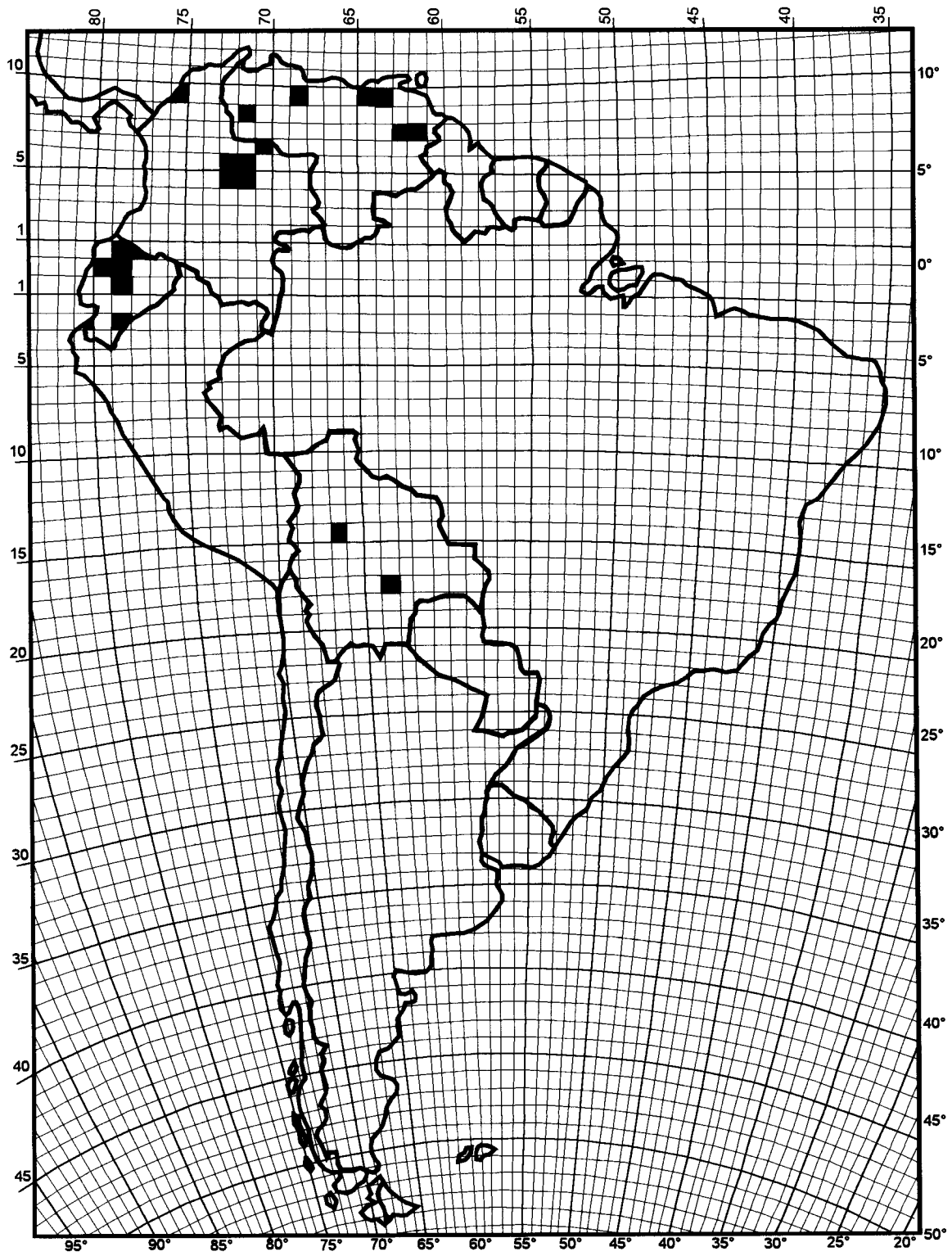
During 1998 the following border agreements held meetings: Colombia-Venezuela, Brazil-Paraguay, Plate Basin, Chile-Peru-Bolivia. Of interest is the fact that Colombia has shown interest in signing agreements with Panama and Peru.

The Andean subregion put into practice a guide of indicators prepared by PANAFTOSA to evaluate the zonal projects, and it has facilitated the tracking and follow-through of the projects by standardize the reports presented at border meetings.

MAP 1. Gridsquares with suspected vesicular disease occurrence, by weeks.  
South America, 1998

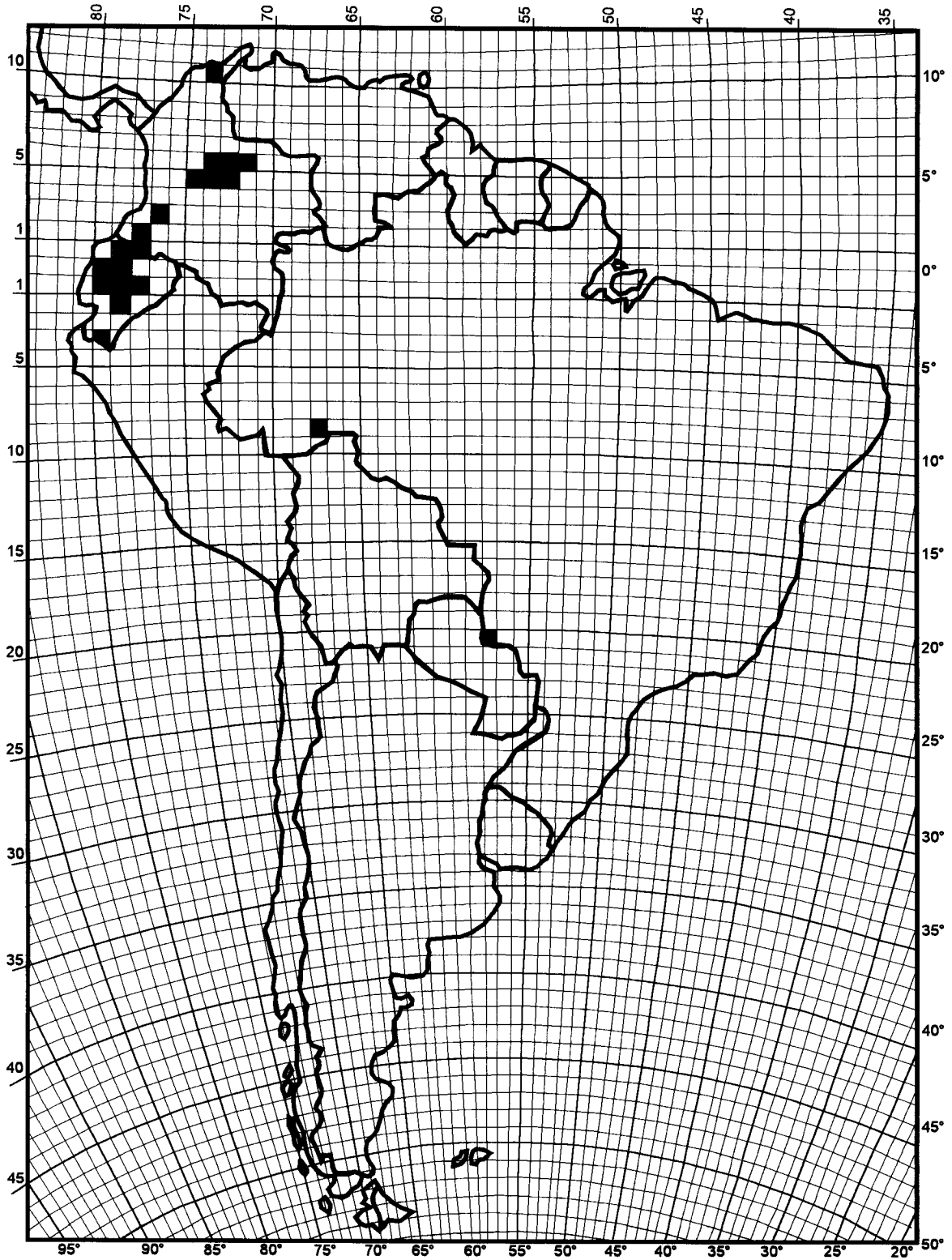


MAP 2. Geographic distribution of FMD virus type A. South America, 1998

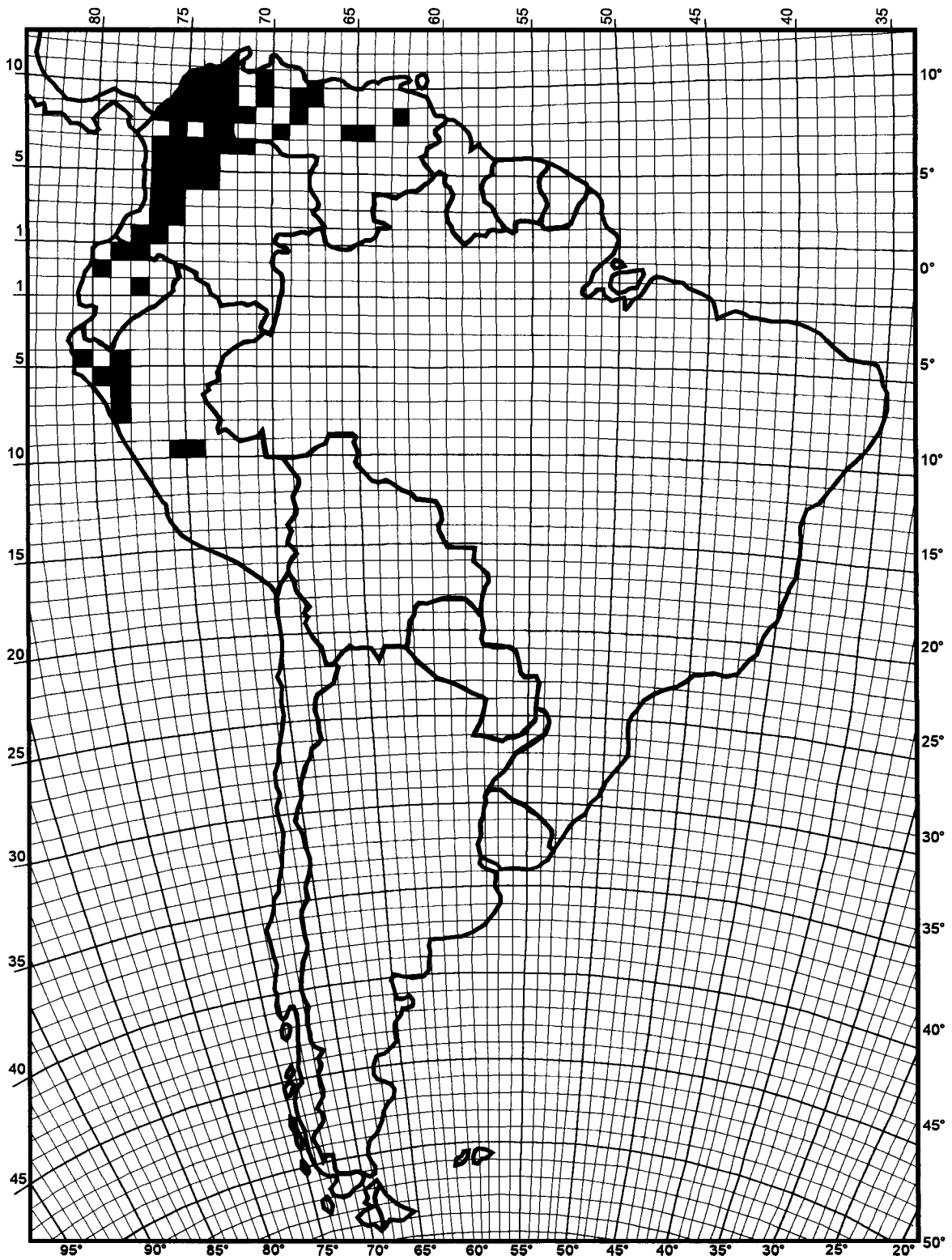




MAP 3. Geographic distribution of FMD virus type O. South America, 1998



MAP 4. Geographic distribution of the New Jersey vesicular stomatitis virus.  
South America, 1998



MAP 5. Geographic distribution of the Indiana vesicular stomatitis virus.  
South America, 1998

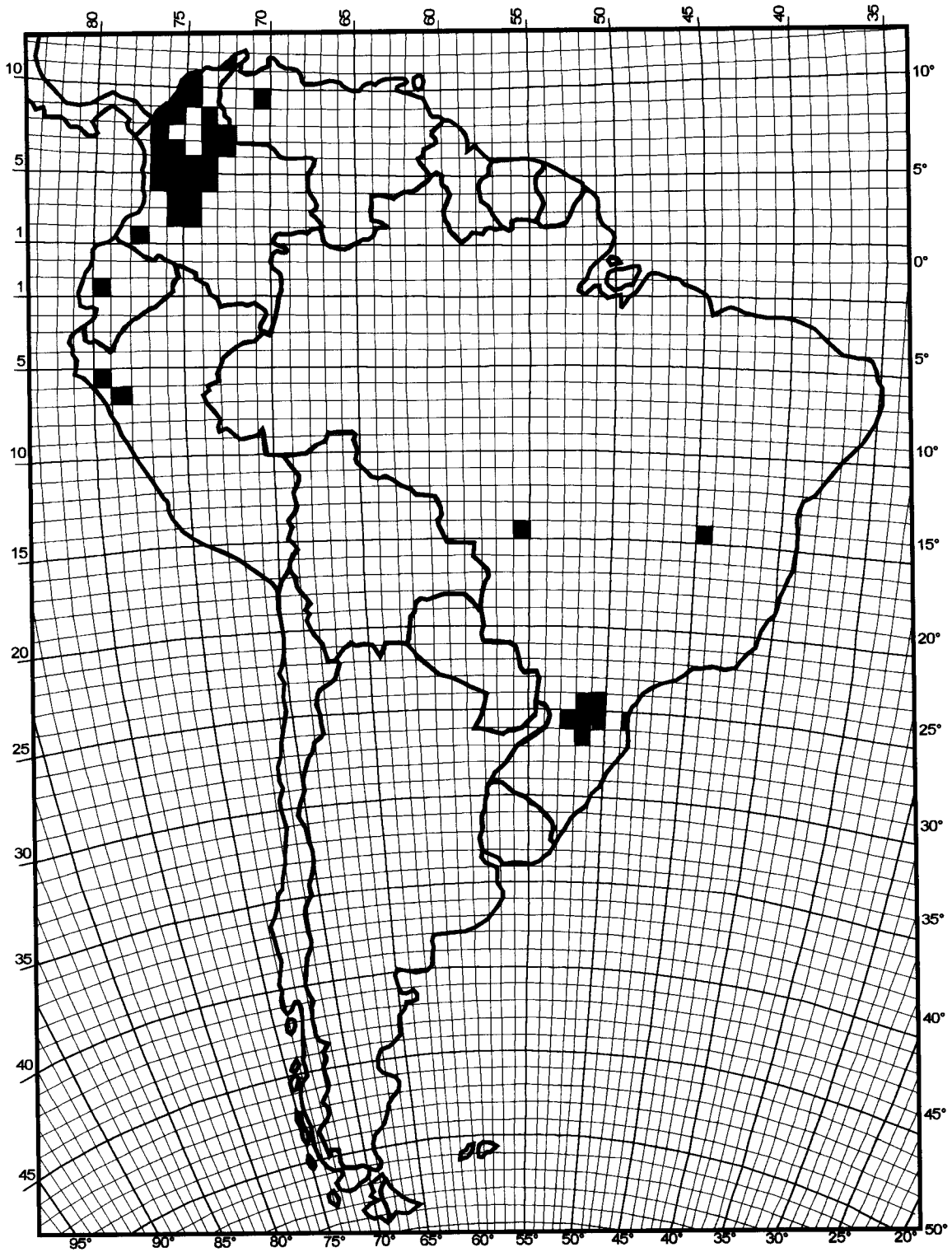


Table 1. Premises with suspected vesicular disease or compatible syndromes. South America, 1998

Country	Premises suspected	Clinical Diagnosis Only	With material collected Cases %	With lab Diagnosis Cases %	Foot-and-Mouth Disease			Vesicular Stomatitis			Similari			Other Diagnosis	Negative Diagnosis	Inadequate Material
					O	A	C	NJ	IN	IBR	LA	DVB				
<b>Region with FMD</b>																
Bolivia	29	9	20 69	10 34	1 6 0	0 0 0	0 0 0	0 0 1	0 0 0	0 0 0	0 0 0	0 0 0	2	10	0	
Brazil affect.	260	29	231 89	150 61	5 1 0	0 0 0	0 134	2 0 8	2 0 0	0 0 0	0 0 0	0 0 0	0	81	0	
Colombia	1,080	...	...	...	92 11 0	0 332 148	2 0 11	2 0 0	2 0 0	0 0 0	0 0 0	0 0 0	0	0	0	
Ecuador	230	0	141 61	98 43	67 14 0	0 14 1	2 0 0	2 0 0	2 0 0	0 0 0	0 0 0	0 0 0	0	9	34	
Peru	18	0	16 89	16 89	0 0 0	0 13 2	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0	0	1	
Venezuela	184	64	120 65	55 30	0 17 0	0 34 4	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0	0	7	
<b>Free Region FMD</b>																
Argentina	235	125	111 47	98 42									154	13	0	
Brazil free*	86	0	86 100	61 71									12	25	0	
Chile	...	...	...	...									...	...	...	
Guyana	...	...	...	...									...	...	...	
Paraguay	45	16	29 64	29 64									19	0	0	
Uruguay	9	2	7 78	7 78									1	2	0	
<b>Total</b>	<b>2,176</b>	<b>245</b>	<b>761 35</b>	<b>524 24</b>	<b>165 49 0</b>	<b>393 306</b>	<b>88 0 80</b>	<b>88 0 80</b>	<b>88 0 80</b>	<b>88 0 80</b>	<b>88 0 80</b>	<b>88 0 80</b>	<b>188</b>	<b>140</b>	<b>42</b>	

\* States of Rio Grande do Sul and Santa Catarina.



Table 3. Monthly distribution of premises with suspected vesicular disease or similar syndromes in countries with foot-and-mouth disease in South America, 1998

Country/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bolivia	1	2	0	2	4	2	3	3	1	5	1	5	29
Brazil	4	11	11	20	15	24	23	14	8	83	125	8	346
Colombia	186	71	37	43	71	96	115	100	82	81	137	61	1080
Ecuador	9	36	15	8	1	19	21	27	40	30	15	9	230
Peru	1	4	0	0	0	0	3	0	3	4	2	1	18
Venezuela	14	1	2	6	10	15	22	14	35	25	28	12	184
Total	215	125	65	79	101	156	187	158	169	228	308	96	1887

Table 4. Monthly distribution of premises affected by type O foot-and-mouth disease virus, by country. South America, 1998

Country/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bolivia	0	0	0	0	0	0	0	1	0	0	0	0	1
Brazil	1	1	1	1	0	1	0	0	0	0	0	0	5
Colombia	2	0	0	0	0	20	22	10	16	4	16	2	92
Ecuador	0	0	0	1	0	10	7	10	17	5	10	7	67
Peru	0	0	0	0	0	0	0	0	0	0	0	0	0
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	1	1	2	0	31	29	21	33	9	26	9	165

Table 5. Monthly distribution of premises affected by type A foot-and-mouth disease virus, by country.  
South America, 1998

Country/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bolivia	0	0	0	0	0	2	1	1	0	1	0	1	6
Brazil	0	0	0	0	0	1	0	0	0	0	0	0	1
Colombia	0	0	0	1	2	0	1	0	2	3	2	0	11
Ecuador	5	5	2	1	0	0	0	1	0	0	0	0	14
Peru	0	0	0	0	0	0	0	0	0	0	0	0	0
Venezuela	1	1	0	0	0	0	0	0	6	6	2	1	17
Total	6	6	2	2	2	3	2	2	8	10	4	2	49

... Information not provided.





Table 7. Monthly distribution of premises affected by New Jersey vesicular stomatitis virus, by country.  
South America, 1998

Country/Mouth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Colombia	59	23	20	8	15	16	30	34	31	23	38	35	332
Ecuador	0	7	4	0	1	1	0	0	0	1	0	0	14
Peru	0	1	0	0	0	0	3	0	3	4	2	0	13
Venezuela	4	0	2	0	1	2	5	4	2	2	11	1	34
Total	63	31	26	8	17	19	38	38	36	30	51	36	393

Table 8. Monthly distribution of premises affected by Indiana vesicular stomatitis virus, by country. South America, 1998

Country/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Brazil	1	0	1	1	7	6	1	1	1	60	67	5	151
Colombia	49	9	2	3	9	12	12	15	11	3	17	6	148
Ecuador	1	0	0	0	0	0	0	0	0	0	0	0	1
Peru	0	1	0	0	0	0	0	0	0	0	0	1	2
Venezuela	0	0	0	0	0	1	1	1	1	0	1	0	5
Total	51	10	3	4	16	19	14	17	13	63	85	12	307

Table 9. Morbidity and mortality rates of vesicular diseases in cattle. South America, 1998

Countries	Herds		Population			Rates				
	Total	Affected	Total	In Affected herds	Sick	Dead	Affected herds /1000	Morbidity /10,000	Attack /100	Lethality /100
<b>Area with FMD</b>										
Bolivia*	32.172	28	6.041.393	2.878	316	0	0,87	0,52	10,98	0,00
Brazil affec.	1.794.668	260	141.487.686	11.377	999	1	0,14	0,07	8,78	0,10
Colombia	582.129	1.080	20.929.779	117.418	11.495	84	1,86	5,49	9,79	0,73
Ecuador	251.445	230	5.363.243	16.319	3.717	85	0,91	6,93	22,78	2,29
Peru	894.315	18	4.362.588	1.399	78	0	0,02	0,18	5,58	0,00
Venezuela	108.432	184	12.651.072	76.464	4.791	31	1,70	3,79	6,27	0,65
<i>Partial</i>	3.663.161	1.800	190.835.761	225.855	21.396	201	0,49	1,12	9,47	0,94
<b>Free Area</b>										
Argentina	269.900	0	50.892.200	0	0	0	0,00	0,00	0,00	0,00
Brazil free**	516.277	0	15.504.872	0	0	0	0,00	0,00	0,00	0,00
Chile	160.218	0	4.098.438	0	0	0	0,00	0,00	0,00	0,00
Guyana	1.600	0	245.000	0	0	0	0,00	0,00	0,00	0,00
Paraguay	229.478	0	8.771.706	0	0	0	0,00	0,00	0,00	0,00
Uruguay	79.603	0	10.492.004	0	0	0	0,00	0,00	0,00	0,00
<i>Partial</i>	1.257.076	0	90.004.220	0	0	0	0,00	0,00	0,00	0,00
<b>Total</b>	4.920.237	1.800	280.839.981	225.855	21.396	201	0,3658	0,7619	9,47	0,94

\* Figures refer to outbreaks with attention form filled.

\*\* States of Rio Grande do Sul and Santa Catarina.

Table 10. Morbidity and mortality rates of vesicular diseases in pigs. South America, 1998

Countries	Total	Population			Morbidity / 10,000	Rates Attack /100	Lethality /100
		In Affected herds	Sick	Dead			
<b>Region with FMD</b>							
Bolivia	2.404.833	5	0	0	0,00	0,00	0,00
Brazil Affec.	26.871.253	33	20	0	0,01	60,61	0,00
Colombia	2.190.035	10.647	363	53	1,66	3,41	14,60
Ecuador	2.620.000	440	373	62	1,42	84,77	16,62
Peru	2.561.555	565	3	0	0,01	0,53	0,00
Venezuela	2.744.438	7.340	77	20	0,28	1,05	25,97
<i>Partial</i>	39.392.114	19.030	836	135	0,2122	4,39	16,15
<b>Free Region</b>							
Argentina	1.974.200	0	0	0	0,00	0,00	0,00
Brazil free*	8.270.586	0	0	0	0,00	0,00	0,00
Chile	1.722.403	0	0	0	0,00	0,00	0,00
Guyana	...	...	...	...	...	...	...
Paraguay	1.723.575	0	0	0	0,00	0,00	0,00
Uruguay	192.196	0	0	0	0,00	0,00	0,00
<i>Partial</i>	13.882.960	0	0	0	0,00	0,00	0,00
<b>Total</b>	53.275.074	19.030	836	135	0,1569	4,39	16,15

\* States of Rio Grande do Sul and Santa Catarina.

Table 11. Morbidity and mortality rates of vesicular diseases in sheep. South America, 1998

Countries	Total	In Affected herds	Population	Sick	Dead	Morbidity / 10.000	Rates Attack /100	Lethality /100
<b>Region with FMD</b>								
Bolivia	7.883.866	156		80	0	0,10	51,28	0,00
Brazil affec.	8.495.533	214		22	0	0,03	10,28	0,00
Colombia	1.527.973	2.962		33	3	0,22	1,11	9,09
Ecuador	1.692.000	5		4	0	0,02	80,00	0,00
Peru	12.775.504	2		0	0	0,00	0,00	0,00
Venezuela	366.168	541		1	0	0,03	0,18	0,00
<i>Partial</i>	32.741.044	3.880		140	3	0,0428	3,61	2,14
<b>Free Region</b>								
Argentina	19.289.300	0		0	0	0,00	0,00	0,00
Brazil free*	9.940.565	0		0	0	0,00	0,00	0,00
Chile	3.710.459	0		0	0	0,00	0,00	0,00
Guyana	...	...		...	...	...	...	...
Paraguay	386.026	0		0	0	0,00	0,00	0,00
Uruguay	18.225.353	0		0	0	0,00	0,00	0,00
<i>Partial</i>	51.551.703	0		0	0	0,00	0,00	0,00
<b>Total</b>	84.292.747	3.880		140	3	0,0166	3,61	2,14

\* States of Rio Grande do Sul and Santa Catarina.

Table 12. Morbidity and mortality rates of vesicular diseases in goats. South America, 1998

Countries	Total	Population			Dead	Morbidity / 10,000	Rates Attack /100	Lethality /100
		In Affected herds	Sick	Dead				
<b>Region with FMD</b>								
Bolivia	1.484.128	0	0	0	0,00	0,00	0,00	
Brazil affec.	10.678.596	299	21	0	0,02	7,02	0,00	
Colombia	1.237.300	666	11	8	0,09	1,65	72,73	
Ecuador	295.000	0	0	0	0,00	0,00	0,00	
Peru	2.083.879	10	0	0	0,00	0,00	0,00	
Venezuela	1.292.860	298	0	0	0,00	0,00	0,00	
<i>Partial</i>	17.071.763	1.273	32	8	0,0187	2,51	25,00	
<b>Free Region</b>								
Argentina	2.916.500	0	0	0	0,00	0,00	0,00	
Brazil free*	200.690	0	0	0	0,00	0,00	0,00	
Chile	738.183	0	0	0	0,00	0,00	0,00	
Guyana	...	...	...	...	...	...	...	
Paraguay	124.127	0	0	0	0,00	0,00	0,00	
Uruguay	8.016	0	0	0	0,00	0,00	0,00	
<i>Partial</i>	3.987.516	0	0	0	0,00	0,00	0,00	
<b>Total</b>	21.059.279	1.273	32	8	0,0152	2,51	25,00	

\* States of Rio Grande do Sul and Santa Catarina.

Table 13. Morbidity and mortality rates of vesicular diseases in equines. South America, 1998

Countries	Population				Tasas		
	Total	In Affected herds	Sick	Dead	Morbidity / 10.000	Attack /100	Lethality /100
Argentina	1.989.000	0	0	0	0,00	0,00	0,00
Bolivia	326.000	0	0	0	0,00	0,00	0,00
Brazil	6.355.725	1.263	349	0	0,55	27,63	0,00
Chile	446.356	0	0	0	0	0	0
Colombia	2.364.965	4.416	198	0	0,84	4,48	0,00
Ecuador	929.000	281	108	0	1,16	38,43	0,00
Guyana	...	...	...	...	...	...	...
Paraguay	354.919	0	0	0	0,00	0,00	0,00
Peru	1.172.927	212	4	0	0,0341	1,89	0,00
Uruguay	439.316	0	0	0	0,00	0,00	0,00
Venezuela	586.663	942	24	0	0,41	2,55	0,00
Total	14.964.871	7.114	683	0	0,4564	9,60	0,00



Table 14. Foot-and-mouth disease and vesicular stomatitis virus subtypes identified by the Reference Laboratory. South America, 1998

Country	Foot-and-mouth disease			Vesicular stomatitis	
	O	A	C	New Jersey	Indiana
Brazil	O <sub>1</sub>				Indiana <sub>2</sub>
Bolivia	O <sub>1</sub>	A <sub>24</sub>			
Colombia	O <sub>1</sub>	A <sub>24</sub>			

**Table 15. Properties affected by vesicular stomatitis, by type of virus and country.  
Central America and Mexico, 1998**

<b>Countries</b>	<b>New Jersey</b>	<b>Indiana</b>	<b>Not identified</b>	<b>Total</b>
<b>Costa Rica</b>	<b>23</b>	<b>0</b>	<b>3</b>	<b>26</b>
<b>El Salvador</b>	<b>56</b>	<b>2</b>	<b>115</b>	<b>173</b>
<b>Guatemala</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>3</b>
<b>Honduras</b>	<b>12</b>	<b>0</b>	<b>28</b>	<b>40</b>
<b>Nicaragua</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>7</b>
<b>Panama</b>	<b>7</b>	<b>3</b>	<b>12</b>	<b>22</b>
<b>Mexico</b>	<b>34</b>	<b>0</b>	<b>6</b>	<b>40</b>
<b>Total</b>	<b>135</b>	<b>6</b>	<b>170</b>	<b>311</b>

**Table 16. Monthly distribution of premises affected by foot-and-mouth disease, by regional subproject. South America, 1998.**

Project/Subproject	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
Atlantic Coast of Colombia Lake Maracaibo Basin	53	12	4	5	21	28	65	50	47	51	99	46	481	30,16
Colombian-Venezuelan Basin	6	2	0	9	8	9	5	4	6	13	18	1	81	5,08
Rest of Venezuela	10	0	1	6	4	9	10	5	16	12	8	2	83	5,20
Rest of Colombia	113	41	29	27	47	31	27	42	22	24	27	21	451	28,28
Colombia-Ecuador Border	22	39	10	4	1	44	33	16	23	10	17	9	228	14,29
Ecuadorian Coast	3	9	4	5	0	1	2	2	6	0	3	2	37	2,32
Rest of Ecuador	1	5	5	1	1	8	13	16	25	24	4	1	104	6,52
Ecuador-Peru Border	1	0	0	0	0	0	2	3	6	1	2	0	15	0,94
Free area in Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Peru	1	4	0	0	0	0	3	0	2	4	2	1	17	1,07
Bolivia-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Beni	0	0	0	1	3	1	2	2	0	2	0	1	12	0,75
Santa Cruz	1	2	0	1	1	1	1	1	1	3	1	4	17	1,07
Rest of Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Andean Area	211	114	53	59	86	132	163	141	154	144	181	88	1526	95,67
Amazon Basin	0	5	7	5	2	4	5	5	7	1	2	0	43	2,70
Brazil (no Amazon)	1	3	0	3	0	2	0	0	0	0	1	0	10	0,63
Amazon Basin No-Amazon Brazil	1	8	7	8	2	6	5	5	7	1	3	0	53	3,32
River Plate Basin Southern Cone	0	0	0	1	7	6	1	0	0	0	0	1	16	1,00
<b>Total</b>	<b>212</b>	<b>122</b>	<b>60</b>	<b>68</b>	<b>95</b>	<b>144</b>	<b>169</b>	<b>146</b>	<b>161</b>	<b>145</b>	<b>184</b>	<b>89</b>	<b>1595</b>	

Table 17. Monthly distribution of premises affected by type O foot-and-mouth disease virus, by regional subprojects. South America, 1998

Project/Subproject	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
Atlantic Coast of Colombia Lake Maracaibo Basin	0	0	0	0	0	0	0	0	0	0	1	0	1	0,61
Colombian-Venezuelan Basin	0	0	0	0	0	0	0	0	1	0	5	0	6	3,64
Rest of Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Colombia	2	0	0	0	0	0	0	5	0	0	1	0	8	4,85
Colombia-Ecuador Border	0	0	0	0	0	24	25	7	18	5	14	7	100	60,61
Ecuadorian Coast	0	0	0	1	0	1	0	1	1	0	1	1	6	3,64
Rest of Ecuador	0	0	0	0	0	5	4	4	10	3	3	1	30	18,18
Ecuador-Peru Border	0	0	0	0	0	0	0	3	3	1	1	0	8	4,85
Free area in Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Bolivia-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Beni	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Santa Cruz	0	0	0	0	0	0	0	1	0	0	0	0	1	0,61
Rest of Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
<b>Andean Area</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>30</b>	<b>29</b>	<b>21</b>	<b>33</b>	<b>9</b>	<b>26</b>	<b>9</b>	<b>160</b>	<b>96,97</b>
Amazon Basin	0	0	1	1	0	1	0	0	0	0	0	0	3	1,82
Brazil (no Amazon)	1	1	0	0	0	0	0	0	0	0	0	0	2	1,21
Amazon Basin <b>No-Amazon Brazil</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>3,03</b>
River Plate Basin Southern Cone	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
<b>Total</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>31</b>	<b>29</b>	<b>21</b>	<b>33</b>	<b>9</b>	<b>26</b>	<b>9</b>	<b>165</b>	

Table 18. Monthly distribution of premises affected by type A foot-and-mouth disease virus, by regional subprojects. South America, 1998

Project/Subproject	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
Atlantic Coast of Colombia Lake Maracaibo Basin	0	0	0	0	0	0	0	0	1	1	1	0	3	6,12
Colombian-Venezuelan Basin	0	1	0	1	2	0	1	0	2	3	1	0	11	22,45
Rest of Venezuela	1	0	0	0	0	0	0	0	4	4	2	1	12	24,49
Rest of Colombia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Colombia-Ecuador Border	2	1	0	0	0	0	0	0	0	0	0	0	3	6,12
Ecuadorian Coast	1	0	1	0	0	0	0	1	0	0	0	0	3	6,12
Rest of Ecuador	1	4	1	1	0	0	0	0	0	0	0	0	7	14,29
Ecuador-Peru Border	1	0	0	0	0	0	0	0	0	0	0	0	1	2,04
Free area in Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Bolivia-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Beni	0	0	0	0	0	1	0	1	0	0	0	0	2	4,08
Santa Cruz	0	0	0	0	0	1	1	0	0	1	0	1	4	8,16
Rest of Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
<b>Andean Area</b>	<b>6</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>9</b>	<b>4</b>	<b>2</b>	<b>46</b>	<b>93,88</b>
Amazon Basin	0	0	0	0	0	1	0	0	1	1	0	0	3	6,12
Brazil (no Amazon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
<b>Amazon Basin No-Amazon Brazil</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>6,12</b>
<b>River Plate Basin Southern Cone</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0,00</b>
<b>Total</b>	<b>6</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>8</b>	<b>10</b>	<b>4</b>	<b>2</b>	<b>49</b>	



**Table 20. Monthly distribution of premises affected by vesicular stomatitis virus, New Jersey type by regional subprojects. South America, 1998**

Project/Subproject	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
Atlantic Coast of Colombia Lake Maracaibo Basin	7	0	1	0	5	7	28	27	25	18	30	29	177	45,04
Colombian-Venezuelan Basin	0	0	0	0	0	1	0	0	0	1	1	0	3	0,76
Rest of Venezuela	4	0	2	0	1	2	1	1	0	0	3	0	14	3,56
Rest of Colombia	41	13	15	6	10	7	5	8	6	6	12	6	135	34,35
Colombia-Ecuador Border	11	17	4	2	0	1	1	0	2	0	1	1	40	10,18
Ecuadorian Coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Ecuador	0	0	4	0	1	1	0	0	0	1	0	0	7	1,78
Ecuador-Peru Border	0	0	0	0	0	0	0	0	0	1	0	0	1	0,25
Free area in Peru	0	0	0	0	0	0	0	0	1	0	0	0	1	0,25
Rest of Peru	0	1	0	0	0	0	3	0	2	3	2	0	11	2,80
Bolivia-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Beni	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Santa Cruz	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Andean Area	63	31	26	8	17	19	38	36	36	30	49	36	389	98,98
Amazon Basin	0	0	0	0	0	0	0	2	0	0	2	0	4	1,02
Brazil (no Amazon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Amazon Basin No-Amazon Brazil	0	0	0	0	0	0	0	2	0	0	2	0	4	1,02
River Plate Basin Southern Cone	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
<b>Total</b>	<b>63</b>	<b>31</b>	<b>26</b>	<b>8</b>	<b>17</b>	<b>19</b>	<b>38</b>	<b>38</b>	<b>36</b>	<b>30</b>	<b>51</b>	<b>36</b>	<b>393</b>	

Table 21. Monthly distribution of premises affected by vesicular stomatitis virus, Indiana type by regional subprojects. South America, 1998

Project/Subproject	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
Atlantic Coast of Colombia Lake Maracaibo Basin	21	6	2	0	3	4	6	3	8	3	16	3	75	24,43
Colombian-Venezuelan Basin	3	0	0	0	0	0	0	0	0	0	0	0	3	0,98
Rest of Venezuela	0	0	0	0	0	1	1	1	0	0	1	0	4	1,30
Rest of Colombia	25	3	0	3	6	8	6	11	3	0	1	3	69	22,48
Colombia-Ecuador Border	0	0	0	0	0	0	0	1	1	0	0	0	2	0,65
Ecuadorian Coast	1	0	0	0	0	0	0	0	0	0	0	0	1	0,33
Rest of Ecuador	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Ecuador-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Free area in Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Peru	0	1	0	0	0	0	0	0	0	0	0	1	2	0,65
Bolivia-Peru Border	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Beni	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Santa Cruz	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Rest of Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Andean Area	50	10	2	3	9	13	13	16	12	3	18	7	156	50,81
Amazon Basin	0	0	0	0	0	0	0	0	0	0	0	0	0	0,00
Brazil (no Amazon)	1	0	1	0	0	0	0	1	1	60	67	4	135	43,97
Amazon Basin No-Amazon Brazil	1	0	1	0	0	0	0	1	1	60	67	4	135	43,97
River Plate Basin Southern Cone	0	0	0	1	7	6	1	0	0	0	0	1	16	5,21
<b>Total</b>	<b>51</b>	<b>10</b>	<b>3</b>	<b>4</b>	<b>16</b>	<b>19</b>	<b>14</b>	<b>17</b>	<b>13</b>	<b>63</b>	<b>85</b>	<b>12</b>	<b>307</b>	



Table 22. Strains utilized in the production of foot-and-mouth disease vaccine. South America, 1998

Country	Strains		
	O	A	C
Argentina	O <sub>1</sub> Caseros - Arg/67	A <sub>79</sub> - Arg/79 A <sub>81</sub> - Arg/87	C <sub>3</sub> - Arg/85
Brazil	O <sub>1</sub> Campos - Br/58	A <sub>24</sub> Cruzeiro - Br/55	C <sub>3</sub> Indaial - Br/71
Colombia	O <sub>1</sub> Campos - Br/58	A <sub>24</sub> Cruzeiro - Br/55	
Paraguay	O <sub>1</sub> Campos - Br/58	A <sub>24</sub> Cruzeiro - Br/55	C <sub>3</sub> Resende - Br/71
Venezuela	O <sub>1</sub> Campos - Br/58	A <sub>24</sub> Cruzeiro - Br/55	

Table 23. Production, control and availability of foot-and-mouth disease vaccine, by countries. South America, 1998

Country	Adjuvant	Valence	Produced	Controlled	Approved	Exported	Imported	Available
Argentina	Oil	Trivalent	81.364.385	68.866.600	68.866.600	3.373.119	0	65.493.481
		Bivalent	5.571.860	5.571.860	5.571.860	5.571.860	0	0
		Monovalent	3.110.090	3.110.090	3.110.090	3.110.090	0	0
Bolivia	Oil	0	0	0	0	1.334.666	1.334.666	
Brazil	Oil	Trivalent	213.786.321	209.861.320	* 205.003.120	3.925.000	0	205.003.120
		Bivalent	0	0	0	0	0	0
		Monovalent	500.000	0	0	500.000	0	0
Colombia	Oil	Trivalent	0	0	0	0	4.500	35.809.335
		Bivalent	40.077.325	40.077.325	35.510.550	0	298.785	3.534.120
Ecuador	Oil	0	0	0	0	0	3.534.120	13.313.595
Paraguay	Oil	Trivalent	12.366.820	12.366.820	12.366.820	400.000	1.346.775	2.840.000
Peru	Oil	Trivalent	0	0	0	0	2.840.000	14.523.000
Venezuela	Oil	Bivalent	11.000.000	11.000.000	11.000.000	0	3.523.000	
Total	Oil	Trivalent	307.517.526	291.094.740	286.236.540	7.698.119	9.060.061	291.518.982
		Bivalent	56.649.185	56.649.185	52.082.410	5.571.860	3.821.785	50.332.335
		Monovalent	3.610.090	3.110.090	3.110.090	3.610.090	**	0

\* Vaccine produced for export it is not under official control.

\*\* Exported outside the Continent.

Table 24. Number of animals vaccinated against foot-and-mouth disease. South America, 1998

Country	Systematic vaccination			Strategic vaccination		
	Cattle		Sheep	Cattle	Pigs	Sheep
	Two doses	One dose				
Argentina	68.010.146	0	0	0	0	0
Bolivia	0	1.430.717	0	5.020	0	0
Brazil	123.231.641	6.221.223	0	513.496	0	0
Colombia	15.888.064	3.675	0	54.578	0	0
Ecuador	341.518	1.593.751	0	67.408	6.025	0
Paraguay	0	7.739.657	0	4.290.483	0	0
Peru	479.167	1.367.018	0	74.393	0	0
Venezuela	7.797.961	0	0	57.045	260.467	0
Total	215.748.497	18.356.041	0	5.062.423	266.492	0

Table 25. Coverage of the foot-and-mouth disease control programs. South America, 1998

Country	Area in km <sup>2</sup> Total Under Program	Cattle herds Total Under Program	Cattle population Total Under Program
<b>Region with FMD</b>			
Bolivia	1.097.960 665.825	32.172 ...	6.041.393 3.808.155
Brazil	8.510.909 4.689.342	2.310.945 1.749.041	156.992.558 130.852.472
Colombia	1.141.813 1.043.114	582.129 581.129	20.929.779 20.929.779
Ecuador	274.045 274.045	251.445 251.445	5.363.243 5.363.243
Peru	1.183.580 1.183.580	894.315 894.315	4.362.588 4.362.588
Venezuela	910.000 910.000	108.432 108.432	12.651.072 12.651.072
<i>Subtotal</i>	13.118.307 8.765.906	4.179.438 3.584.362	206.340.633 177.967.309
<b>Free Region</b>			
Argentina	2.780.199 1.998.927	270.146 268.011	55.798.192 55.224.714
Chile	756.618 756.618	160.218 160.218	4.098.438 4.098.438
Guyana	215.020 215.020	1.600 1.600	245.000 245.000
Paraguay	406.752 406.752	229.478 229.478	8.771.706 8.771.706
Uruguay	176.215 176.215	79.603 79.603	10.492.004 10.492.004
<i>Subtotal</i>	4.334.804 3.553.532	741.045 738.910	79.405.340 78.831.862
<b>Total</b>	17.453.111 12.319.438	4.920.483 4.323.272	285.745.973 256.799.171

... Information not provided.

Table 26. Human resources per country in the foot-and-mouth disease control programs. South America, 1998

Country	Field Operational Units	Professional Staff			Otros		
		Central	Laboratory	Field	Central	Laboratory	Field
<b>Affected Area</b>							
Brazil	2.332	22	96	2.781	25	136	6.181
Bolivia	...	...	21	67	...	15	24
Colombia	115	...	21	118	...	11	299
Ecuador	53	2	1	54	2	1	62
Peru	...	2	2	177	...	3	2.103
Venezuela	156	...	18	141	...	17	58
<b>Free Area</b>							
Argentina	310	...	25	296	...	12	678
Chile	62	4	2	100	...	2	60
Guyana	9	...	5	9	...	5	29
Paraguay	65	...	32	153	...	35	191
Uruguay	41	...	13	69	...	14	229
<b>Total</b>	<b>3.143</b>	<b>30</b>	<b>236</b>	<b>3.965</b>	<b>27</b>	<b>251</b>	<b>9.914</b>

... Information not provided.

Table 27. Human resources in the foot-and-mouth disease control programs. South America, 1998

Country	1997			1998			
	Central	Laboratory	Field	Central	Laboratory	Field	Total
<b>Affected Area</b>							
Bolivia	...	20	30	...	36	91	127
Brazil	47	261	9.263	47	232	9.009	9.288
Colombia	12	16	572	...	32	417	449
Ecuador	50		105	4	2	116	122
Peru	3	4	204	2	5	2.280	2.287
Venezuela	21	65	425	...	35	199	234
<i>Partial</i>	133	366	10.599	53	342	12.112	12.507
<b>Free Area</b>							
Argentina	18	22	853	...	37	974	1.011
Chile	...	4	94	4	4	160	168
Guyana	11	...	22	...	10	36	46
Paraguay	...	...	...	...	67	344	411
Uruguay	21	256	873	...	27	298	325
<i>Partial</i>	50	282	1.842	4	145	1.812	1.961
<b>Total</b>	183	648	12.441	57	487	13.924	14.468

... Information not provided.

**Table 28. Vehicles used in the foot-and-mouth disease control programs, by country  
South America, 1997-1998**

Country	1997			1998		
	Cars	Motorcycles	Total	Cars	Motorcycles	Total
<b>Area with FMD</b>						
Bolivia	19	0	19	25	23	48
Brazil	2.647	78	2.725	2.925	114	3.039
Colombia	114	258	372	106	255	361
Ecuador	54	0	54	52	0	52
Peru	13	100	113	19	113	132
Venezuela	...	...	...	75	0	75
<i>Partial</i>	2.847	436	3.283	3.202	505	3.707
<b>Free Area</b>						
Argentina	566	0	566	563	4	567
Paraguay	...	...	...	74	61	135
Chile	27	0	27	241	28	269
Guyana	3	5	8	9	34	43
Uruguay	143	160	303	67	164	231
<i>Partial</i>	739	165	904	391	287	678
<b>Total</b>	<b>3.586</b>	<b>601</b>	<b>4.187</b>	<b>3.593</b>	<b>792</b>	<b>4.385</b>

... Information not provided.

Table 29. Public and private expenditures in the foot-and-mouth disease control programs in US dollars.  
South America, 1998

Country	Public			Private	Total
	Operating	Capital	Total		
<b>Region with FMD</b>					
Bolivia	38.900,00	539.070,00	577.970,00	0,00	577.970,00
Brazil	36.284.424,15	3.761.448,09	40.045.872,24	98.940.011,14	138.985.883,38
Colombia	574.627,00	3.414.178,00	3.988.805,00	15.087.278,00	19.076.083,00
Ecuador	57.309,00	275.685,00	332.994,00	1.584.789,00	1.917.783,00
Peru	658.335,00	6.140.306,00	6.798.641,00	1.584.789,00	8.383.430,00
Venezuela	53.780,00	1.857.836,00	1.911.616,00	1.584.789,00	3.496.405,00
<i>Partial</i>	37.667.375,15	15.988.523,09	53.655.898,24	118.781.656,14	172.437.554,38
<b>Free Region</b>					
Argentina	3.139.534,00	629.810.715,00	632.950.249,00	0,00	632.950.249,00
Chile	76.627,00	1.793.127,00	1.869.754,00	0,00	1.869.754,00
Guyana	60.000,00	46.000,00	106.000,00	0,00	106.000,00
Paraguay	847.618,00	4.500.016,00	5.347.634,00	10.225.619,00	15.573.253,00
Uruguay	3.558.000,00	374.000,00	3.932.000,00	1.200.000,00	5.132.000,00
<i>Partial</i>	7.681.779,00	636.523.858,00	644.205.637,00	11.425.619,00	655.631.256,00
<b>Total</b>	<b>45.349.154,15</b>	<b>652.512.381,09</b>	<b>697.861.535,24</b>	<b>130.207.275,14</b>	<b>828.068.810,38</b>



Edited by the  
**PAN AMERICAN FOOT-AND-MOUTH DISEASE CENTER (PAHO/WHO)**  
Caixa Postal 589, 20001-970, Rio de Janeiro, RJ, Brasil

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