Centro Panamericano de Fiebre Aftosa

SITUATION OF THE FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS.
SOUTH AMERICA, 1986

MARCH, 1987

organización panamericana de la salud
oficina sanitaria panamericana, oficina regional
de la organización mundial de la salud

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1. SITUATION OF THE VESICULAR DISEASES

1.1 GENERAL SITUATION

Vesicular diseases in South America totalled 4552 episodes in herds in 1986, a 15% decline in the number of herds affected in comparison with 1985. That total is not significantly different from the numbers posted in the previous three years (1982-84).

The rate of cattle herds affected by vesicular diseases was 1 per 1000, a rate comparable to that recorded in recent years.

1,175 herds were affected by FMD (episodes with laboratory diagnosis), a 1% decline as compared to 1985 and comparable to the frequencies recorded from 1982 on.

With respect to the geographical disbribution of the frequency of herds affected by vesicular diseases in South America in 1986, high levels continued to be recorded in Argentina's humid pampa (virus type C) the central region of Colombia (virus types A and O) and northeastern Brazil (viruses O and A).

Uruguay, which in the 1980's has been recording low numbers of herds affected, recorded an increase of over 100% in 1986 in comparison to 1985. Nevertheless, the occurrence is still low in relation to levels recorded in the 70's and continues to indicate an epidemiological situation favorable to eradication of the disease.

In South America, Chile, Guyana, French Guiana and Surinam remained free of FMD.

Regarding the types of virus in evidence in 1986, type A showed a 22% drop in presence in relation to 1985. That situation was largely due to the reduction of the epidemic situation experienced in Colombia in 1985, caused by the appearance of virus A Sabana-Col/85. Virus types O (up 22%) and C (up 10%) posted a slight rise in frequency throughout South America in general. Argentina again recorded a high frequency of virus type C. Generally speaking, FMD virus type A was the most predominant in 1986 (38%), followed by types O and C (31% each).

Vesicular stomatitis in South America in 1986, expressed as the frequency of laboratory diagnoses with virus identification, dropped 13% in comparison with 1985, although Indiana type climbed by 41% and New Jersey type declined by 46%. The frequency of herds affected by Indiana type vesicular stomatitis in Colombia increased, and during the first months of 1986 that virus was detected in episodes in Brazil and Argentina. The Indiana virus was the vesicular stomatitis virus predominant in 1986 (62%).

Cattle morbidity was 7.1 per 10,000 head, a total similar to the rate shown in recent years. Cattle lethality reached 1.5% and the internal morbidity of the affected bovine herds was 10.7%.

Populational morbidity in pigs was 2.3 per 10,000 while lethality was 18.4% and internal morbidity in the affected countries was 14%.

Other regions of the Americas continue to be free of FMD (North America, Central America, and the Carribbean).

In Mexico and other countries of Central America, the recorded frequency of vesicular stomatitis in 1986 was higher than in 1985. Increases occurred in both the total of herds affected (up 145%) and especially in the presence of New Jersey type vesicular stomatitis virus (up 166%). This type of virus was identified in 50% of the episodes of the disease.

1.2 COUNTRY-BY-COUNTRY SITUATION

ARGENTINA

The total number of affected herds (819) recorded in 1986 (787 cattle herds and 53 pig herds, in some cases coexisting) is lower than the average of recent years. Cattle number corresponds to an affected herd rate of 2.7 to 1000. The monthly frequencies noted in affected herds from February to October were always higher than the optimistic forecasts.

The provinces that reported higher numbers of affected herds were: Buenos Aires, Santa Fé, La Pampa and Córdoba, in the humid pampa region, a secondary endemic region where fattening cattle predominate. The most important epidemic situation in 1986 was noted west of the province of Buenos Aires and east of the province of La Pampa, in the second half of the year. The major cause was virus type A. The province of La Pampa in 1986 showed a critical epidemiological situation and was the area responsible for the highest frequency of viruses O and A in all of Argentina. Virus C occurrence was also highly significant.

The disease was also recorded in the provinces of Chaco, Formosa (they belong to a primary endemic ecosystem), Misiones, Catamarca, Santiago del Estero, Tucumán and Mendoza, which correspond to sporadic FMD ecosystems. The situation occurring in the department de Malargue, province of Mendoza, may also be considered epidemic. The critical phase was reached in October and November, and types O and C were identified. The detection of FMD in the province of Mendoza, bordering Chile, has increased the risk for that desease-free country which was obliged to reinforce prevention measures.

Cattle morbidity reached 11.96 per 10,000, lethality was 1.21% and the internal morbidity was 8.17%.

Virus type C_3 was once again predominant in 1986 (88% of the cases). Its presence (315) reached epidemic proportions from January to October, especially in the humid pampa region. Types O_1 and A_{24} were also present in 30 and 11 cases, respectively. In relation to 1985 the frequency of the three virus types increased.

The active virus was identified in only 44% of the recorded affected herds.

Four foci of vesicular stomatitis (Indiana$_2$) were recorded in the province of Buenos Aires (February).

BOLIVIA

Program coverage continues limited officially to the departments of Santa Cruz de la Sierra and Cochabamba, plus the Pilot Plan area of Beni. Information is likewise obtained about other areas of the country, albeit not systematically.

The year of 1986 recorded a low frequency of affected herds in the area under program (22), of which 18 were cattle herds and 4 were pig herds. A large part of those episodes occurred in the first and fourth quarters of the year in the department of Santa Cruz de la Sierra.

The affected herd rate reached 1.64 per 1000, cattle morbidity was 11.2 per 10,000, cattle lethality 7.5% and internal morbidity rate 22.11%.

Virus types O_1 (3) and A_{24} (11) were identified in 1986.

BRAZIL

The number of affected herds recorded during 1986 was very similar but higher than any of the past three years (total of 1746 herds affected, of which 1728 were cattle herds, 1 pig herd, and 17 equine herds). That total confirms a slight upward trend over the past 4 years. However, the magnitude of those numbers is substantially lower than those recorded before 1982. The affected herds rate was 1.1 per 1000. The monthly records of affected herds was below the forecasts, except in April and May when they exceeded the optimistic predictions. Again the two regions recording the highest frequency of vesicular diseases were the Central-West and the Northeast. An upward tendency was also been detected in the North, albeit at levels much lower than those recorded in the preceding regions.

In the Northeast, the states of Pernambuco, Sergipe and Rio Grande do Norte were largely responsible for the very high frequencies that assumed epidemic character in the period from April to September. In the Central-West region, the states of Mato Grosso do Sul and São Paulo, although showing higher affected herds levels, were still lower than the records for previous years, especially in the case of São Paulo. The disease's frequency continued to fall in the South, producing favorable conditions for the start of a disease-eradication phase. That was especially true in the state of Rio Grande do Sul.

In summary, a higher number of herds affected was recorded during 1986 than the previous year (+15%); but in the regions having better organized programs there has been a lower record of vesicular diseases.

Morbidity in cattle reached 5.50 per 10,000, cattle lethality was 1.67% and the internal mordibity rate was 15.77%.

The three types of virus were recorded in the Central-West region, virus type O being predominant. Virus type C was recorded with a low frequency in that region, while viruses O and A were predominant in the Northeast.

The active virus was identified in only 17% of the affected herds, and there was a net predominance of viruses O and A. In relation to 1985, FMD viruses A and C were recorded at lower levels. The subtypes identified in Brazil in 1986 were O_1, A_{24} and C_3.

Fifty foci of vesicular stomatitis were recorded in 1986, with identification of virus Indiana$_3$ Alagoas. The disease was recorded not only in the northeastern region, but also in the states of Minas Gerais, Rio de Janeiro and São Paulo. Of the 50 foci, 17 occurred in horses.

COLOMBIA

A high frequency of herds affected by vesicular diseases (1623) was recorded in Colombia in 1986, the second in order of importance since 1981. The affected cattle herds rate was 3.2 per 1000.

The recorded monthly frequency of herds affected by vesicular diseases during the entire year was higher than the optimistic forecast. In the months of January, February and September it surpassed even the pessimistic forecast. Practically all the virus types presented monthly frequencies higher than the forecasts.

The cattle morbidity due to vesicular diseases was 13 per 10,000, lethality was 2% and the internal morbidity rate was 13.4%.

In pigs affected by vesicular diseases the internal morbidity rate and the lethality rate were each 10%.

Geographic distribution of the vesicular diseases in 1986 was characterized by high numbers in the central departments of the country: Cundinamarca, Boyacá, Santander and Antioquia.

FMD was concentrated mainly in Cundinamarca, Boyacá, Meta and Santander. January, February and August were the months showing the most diagnoses of FMD, and the subtype A Sabana-Col/85 was the most frequent in those four departments. Type O affected a greater number of herds in Cundinamarca, Boyacá, Santander and Tolima in February, March, July and November.

The internal morbidity rate was 17% and the lethality rate 2% in the bovine herds affected by FMD. In herds with existing vaccination internal morbidity was 13%, and in the cattle herds without records of updated vaccination, that rate was 24%.

In pigs the internal mordibity rate for FMD was 36% and lethality 11%.

High frequencies of New Jersey type vesicular stomatitis were recorded in Caldas, Valle, Córdoba and Risaralda in July, September and November. Indiana type vesicular stomatitis posted high frequencies in Antioquia, Caldas and Risaralda, and was most frequent in January, February and August.

In 1986 more episodes of FMD were recorded than vesicular stomatitis. Virus type A was the most frequent (61%), although the epidemic caused by this type declined during the year. The active virus was identified in 47% of the affected herds.

In relation to 1985, virus type O invreased by 86%, while type A dropped 38%, New Jersey dipped 44% and Indiana rose 38%.

The FMD virus subtypes identified in Colombia were O_1, A_{24} and A Sabana-Col/85.

CHILE

Chile continued free of FMD in 1986.

The presence of FMD disease in Argentina, in regions near the Chilean border in the final months of the year, increased the risk for Chile. This is especially true due to the seasonal practice of moving cattle to the Andes mountain in the summer to make use of the fresh pastures (veranadas) that appear after the spring thaws. This risk is maintained from November through April. The Chilean Agriculture and Livestock Service (SAG) has increased the protection measures during the current summer, especially in Regions VI, VII and VIII which are those exposed to greater risk because of the epidemiological situation presented in Argentina. Seven foci of FMD occurred in late 1986 in the departments of Malargue and San Rafael in the province of Mendoza, across from Chile's VII Region.

ECUADOR

The recorded frequency of herds affected by vesicular diseases (85) in 1986 was 31% higher than the 1985 total. Nevertheless this is one of the lowest frequencies recorded in the last seven years.

The affected herd rate was approximately 0.33 per 1000. Morbidity in cattle was 5.6 per 10,000 head, lethality was 0.4 and the internal morbidity rate in affected herds was 16.7%.

Loja, Pichincha and Pastaza were the departments where the vesicular diseases reached frequencies of greater magnitude.

With respect to the virus types, type A was predominant (Pichincha). During 1986 the New Jersey vesicular stomatitis virus was identified only in one affected herd in Ecuador. Worthy of mention was the presence of vesicular episodes in the eastern departments of Napo and Pastaza, where FMD was recorded. In only 31% of the foci was the causal virus identified.

The FMD subtypes identified were O_1 and A_{24}.

FRENCH GUIANA

There was no record of vesicular disease in 1986.

GUYANA

There was no record of vesicular disease in 1986.

PARAGUAY

The 12 episodes of FMD recorded in Paraguay in 1986 were the lowest annual total in the last seven years. The majority of those episodes was concentrated in the winter months. The affected cattle herds rate was 0.06 per 1000 (6 x 100,000).

The geographic distribution of the disease was mainly limited to the central-southern section of the Eastern region (especially in the departments of Central, Ñeembucú and Misiones) and the southern part of the department P. Hayes (in the Western region).

Cattle morbidity was 0.75 per 10,000 animals, lethality was nil, and the internal morbidity rate was 22.10%.

With respect to the types of virus, the only virus typified in 1986 was O_1, detected in only four affected herds. In only one third of the episodes was the agent identified.

PERU

The total number of herds affected by vesicular diseases (93) in 1986 declined in relation to the total of the previous two years, but is higher than the total recorded in the 1981-83 period. The rate of cattle herds affected by vesicular diseases in 1986 was 0.2 per 1000.

The frequency observed in each of the first six months exceeded the optimistic forecast, due to the appearance of a high number of affected herds in Lima and Cajamarca. During the second half of the year the frequencies recorded in Lima and Piura, in Nobember and December, were the only significant ones.

The geographic distribution of the vesicular diseases shows more striking occurrences in Lima (virus type A and Indiana), Cajamarca (New Jersey and Indiana) and Piura (virus type A).

A significantly important epidemiological aspect was the occurrence of virus A in Arequipa, toward the southern part of Peru. During the last two months of the year FMD virus A concentrated its occurrence in Piura (5), Lima (11) and Arequipa (1).

The New Jersey vesicular stomatitis virus was more frequent between March and June in the departments of Cajamarca and Ayacucho. The

Indiana virus was recorded in January and March in several departments between the central and northern sections of the country.

Also affected were 14 pig herds that coexisted with cattle affected on the same properties. No single vesicular disease virus was generally predominant, but the frequency of virus type A was high in November and December. Since 1981 it was the highest recorded frequency of virus A. In only 37% of the vesicular disease episodes occurring in 1986, was the agent identified. The A virus subtype identified in Peru was A_{24}.

Cattle morbidity due to vesicular diseases was 2 per 10,000, lethality was 1.8% and internal morbidity in the affected bovine herds was 11.6%. The internal morbidity in the pig herds affected was 30%.

SURINAM

No vesicular disease was recorded in 1986.

URUGUAY

Uruguay recorded in 1986 the least favorable situation of the last six years, as 58 herds recorded FMD episodes, an increase of 176% in relation to 1985 in the number of affected herds. The affected cattle herds rate was 1 per 1000. The monthly frequencies for April, July and August were strikingly higher than the optimistic forecasts for those months. Virus type C showed a considerable increase in relation to the last seven years, and exceeded expectations for the March to October period.

The geographic distribution indicates a predominance of FMD in the coastal region (near the Uruguay River and the Argentine Mesopotamia area). The departments that recorded a higher frequency were Soriano (16), Colonia (11), Salto (6) and Paysandú (6). Also affected were Tacuarembó (6) and Canelones (5). Virus C was typified in 90% of the cases, and in 53% of the foci the virus type was identified. The subtypes identified in Uruguay in 1986 were O_1, A_{24} and C_3.

Cattle morbidity was 2 per 10,000 and the rate of internal morbidity of the affected herds was 4.6%.

VENEZUELA

The frequency of vesicular disease affected herds in 1986 was one of the lowest recorded in the past few years (94). The rate of cattle herds affected by vesicular diseases was 0.50 per 1000.

Cattle morbidity reached 1.22 per 10,000, while cattle lethality was 0.35% and the internal morbidity rate was 10.76%.

The highest frequencies of vesicular diseases in 1986 were recorded in the state of Táchira, followed by Lara, Yaracuy, Barinas and Guárico.

There were more episodes of FMD (13 diagnoses of virus type O and eight of virus A) recorded in 1986 than of vesicular stomatitis (seven of New Jersey).

The virus was typified in 30% of the vesicular episodes.

The FMD virus subtypes identified in Venezuela in 1986 were O_1 and A_{32}.

2. SITUATION OF THE FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS

2.1 GENERAL SITUATION

The FMD control programs in South America in 1986 continued to suffer the consequences of the overall economical and social crisis. The programs maintained the activities considered basic, such as epidemiological surveillance, control of foci, and systematic vaccination with vaccines subjected to official control. The programs have therefore been able to maintain a level of sanitary activity that is responsible for reducing the seriousness of the disease's repercussions and for maintaining the frequency of foci at a low level in relation to previous periods.

In reaction to this situation, which reflects upon such a serious problem for the livestock industry in South America as is FMD, the countries during 1986 continued their efforts to restructure their national control plans and strenghthen the veterinary services. Their reference framework are the policies and strategies determined by the South American Commission for the Control of Foot-and-Mouth Disease (COSALFA). This process has been stimulated by the favorable results attained in controlling the disease in the southeastern region of the Rio de la Plata Basin, especially in the state of Rio Grande do Sul, Brazil. The technical support of these accomplishments has been based on new strategic, tactical and operational measures designed and applied as the product of an improved epiedmiological awareness of the disease in that region of the continent. The concrete result achieved can be seen in the striking reduction of the occurrence of FMD to the point that endemic ecosystems have undergone changes in the behaviorial pattern of the disease. As a consequence, the disease has not occurred there for more than two and a half years. Concurrently with that accomplishment, there has been a greater rationalization in the use of available resources.

Several South American countries are now engaged in remodelling their programs and negotiating specific funding for them. This is the case of Bolivia, Brazil, Paraguay and Uruguay.

Moreover, during 1986 the Ministers of Agriculture and Livestock of Argentina, Brazil and Uruguay signed an agreement to carry out a subregional plan for FMD eradication in the southeastern part of the Plata Basin. The first phase of the plan will include the state of Rio Grande do Sul in Brazil, all of Uruguay, and Argentine Mesopotamia (provinces of Misiones, Corrientes and Entre Ríos). To this end a specific eradication project has been drafted and complemented by a technical cooperation plan involving the three countries and the Pan American Foot-and-Mouth Disease Center (PAHO/WHO). These plans will enable coordinated action to be carried out by the animal health services of the three countries in that region.

Along this same line of action, another important event in 1986 was the Seminar held in Lima, Peru. There, with the presence of specialists from all the countries of the Andean subregion, the initial bases were laid for a project to attain areas free of FMD in that subregion.

In the final months of 1986, Chile, which continues to be free of FMD had to reinforce its strict populational control and surveillance plan along the border with Argentina. The measures were taken to protect the summer pastures (veranadas) in the Andes mountains, especially in Regions VI, VII and VIII, to cope with the occurrence of the disease in the Argentine province of Mendoza close to Chile's border during the second half of the year.

Nineteen eighty-six also witnessed significant activity within the bilateral border agreements, as the animal health services strived to coordinate their action to prevent and control livestock dieseases.

To coverage provided by the FMD control programs in 1986 achieved levels very similar to those recorded in 1985, as indicated by the following values:

Geographic coverage	61%
Coverage of cattle herds	73%
Cattle population coverage	76%

The geographic coverages of the programs in Bolivia, Brazil and Colombia do not encompass those countries' entire territory. The Amazon regions of Brazil and Colombia, for example, are excluded because the cattle population is still relatively insignificant. The Bolivian program covers only the departments of Santa Cruz de La Sierra and

Cochabamba and, as of 1983, a pilot project area in the department of Beni.

Whereas FMD vaccination strategies in South America differ with the region, vaccination coverage is perhaps best expressed in the ratio of doses/head of cattle. This ratio excludes the vaccine administered to sheep in Argentina and Uruguay.

In a region where the FMD control programs' in 1986 covered 76% of the cattle population, 2.08 doses were administered per head of cattle, varying from 0.20 in Peru to 2.50 in Argentina.

463.7 million doses of FMD vaccine were produced and 463 were submitted to official controls. 427.3 million were approved. The total available quantity was 402.2 million doses. This means a 5% decrease compare to 1985. The PAFMDC produced and distributed 6.8 million doses of oil-adjuvanted vacine to the countries.

The number of field operation units in 1986 remained more or less comparable to the 1985 total, increasing 6% to 2112 units.

Each field operation unit covered and average of 5020 km², 1730 cattle herds and 91,393 cattle.

Available human resources in the programs in 1986 totalled 13,311 personnel, of which approximately 94% are in the field. Of total personnel, 27% are professional staff. The field units have an average of 1.56 professionals, 4.31 support staff, and 2,179 vehicles (according to PAFMDC estimates) to conduct their activities.

The laboratory sector activities occupy 1.7% of the programs personnel, while 3.9% staff of the central units of the services.

Available funding from public sources totalled US$ 63,052,044 in 1986, of which 93% was spent on operating costs. In assessing the available funding in relation to the herds, the FMD programs allocated US$ 17.25 for each cattle herd and US$ 0.33 per head of cattle.

International trade in 1986 was characterized by an increase in regional exchange.

Tables 18 to 34 demonstrate the numbers discussed in this chapter.

2.2 COUNTRY-BY-COUNTRY SITUATION

ARGENTINA

The National Animal Health Services (SENASA) covers the entire livestock population and national territory.

The basic FMD-control strategy, emphasizing the following measures, was continued in 1986:

i) systematic mandatory vaccination of cattle every four months and sheep every six months, north of the Barrancas and Colorado Rivers;

ii) official buffer vaccination in the northern part of Rio Negro province and the Partido de Patagones in the province of Buenos Aires;

iii) strategic vaccination in the rest of Rio Negro and Neuquén;

iv) maintenance of the disease-free area in the provinces of Chubut and Santa Cruz and Territory Tierra del Fuego.

Although during 1986 SENASA sidelined the Argentine Animal Health Plan (PLANARSA) as a priority plan, it did ratify its commitment with Brazil and Uruguay to eradicate FMD within fove years in the southeastern section of the Plata Basin that encompasses the Argentine Mesopotamia region (provinces of Misiones, Corrientes and Entre Ríos).

The government of the province of Entre Ríos continued its efforts to fund the construction of an oil-adjuvanted vaccine production plant with direct cooperation from the PAFMDC. The Center also continued to render technical cooperation to SENASA during 1986.

The private laboratories produced 149.5 million doses of aluminum-hydroxide FMD vaccine, of which 142.2 million were approved by the official quality controls.

With respect to FMD vaccinations, the doses/head of cattle ratio was 2.50 per head, due to the fact that a monovalent vaccine of type C Argentina/84 was administered. Additionally, about 50% of the sheep population in Argentina was also vaccinated.

The service engaged a total of 1589 persons in 1986, of which 317 were veterinarians, 976 paratechnical staff and 296 administrative personnel. The 298 field units engaged 285 veterinarians and 1173 field assistants and administrative personnel. Professional personnel comprise 20%, of which 90% are in the field and less than 1% in the laboratory.

Of the administrative and assistant personnel, 92% work in the field and only 1% in the laboratories.

On the average, each field unit engaged 0.96 professional staff, 3.94 auxiliary and administrative personnel, and 4.3 vehicles out of the total fleet of 1292 vehicles. Each field unit covered an average of 9328 km², 974 herds and 169,688 cattle. Thus each veterinarian tended 1018 herds and 177,428 cattle, while the ratio of field personnel was one to 247 herds and to 43,109 cattle.

Of the 17.8 million dollars available to the program in 1986, 94% was earmarked for operating expenses. In relating those figures to the herds, the following breakdown can be established: SENASA has US$ 61.36 for each cattle herd and US$ 0.35 for each head of cattle, the vaccine and vaccination costs that are the responsibility of the cattleraisers themselves.

The animal health border agreements continued their activities during the year along the border with Chile and in the Plata Basin area bordering Brazil, Paraguay and Uruguay, as well as in the Andean area bordering Bolivia.

The year in review was characterized by the decision regarding the new FMD eradication program in Argentina, which lost its priority. At the same time Argentina actively took part in the joint effort with Brazil and Uruguay to implement the FMD eradication plan in the southeastern section of the Plata Basin.

BOLIVIA

The area under program, covered by the National Service for the Control of Foot-and-Mouth Disease, Rabies and Brucellosis (SENARB), encompassses the departments of Cochabamba and Santa Cruz and a pilot plan in the department of Beni (three provinces). That accounts for 487,166 km², 49.114 cattle herds and 2,548,500 cattle. Nevertheless the area in which the program conducts its activities includes 65% of the land surface of those three zones.

In national terms, the program therefore actually covers 29% of Bolivia, 11% of the cattle herds and 9% of the national cattle population.

SENARB operated 18 field units in 1986. On the average, each unit engaged 3.1 professional staff (including 10 non veterinarians), 4.8 assistant staff (excluding 17 lab personnel) and 1.4 vehicles.

According to the 1986 data, each field unit in the program area covered an average of 17,703 km², 611 cattle herds and 27,778 cattle.

Each veterinarian therefore serviced an average of 239 herds and 10,870 cattle.

SENARB's funding totalled US$ 349,156 in 1986, of which 89% was spent on operating costs.

When expenditures are assessed in relation to the herds only in the area where animal health activities are conducted, within the area under program, the following results are produced:

US$/cattle herd tended	31.76
US$/head of cattle tended	0.70

These figures exclude the costs of vaccine and vaccinations, which are the responsibility of the cattleraisers themselves.

Bolivia does not produce FMD vaccines. It imports all vaccines and utilizes oil-adjuvanted vaccine produced by the PAFMDC. In 1986 Bolivia imported 260,000 doses from Brazil.

The vaccination of cattle herds was 50% in the area under program, and 11% in relation to the total of herds in that area. With regard to cattle, 0.52 doses/head of cattle were applied in the area where activities are carried out, which corresponds to 0.1 dose/head of cattle in the area under program.

The vaccination activities are complemented with sanitary education and animal-transit control activities. Fifty-two auctions totalling 72,252 cattle were controlled, while transit of 54,703 cattle and 10,960 pigs was controlled.

Bilateral animal health meetings were held during the year with Argentina, Brazil, Paraguay and Peru.

SENARB has concluded some works as part of the project funded by the Inter-American Development Bank (IDB). They are part of the first stage of the Plan to Control Foot-and-Mouth Disease, Rabies and Brucellosis; other works are currently in the adjudication and execution phase.

BRAZIL

The National Foot-and-Mouth Disease Control and Eradication Plan (PNCFA) covered 36% of the land surface, 57% of the herds, and 64% of the cattle population. The figure referring to the land surface is low because it excludes the extensive Amazon region where the animal population is sparse, as well as a large region corresponding to the

states of the Northeast, Bahia and Minas Gerais. The plan continued operating in 21 units of the Brazilian Federation. Only some states in the North and Central-West regions remain to be included.

Eight private laboratories produced 219,492,570 doses of saponin-aluminum hydroxide adjuvanted inactivated FMD vaccine, 13% more than in 1985. Additionally, 16,944,230 doses of oil-adjuvanted vaccine (down 17%) were produced and utilized on a priority basis in strategic areas. Official control approved 196,229,730 doses of traditional vaccine and 12,095,515 doses of oil-adjuvanted vaccine, or 89% and 71% of the output, respectively. The control methods utilized were the BPD_{50} technique and the percentage of protection against footpad generalization. Those results generated a 12% increase in available vaccine in 1986, providing 208.3 million doses as compared with the 186.0 million doses in 1985.

Vaccination coverage in the area where program activities are conducted reached 846,811 herds (53%) and 61,625,750 cattle (71%), yielding a dose/cattle ratio of 2.40. That ratio is on a par with the previous year. The oil-adjuvanted vaccine used in some areas of the country was produced by the Regional Support Laboratory (LARA) in Campinas, São Paulo, by the PAFMDC/PAHO, and by some private laboratories. The vaccine was administered by the cattleraisers under the supervision of official personnel.

The program operates 1191 field units (up 8% from 1985) covering an average of 2544 Km^2, 1354 herds and 72,756 cattle.

The program engages 8156 persons, divided into 2332 professionals and 5824 auxiliary personnel. Excluding the personnel at the central level of the Ministry of Agriculture in Brasilia (27 professionals and 25 assistants), each professional staff member services an area of 1314 Km^2, 700 cattle herds and 37,593 cattle.

Brazil's 1986 report to COSALFA does not indicate the number of vehicles in the program fleet. The information provided on the program's financial resources amounts to 35.7 million cruzados; that totals US$ 2.55 million at the average exchange rate in 1986 of US$ 1.00 = Cz$ 14.00. That amount is extremely low for the expenses sustained by the FMD control program in Brazil. It is likely that the mentioned amount refers only to the funds available through the Secretariat of Animal Sanitary Defense (SDSA) of the Ministry of Agriculture, for that purpose. In this case, the part corresponding to the funds from the State Departments of Agriculture that take part in the program would not be included.

The PAFMDC has conducted an estimate of the financial resources applied by Brazil in the program. The estimated total is US$ 32.68

million, of which 95% is spent on operating expenses. These figures, when related to the herds, yield the following sums: US$ 20.27 per cattle herd and US$ 0.38 per head of cattle in the area where the program is being conducted.

For lack of funds the SDSA was unable to proceed with the personnel training program as originally planned. That was also one of the reasons that restricted the development of sanitary education activities.

Through meetings involving the bilateral border agreements with Argentina, Bolivia, Colombia, Paraguay and Uruguay, Brazil in 1986 conducted extensive activity in international sanitary coordination.

Jointly with Argentina and Uruguay, they decided to put into action the project for eradication of FMD in the Plata Basin area, including the state of Rio Grande do Sul. To this end, in addition to relying on the project, they signed a technical cooperation agreement with the PAFMDC/PAHO for implementation of the project.

Regarding international trade in 1986, the most significant import event was the purchasing of beef from European countries, the USA, Paraguay and Uruguay, of milk from European countries and of pork from several sources including Asia and South America. With respect to imports and exports of animals and genetic material, commercialization characteristics were similar to those of previous years.

In 1986 the procedures leading to the final revision of the document for the second stage of the national animal health plan were concluded The plan has been approved at the national level and has been submitted to the World Bank for final consideration.

COLOMBIA

The FMD control program is nationwide is scope, excluding the Amazon region. Various different strategies have been established according to the disease's regional epidemiological characteristics in the country. In the northeastern section of the country, the area of Chocó is a free zone which applies strict population and mobilization controls, inspects farms on a systematic basis, does not administer any vaccine, and eliminates the animals in case of an outbreak. This area is protected by a buffer-like zone where strict programs emphasize control of animal transit and mobilization, epidemiological surveillance, prompt attention to foci, and massive systematic vaccination. A change of strategy was effected in 1986 in the area of Urabá, Antioquia the area under the ICA/USDA project. The goal is to expand the free area eastward until it encompasses the entire northern coast, which accounts for 50% of Colombia's livestock.

In the economically important livestock areas on the northern coast, eastern plains and inter-Andean valleys, vaccination cycles are conducted every four months. Varying levels of coverage are achieved according to the program's progress. Vaccination is also done every four months in areas of lesser livestock importance, but not in cycles.

During 1986 a specific program for the Bogotá plains and its sources of feeder cattle was drawn up and put into practice. The program intends to prevent the occurrence of epidemics in that region by controlling the animals brought into the Bogotá Sabana area and by raising the immune level of livestock in the area. The procedure will include specific vaccination for this region. The officially administered vaccination in the Sabana of Bogotá and Ubaté and Chiquinquirá valleys achieved 75% coverage of the cattle population.

Projects were drawn up for the region of the Piedemonte plain with a massive vaccination strategy. Another project was prepared for the department of Caquetá, controlling the entry of animals and eliminating foci.

The only FMD vaccine-producing laboratory -VECOL- produced a total of 30.5 million doses distributed in 34 batches. The major portion of vaccine is the bivalent (O-A) inactivated saponin-hydroxide type, with cell-culture produced antigen. Of these vaccines 29.6 million doses were submitted to efficacy control tests; 29.5 million doses in 32 batches were approved. Of all the vaccine 910,360 doses are oil-adjuvanted, of which 909,300 were controlled and 762,900 were approved.

The vaccines are tested by the protection against foot generalization test in cattle, the expected percentage of protection, and the guinea pig PD_{50} tests.

26.5 million doses were distributed for vaccination purposes, yielding a ratio of 1.6 doses/head of cattle in the area where program activities are conducted.

The program engaged 195 professional staff and 611 technical and administrative personnel in 111 field operation units. 86% of the professionals and 91% of the technical and administrative assistants work in the field. Each field unit covers an average of 6187 km², 3980 cattle herds and 147,690 cattle. Veterinarians averaged coverage of 2646 herds and 98,165 cattle, while each field staff member accounted for an average of 793 herds and 29,432 cattle. The FMD program consumed 70% of the personnel's time.

Of a total of 360 vehicles, 346 are engaged in the field. Each of the field vehicles covers, on the average, 1985 km², 1277 herds and 47,380 cattle.

The program had an allocation of US$ 5 million in 1986, of which 96% was expended on operating expenses and 4% on capital costs. Funding was from public sources.

Private funding, which provided US$ 6.2 million, is derived from buying and application of the vaccine by the cattleraisers.

In relation to their application to herds, the US$ 5 million in public funds allow US$ 11.40 per herd and US$ 0.31 per head of cattle.

In 1986 Colombia imported cattle and cattle semen from the USA, Canada, Chile, Costa Rica, and Panama and pigs from the USA and Panama. The significant exports were fowl to Ecuador and Panama.

Regarding international coordination activities, meetings were held by the animal health border commissions on agreements with Brazil, Ecuador and Venezuela.

The epidemiological situation experienced in 1986 should serve to point out the need to reactivate Stage II of the Program.

CHILE

Chile is free of FMD. Its prevention program covers the entire nation of 757,720 km² with susceptible populations of 3,818,682 cattle, 5,678,325 sheep, 1,134,516 goats, 890,871 pigs and 100,173 camelidae. The program's strong component is the epidemiological surveillance system for prevention and the control of inbound animals, products and byproducts of animal origin at ports, airports and borders.

The Program's strategy is based on situational diagnosis of the risks of introducing FMD and other exotic diseases over the borders, or through ports and airports. The data compiled in the 13 regions into which the country is subdivided are processed for use in the exotic diseases program. This activity has received technical cooperation from the PAFMDC/PAHO.

The program for prevention of FMD and other exotic diseases is based on the effectiveness of a system of epidemiological surveillance of and controls at ports, airports, border check stations, places where livestock concentrate, etc. These elements include livestock centers having certain relationships with ports and airports (proximity, possibility of receiving garbage or refuse, etc.), summer pasturelands (veranadas) bordering Argentina and the highlands bordering Peru and

Bolivia. Since 1985 the (SAG) of the Chilean Ministry of Agriculture has conducted feasibility studies about controlling the use of the summer mountain pasturelands in order to exclude the presence of economically important livestock susceptible to FMD in zones near the border. The purpose of that study is to find alternatives for structuring and conserving the renewable natural resources in the areas of the Andes and the Andean foothills. This might enable the government to have a solid basis not to authorize the use of the "veranadas" by animals susceptible to FMD, thus reducing the chance of contact with Argentine livestock. A strip of land in the Andes in Regions VI, VII and VIII has been put off limits to livestock in order to prevent contact between Chilean and Argentine cattle, in view of the FMD occurrence near the border in the province of Mendoza, Argentina.

Detailed characterization of the northern highland plateau in Regions I and II, near the Peruvian and Bolivian borders, also got underway in 1986.

Chile continues to maintain a permanent stock of 50,000 doses of vaccine for emergency purposes, stored at the PAFMDC in Rio de Janeiro, Brasil.

The FMD prevention program in Chile engages 62 veterinarians and 121 administrative and field assistants in 56 field units. Each field unit covered an average of 13,530 km², 3376 cattle herds and 68,191 cattle. 98% of the personnel are engaged in the field, and each veterinarian covers an average of 3150 herds and 63,645 cattle. The program's regular funding in 1986 amounted to US$ 317,048, of which 96% was spent on operating expenses. In turn, 72% of that amount was allocated to the field units.

In accordance with the funding allocated to the prevention program, the following cost relation were achieved: US$ 1.61 per cattle herd and US$ 0.08 per head of cattle.

The Exotic Diseases Prevention and Emergency Program of the Livestock Protection Division of the SAG intensified its professional training activities. 43 professionals received training in Chile and 5 were trained abroad. The educational program seeking community involvement in emergencies has been continued. Work is also underway to discourage the use of the summer highland pastures in some regions of the country, in order to reduce the risk of bringing FMD virus in through the Andes.

Together with these measures, as long as there is FMD in neighboring Argentina, Chile and that country must establish a joint program involving the Andes mountains region between the provinces of

San Juan and Neuquén in order to protect Chile's status as a disease-free country.

Coordination activities at the national and international levels have been continued. They included the meetings of the activities involving the bilateral border agreements with Argentina and Peru.

ECUADOR

The National Animal Health Program covers the entire country and its livestock population of 3.4 million cattle distributed into 246,628 herds.

The predominant risk factors in the spread of FMD in 1986 continued to be the uncontrolled mobilization of animals and the low FMD vaccination coverage.

The program had available 1,541,000 doses of inactivated O-A bivalent vaccine, of which 600,000 doses of oil-adjuvanted vaccine were supplied by the PAFMDC. The cattle population vaccination coverage remained at low levels in 1986; only 30% of the cattle herds were vaccinated, a fact reflected in the 0.45 dose/head of cattle ratio.

The program operated 60 field units with 94 professional staff and 251 assistants. 74% of the professionals and 89% of the assistant staff are in the field. The average coverage attained per each field unit was 4450 km², 4110 cattle herds and 56,713 cattle. 54 vehicles were available to the program.

Each field professional covers an average of 3523 cattle herds and 48,611 cattle.

Operating expenses reached US$ 1,846,641 of which 69% was spent on the field activities.

When the financial allocations are broken down they allot US$ 7.49 per cattle herd and US$ 0.54 per head of cattle.

The border sanitary agreement with Colombia proceeded actively and activities within the agreement with Peru were also developed. No significant steps were taken during 1986 with respect to the project for the Second Stage of the FMD Control Program.

PARAGUAY

The FMD Control Program of the National Animal Health Service (SENACSA) covers the entire nation of 406,752 km² and the cattle population of 7,148,447. Based on the ratio existing between head of

cattle and herds in the area where program activities are conducted, a rought estimate sets the total of herds in Paraguay at about 187,608.

The control strategy consists of massive immunization, sanitary control of animal mobilization (26,000 herds of animals and 894,176 cattle) and active epidemiological surveillance. In some regions having endemic charcteristics oil-adjuvanted FMD vaccine has been utilized.

Two private laboratories produced 9,279,750 doses, including the first batch of 120,000 doses of oil-adjuvanted vaccine prepared by one of the private labs. That batch was submitted to quality control by means of the protection against foot generalization protection method. All the 9,729,750 doses were submitted to official control by serological tests and totally approved. The program also imported 1,000,000 doses of oil-adjuvanted FMD vaccine from the PAFMDC.

The oil-adjuvanted vaccine continues to be used in the pilot project of Caapucú and Quiquihó in the Mennonite Colonies in both the eastern and western regions of seven districts of the department of Ñeembucú, as well as on dairy farms near Asunción, around the Central Laboratory, and areas around sites of cattle auctions, shows and expositions.

Average vaccination coverage in 1986 was 106,574 cattle herds and 4,021,141 cattle. That represents 56% of the national total. In the western region, where a regionalized vaccination program exists, coverage reached 34% of the cattle.

The program in 1986 engaged 124 professional staff, 434 administrative and assistant personnel and 69 vehicles. It operated 44 field units. 28% of the human resources are deployed in the central unit and 57% in the field. The average coverage of each field unit was 9244 Km^2, 4264 cattle herds and 162,465 cattle. The field veterinarians each averaged 3076 herds and 117,187 cattle. The financial resources totalled US$ 2.87 million of which 62% were spent on operating expenses. 43% of the funding was allocated for field work.

The breakdown of funding available to the program yields US$ 15.30 per cattle herd and US$ .40 per head of cattle.

Activities under the animal health border agreements with Argentina, Bolivia and Brazil were continued. Within the agreement with Brazil, the 4th meeting of epidemiologists was held with the presence of an observer from Argentina.

There continues to be close interinstitutional cooperation with other public and private sectors inside the country.

A program to fight FMD in Paraguay is being drafted to define the eradication goals that can be met in the next few years, beginning with the eastern region. The project will have technical advisement from the PAFMDC and is expected to be submitted to the government for funding.

In compliance with recommendations issued by COSALFA, the program continues applying animal health standards for various livestock-expansion programs underway in the country.

International trade involved significant imports of cattle semen principally from England and the USA. With respect to species not susceptible to FMD, the importing of poultry and fowl from Brazil, Germany and Holland was important.

PERU

The FMD Control Program encompasses the entire nation, covering 1,282,120 km², 463,182 cattle herds and 3.4 million cattle.

The official laboratory produced 1,140,240 doses of bivalent FMD vaccine, of which 768,440 doses were officially controlled and 100% approved. 371,800 doses are currently in the process of control and 100,000 were exported to Bolivia.

Vaccination, limited solely to cattle, is conducted in three cycles in the departments having the greatest FMD risks: the borders along Ecuador and Bolivia, and the departments of Lima and Arequipa. The other departments on the coast provide two vaccinations annually, except for Tacna where vaccination is not systematic. In the departments including the northern and central sierras and the jungle area one annual vaccination is administered.

Vaccination is not regularly scheduled in the departments of Ayacucho, Huancavelica, Apurimac, Cuzco and Madre de Dios, where livestock is vaccinated only for transit purposes. The populational vaccination coverage was rather low in 1986. The FMD vaccination records, which are maintained by official personnel, indicate that coverage reached 45,673 cattle herds (10%) and 470,577 cattle (14%). Another indicator of the FMD vaccination situation is the ratio of available doses/cattle, which in 1986 was 0.20 doses per head; that was extremely low, even considering the different regional modalities of vaccination.

The program staff totalled 98 professionals and 420 technical and administrative personnel. 97% of the human resources are deployed in the field. 145 vehicles were available, of which 143 are assigned to the 144 field offices. The personnel also provide other animal health

activities. The average coverage by each field unit was 8904 km², 3217 cattle herds and 23,552 cattle. The average coverage per field veterinarian was 5035 herds and 36,864 cattle.

The official budget of US$ 1,089,714 in 1986 was 94% used to cover operating expenses. Thus the funding alloted US$ 2.35 for each herd of cattle and US$ 0.32 for each head of cattle.

The international trade records reflected imports of cattle from Chile, the USA, Argentina, Brazil, Panama, Spain, Canada, Colombia and Uruguay. Semen was likewise imported from the USA, Canada, Germany and Australia, and pigs came from the USA, Chile, Panama and Uruguay.

URUGUAY

The General Board of Veterinary Services of the Ministry of Agriculture, Livestock and Fishing proceeded with the FMD Control Program throughout all of Uruguay. It covered 100% of the cattle and sheep population.

The animal health control policy emphasizes massive immunization, epidemiological surveillance and prompt attention to foci. The goal is to achieve full eradication of the disease over the short term. FMD has been limited to sporadic occurrences in Uruguay.

The output of vaccine in 1986 totalled 33,076,060 doses. 28,949,100 doses were submitted to official control and 97% (28,212,850 doses) were approved. 828,000 doses were exported to the Philippines.

Population vaccine coverage in two stages, and one specifically for calves, reached 93% of the cattle. It should be noted that the program continued the recently implemented schedule of conducting two general nationwide vaccinations of the cattle population in the first two weeks of May and November, and only calves in March. The annual massive vaccination of sheep is still conducted in December and January. Considering these vaccination schedules, the dose/cattle ratio in 1986 was 1.96.

The Program engaged 112 professional staff and 483 administrative and assistant personnel. 71% of the personnel are assigned to the 41 field units. 150 vehicles comprised the program fleet. Each field unit averaged 2.07 professionals, 8.46 administrative and assistant personnel, and 3.5 vehicles. The average field unit covered 3963 km², 1279 cattle herds and 226,902 cattle.

Each field professional (85) was responsible for 617 cattle herds and 109,447 cattle.

The Program received US$ 2,373,400 (the 1985 total) of which 100% was spent on operating expenses. 72% of the budget was allocated to the field units. Uruguay therefore alloted US$ 45.24 per cattle herd and US$ 0.26 per head of cattle under the program. The vaccine and vaccination costs were covered by the ranchers themselves.

Meetings were held in 1986 with animal health authorities from Argentina and Brazil within the framework of the border sanitary agreements. The "Manual of Procedures for Joint Action in the Agreement Area" was approved; a plan of action was also prepared for the eradication of FMD in the Plata Basin.

Concerning international trade in 1986, as in previous years, Uruguay was mainly an exporting country. Exports included cattle to Argentina, Bolivia and Paraguay, sheep to Peru, and horses mainly to Argentina, Brazil, Italy and Paraguay.

VENEZUELA

The Animal Health Division conducts the FMD control program throughout the entire country, covering 911,930 km², 160,173 cattle herds and 11.8 million cattle. The program is based on epidemiological surveillance, prompt attention to outbreaks, and vaccination.

The program in 1986 had available 9,244,950 doses of vaccine, of which 7,644,950 were controlled and approved attenuated live-virus vaccine produced by the Ministry of Agriculture and Livestock. Likewise, 350,000 doses were inactivated virus vaccine imported from Colombia (VECOL) and 1,250,000 oil-adjuvanted vaccine produced at the PAFMDC.

The overall vaccination populational coverage was low if we consider that only 19% of the cattle herds were vaccinated and that the dose/cattle ratio was 0.71. But it mus be kept in mind that the coverage by districts and vaccination areas varies according to the control strategies established in accordance with the regional characterization of the livestock raising activity and the type of vaccine utilized. Vaccination is conducted by official personnel and authorized private veterinarians. The inactivated and the oil-adjuvanted vaccines are applied according to the type of ecosystems.

The program continues exercising control of internal livestock movement and strict quarantine at international airports, international ports, border stations and postal customs offices.

The Animal Health Division operates through 149 field offices. Personnel total 188 professionals and 214 administrative and assistant staff. The automotive fleet comprises 314 vehicles, all assigned to the field activities. Of the 188 professionals and 214 other personnel, 177

and 208 are assigned to the field, respectively. The field units therefore have an average of 1.2 professional staff, 1.4 administrative and assistant personnel, and 2.1 vehicles.

The average coverage per local field unit was 6120 km², 1075 cattle herds and 79,487 cattle. The average field professional attended 905 herds and 66,913 cattle. The animal health service personnel cover all the sanitary aspects of the livestock sector.

Financial resources in 1986 amounted to US$ 1,052,267. That total made available US$ 6.60 per cattle herd and US$ 0.09 per head of cattle.

Construction proceeded on the oil-adjuvanted vaccine production laboratory that will be the cornerstone for reformulating the country's FMD control program.

3. CONTINENTAL VESICULAR DISEASE SURVEILLANCE AND INFORMATION SYSTEM: RESULTS AND PERFORMANCE

3.1 RESULTS IN SOUTH AMERICA

As in preceding years, the behavior of the vesicular diseases in South America in 1986 was continuously monitored by means of a system of indicators that enable analysts to characterize and interpret the levels of occurrence and the behavior of the virus types. The historical series of vesicular disease occurrences stored in the PAFMDC computer is used to interpret the significance of the weekly frequencies of vesicular disease recorded on a grid map, and the frequency of affected herds, by virus types, by each country's political and administrative subdivisions, and total.

Figure 1 shows that there was a significant number of grid squares where vesicular diseases were recorded for more than 15 weeks of the year in 1986: the Humid Pampa of Argentina, the northwestern and central-south regions of Colombia, and the northeastern section of Brazil.

In the last few years, the number of grid squares representing the map of South America where disease was recorded for more than 15 weeks has been kept low, that is, from 1% to 3% of all the grid squares of the continent. These percentages are lower than those recorded prior to 1980.

Table 5 shows for each country of the continent the months when the recorded frequency of herds affected by some type of virus significantly exceeded the expected frequencies. These situations may be

considered epidemic. The most characteristic situation in 1986 in this sense was found in Colombia, where the FMD virus and vesicular disease viruses frequencies were high. Another critical situation occurred in Argentina, a continuation of the 1985 occurrence caused by virus type C.

3.2 PERFORMANCE IN SOUTH AMERICA

This chapter assesses the operating performance of the transmittal of communications within the Continental Epidemiological Information System, especially in terms of the regular flows of information between the national animal health services in South America and the PAFMDC.

3.2.1 Comunications of Alert

Notices of alert were frequently telexed or telegraphed in 1986 to several countries of the continent to warn them of the appearance of vesicular diseases in neighboring countries' areas near their borders, and to inform of disease occurrence in previously unaffected areas. Alerts were also sent to other agencies, veterinary services of the European Economic Community (EEC) and to the World Reference Laboratory at Pirbright, England.

3.2.2 Weekly transmittal of information on the presence of vesicular disease, by grid squares

The personnel engaged in the national control programs is aware that the map of each South American country has been subdivided into a grid map based on geographic coordinates. The grid map serves as a guide for a weekly telex communication of the presence of vesicular disease (regardless of the number of episodes). A numerical code is employed to indicate both the week reported and the grid squares affected. The PAFMDC prepares the code annually and distributes it to the countries at the beginning of each year. The telexed notice received from the reporting countries then serves as data input for the PAFMDC's epidemiological file stored in a Digital 1134 computer. The PAFMDC issues a weekly printout named the Weekly Epidemiological Report for distribution to the South American countries and to other countries and agencies.

a) - Reporting level

The reporting level of the weekly communications sent to the PAFMDC by the South American countries in 1986 reached 98.7%, an adequate level in relation to preceding years: 1985 (99.8%), 1984 (98%), 1983 (99.6%), 1982 (97%), 1981 (96%), 1980 (99%), and 1979 (97%). The Center received an average of 51.3 weekly communications in relation to the 52 weeks on its codified report calendar.

Except of Bolivia, Peru and Uruguay, the reporting countries forwarded all their respective reports (Table 35).

b) - Publishing level

Considering the data received by the PAFMDC, 97.6% of the weekly reports were published. there was a decline in relation to 1985, even though the PAFMDC published information received after the receiving deadlines.

c) - Prompt transmittal of weekly communications

Bolivia, Colombia and Peru improved and transmitted their weekly reports in a more timely fashion than in 1985. Argentina, Brazil and Venezuela were less prompt. Ecuador, Paraguay and Uruguay showed no change from 1985.

3.2.3 Monthly information on vesicular disease episodes and their laboratory diagnosis

This information reports the number of herds affected, according to each country's political and administrative divisions, and the number of affected herds from which specimens were collected, according to the type of virus identified.

a) - Reporting and publishing levels

Both the reporting and publishing levels declined in comparison to the 1985 levels (Table 36).

Brazil, Colombia, Paraguay and Uruguay all maintained their good reporting and publishing performance, while the levels for Argentina, Bolivia, Ecuador and Peru slipped. Venezuela's monthly series was incomplete at the close of the year in review. The overall publishing level is favorably influenced by the PAFMDC's policy of including overdue months in any of the numbers of Volume 18 of the Monthly Epidemiological Report.

b) - Monthly reporting delays

As shown in Table 37, the South American countries were inconsistent in transmitting their Monthly Epidemiological Reports promptly to the PAFMDC on time. Generally speaking, the countries were less than prompt. Only Brazil, Colombia and Paraguay maintained acceptable levels, even though their transmittals were approximately a month late. The other countries of South America posted delays of up to two months, which is too long. It would be ideal if reports were received no more than a month late.

In general the monthly reporting system continues to suffer from the same shortcomings noted in previous years. The lack of punctuality in forwarding reports to the PAFMDC has worsened. The countries repeatedly fail to provide the epidemiological comments required for data interpretation and to locate the virus types on the grid map. Only Argentina, Colombia, Ecuador, Paraguay and Peru have complied with the necessity of locating the virus types on the grid map.

3.2.4 Surveillance activities: laboratory confirmation

Specimens were collected for laboratory diagnosis in approximately half of the total number of herds with animals showing clinical symptoms of vesicular disease in 1986. Argentina, Bolivia, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela recorded favorable performance in this field work. On the other hand, Brazil collected very little material for diagnosis. In general, the level of specimen collection is low (Table 38).

With regard to virus identification, this was accomplished in only one third of the episodes having clinical signs of vesicular disease (34%). This result in itself reflects a situation of great concern for a very important aspect of epidemiological surveillance.

Bolivia and Uruguay performed well in this area, while Brazil produced low levels of virus identification.

The monthly communication of information on the active virus subtypes must be improved. This is a very important requirement for providing information to the COSALFA countries, other countries and international agencies.

3.3 PERFORMANCE IN CENTRAL AMERICA AND MEXICO

This chapter assesses the operational performance of the communications of the Continental Epidemiological Information System between the national animal health services of Mexico and the Central American countries, and the PAFMDC, which is the organization responsible for overseeing that system Table 39).

3.3.1 Communications of Alert

Alert notices were telegraphed to Panama in 1986 to advise of vesicular disease episodes in Colombia near the Panamanian border.

3.3.2 Weekly communication on the presence of vesicular disease by grid squares

The map of each country in this region of the Americas has been subdivided into a grid map based on geographic coordinates. The map serves as a guide for weekly telex notification of the presence of vesicular disease (regardless of the number of episodes). The PAFMDC annually prepares a numerical code employed to indicate both the week reported and the grid squares affected. The code is distributed to the countries at the beginning of each year.

a) - Reporting level

Excluding Belize and Nicaragua, which did not send in reports, Mexico and the other Central American countries provided 94% of the weekly reports due to the PAFMDC. Of the countries that reported, only Honnduras was below that percentage. Considering the six countries that did forward reports, the Center received an average of 49 weekly reports out of the 52 weeks on its codified report calendar.

b) - Publishing level

Considering the data received by the PAFMDC, all the weekly reports were published. The publishing level reached 100% because the PAFMDC published even the weekly reports that were received late.

c) - Prompt transmittal of weekly communications

Honduras and Panama were the two countries that transmitted their reports to the PAFMDC with least delay.

3.3.3 Monthly information on vesicular disease episodes and their laboratory diagnosis

This information reports the number of herds affected according to each country's political and administrative divisions, and the number of affected herds from which specimens were collected, according to the type of virus identified.

a) - Reporting and publishing levels

As Table 40 indicates, the majority of the countries of the region achieved excellent reporting levels in 1986.

b) - Monthly Report delays

The Central American countries and Mexico were generally late in transmitting their Monthly Epidemiological Reports to the PAFMDC, as

shown in Table 41. Only the average delays by Panama and Guatemala may be considered very acceptable when the overall experience in South America is taken into consideration.

3.3.4 Surveillance activities: Laboratory confirmation

Slightly more than half of the herds with animals having clinical signs of vesicular disease in Mexico and Central America in 1986 provided positive results in the laboratory diagnosis. Panama, Guatemala, Nicaragua and Costa Rica performed well in this field activity.

3.3.5 Support of the vesicular diagnosis laboratory LADIVES, in Panama

The Vesicular Diseases Diagnosis Laboratory (LADIVES) continued functioning normally. Located in Panama, that laboratory sends the PAFMDC a monthly report on the results of virus typification, and plots them geographically in the department or province where the typified virus episode occurred.

3.4 EXTENDING THE PROCEDURES TO HOG CHOLERA

The Continental Vesicular Diseases Epidemiological Surveillance and Information System, coordinated by the PAFMDC, now receives the participation of practically all the Latin American countries in the mechanism of weekly telexed reports based on grid maps. The procedures have become regular and systematic.

Whereas Hog Cholera is economically and socially a very important disease, the information-gathering system is being extended to include it through the joint action of the PAHO/WHO and the Interamerican Institute of Cooperation for Agriculture (IICA). The system's procedures will gradually be improved, especially as the national programs adequately develop and implement their information systems by making use of the existing mechanisms and their experience with the vesicular diseases.

Another step forward is planned in 1987. In addition to the weekly country reports that the PAFMDC publishes in its respective international bulletin, referring to notifications or suspected occurrences on a grid map, the monthly report on vesicular diseases will begin to include results of laboratory confirmation diagnoses of Hog Cholera.

3.5 RECOMENDATIONS

Continue to emphasize the following points:

a) - Carefully maintain and improve the epidemiological information system that is a valuable working asset for all the countries of the continent, a precious mechanism of support to the programs, and one of the most important animal health accomplishments in South America. Every possible effort must be made to prevent a decline in the system and its performance.

b) - Transmit the weekly and monthly epidemiological reports more punctually to the PAFMDC.

c) - Carefully ensure that the information generated by the system is timely, reliable, up-to-date and is transmitted in accordance with the prescribed forms and standards.

d) - Make greater use of the information as an objective base for the epidemiological characterization of FMD and subsequent readjustment of the overall control goals and strategies, such as the monitoring and solving of epidemic situations.

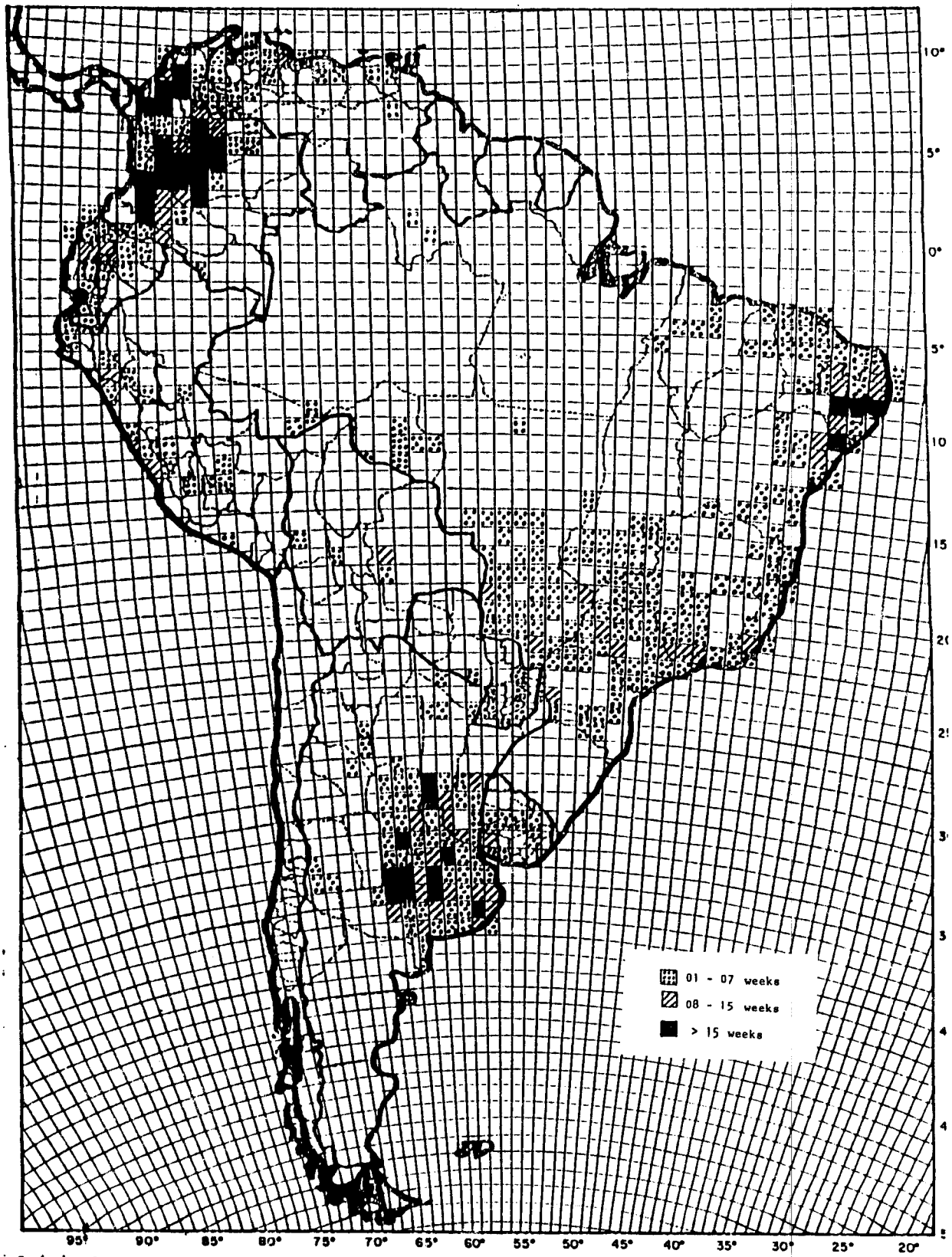
e) - Include monthly information on identified subtypes and locate the identified types on the map.

f) - In the case of epidemic situations, keep the PAFMDC permanently informed. It is the reference body for consultation by the neighboring countries, international agencies and other countries. On a weekly basis at least, complete information should be forwarded not only showing the affected grid squares, but also the number of foci and typification by grid squares. If a variant appears, indicate the grid squares where it is being identified. Additionally the reports should also include the degree of morbidity that is being recorded.

g) - Encourage greater integration between the laboratory and the central and field-level epidemiologists, in pursuit of the correct inclusion of the information on types and subtypes and their repercussion on FMD epidemiology.

h) - Regularly forward to the PAFMDC field specimens for the reference laboratory.

FIGURE 1. DISTRIBUTION OF GRID SQUARES ACCORDING TO THE NUMBER OF WEEKS WITH VESICULAR DISEASE OCCURRENCE. SOUTH AMERICA, 1986



Original C.P.F.A.

TABLE 1. Number of herds affected by vesicular disease, and causal agent. South America, 1986.

Country	Affected herds	Affected herds with samples collected	Diagnosis				
			Foot-and-mouth			Vesicular stomatitis	
			O	A	C	New Jersey	Indiana
Argentina	819	512	30	11	315	-	4
Bolivia	22	19	3	11	-	-	-
Brazil	1746	522	126	102	17	-	50
Chile	-	-	-	-	-	-	-
Colombia	1623	1042	182	280	-	130	173
Ecuador	85	46	6	19	-	1	-
Paraguay	12	5	4	-	-	-	-
Peru	93	45	—	17	—	6	12
Uruguay	58	35	2	1	28	-	-
Venezuela	94	55	13	8	-	7	-
Total	4552	2281	366	449	360	144	239

TABLE 2. Herds affected by foot-and-mouth disease according to type of virus, by country and year. South America, 1986.

Country	Type of virus	1980	1981	1982	1983	1984	1985	1986
Argentina	O	44	64	13	351	90	10	30
	A	339	429	39	23	6	5	11
	C	37	22	4	196	348	288	315
Bolivia	O	9	2	-	1	3	6	3
	A	5	3	3	1	8	-	11
	C	2	7	7	3	1	3	-
Brazil	O	645	218	85	61	82	127	126
	A	410	731	589	190	144	113	102
	C	9	18	13	22	19	25	17
Colombia	O	263	87	50	192	164	98	182
	A	76	99	79	32	78	402	280
	C	-	-	-	-	-	-	-
Chile	O	-	-	-	-	13	-	-
	A	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-
Ecuador	O	23	12	9	66	13	5	6
	A	31	35	35	47	29	16	19
	C	-	-	-	-	-	-	-
Paraguay	O	3	5	6	11	22	1	4
	A	-	1	13	1	-	-	-
	C	-	-	1	-	6	7	-
Peru	O	-	4	-	-	-	7	-
	A	24	2	6	1	4	11	17
	C	49	1	7	3	-	-	-
Uruguay	O	127	4	1	-	10	15	2
	A	6	14	2	1	-	-	1
	C	-	-	-	4	6	3	28
Venezuela	O	19	29	28	13	18	31	13
	A	18	22	13	10	7	16	8
	C	-	-	-	-	-	-	-

TABLE 3. Foot-and-mouth disease virus subtypes identified by country. South America, 1986.

Argentina	O_1	A_{24}	C_3
Bolivia	O_1	A24	-
Brazil	O_1	A_{24}	C_3
Colombia	O_1	A_{24}, $A_{Sab/85}$	-
Ecuador	O_1	A_{24}	-
Paraguay	O_1	-	-
Peru	-	A_{24}	-
Uruguay	O_1	A_{24}	C_3
Venezuela	O_1	A_{32}	-

TABLE 4. Strains used for production of foot-and-mouth disease vaccine. South America, 1986.

Country	Strains		
	O	A	C
Argentina	O_1 Caseros o O_1 Campos	$A_{Arg/79}$	C_3 Arg/84
Brazil	O_1 Campos	A_{24} Cruzeiro y A Venceslau	C_3 Indaial
Colombia	O_1 Campos	A_{24} Cruzeiro	-
Ecuador	O_1 Ecuador	A_{24} Ecuador	-
Paraguay	O_1 Campos	A_{24} Cruzeiro	C_3 Resende
Peru	O_1 Urubamba	A_{24} Cruzeiro	C_3 Resende
Uruguay	O_1 Campos	A_{24} Cruzeiro	C_3 Resende
Venezuela/1	O_1 Campos	A_{32} Venezuela	-

Source: PAFMDC Diagnosis and Reference Laboratory and reports sent by the countries.

TABLE 5. Months when the recorded frequency of herds affected by some type of virus significantly exceeded the expected frequencies. South America, 1986.

Month	Argentina	Bolivia	Brazil	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
January	C		I	O, A, NJ, I	O				
February	C	A	I	O, A, I			I		
March	C	A	I	O, I	O, A		NJ, I	O, C	
April	C		I	O, I			NJ, I	A, C	A
May	C	A	C, I	O, A, NJ, I	A		NJ, I	C	
June	O, C	A	C, I	O, A, I	A		NJ	C	
July	C			O, A, NJ, I		O		C	
August	C			O, A, NJ, I				C	
September	C			O, A, NJ, I	A			C	
October	C			O, A, NJ, I				C	
November				O, A, NJ, I			A, I		NJ
December				O, A, NJ, I	A		A		NJ

TABLE 6. Vesicular disease morbidity in cattle. South America, 1986.

Country	Herds		Population				Rates			
	Total	Afect.	Total (x 1000)	In affected herds	Diseased	Deaths	Herds affected (0/00)	Population morbidity (0/000)	Internal morbidity (0/0)	Lethality (0/0)
Argentina	290294	787	50567.0	740038	60454	731	2.71	11.96	8.17	1.21
Bolivia	10995	18	500.0	2533	560	42	1.64	11.20	22.11	7.50
Brazil	1612500	1728	86653.0	301950	47617	793	1.07	5.50	15.77	1.67
Colombia	441818	1433	16393.5	164234	22075	439	3.24	13.46	13.44	1.99
Chile	189044	-	3818.7	-	-	-	-	-	-	-
Ecuador	246628	82	3402.8	11487	1914	8	0.33	5.62	16.67	0.42
Paraguay	187608	12	7148.4	2439	539	-	0.06	0.75	22.10	-
Peru	463182	93	3391.5	5880	681	12	0.20	2.01	11.58	1.76
Uruguay	52460	58	9303.0	41112	1876	...	1.10	2.01	4.56	...
Venezuela	160173	80	11843.6	13429	1445	5	0.50	1.22	10.76	0.35
Total	3654702	4291	193021.5	1283102	137161	2030	1.17	7.10	10.69	1.50

... No information.

TABLE 8. Vesicular disease morbidity in sheep. South America, 1986.

Country	Population				Rates		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population morbidity (0/000)	Internal morbidity (0/0)	Lethality (0/0)
Argentina	31840.0	101450	931	12	0.29	0.92	1.29
Bolivia	1105.4	-	-	-	-	-	-
Brazil	18588.0	5519	845	140	0.45	15.31	16.57
Colombia	2335.9	1226	68	-	0.29	5.54	-
Chile	5678.3	-	-	-	-	-	-
Ecuador	1200.0	-	-	-	-	-	-
Paraguay	445.0	-	-	-	-	-	-
Peru	15294.2	271	-	-	-	-	-
Uruguay	23858.0	86145	21	...	0.01	0.02	...
Venezuela	309.5	339	-	-	-	-	-
Total	100654.3	194950	1865	152	0.18	0.96	8.15

... No information.

TABLE 7. Vesicular disease morbidity in swine. South America, 1986.

Country	No. of herds affected	Population				Rates		
		Total (x 1000)	In affected herds	Diseased	Deaths	Population morbidity (0/000)	Internal morbidity (0/0)	Lethality (0/0)
Argentina	53	3700.0	14851	2450	91	6.62	16.50	3.71
Bolivia	4	280.0	154	114	5	4.07	74.03	4.39
Brazil	1	33176.0	9006	3073	908	0.93	34.12	2.55
Colombia	95	2312.0	21583	2143	206	9.27	9.93	9.61
Chile	-	890.8	-	-	-	-	-	-
Ecuador	3	2500.0	649	267	15	1.07	41.14	5.62
Paraguay	2	1400.0	62	13	-	0.09	20.97	-
Peru	14	2141.9	535	158	3	0.73	29.53	1.90
Uruguay	...	200.0	329	27	...	1.35	8.21	...
Venezuela	12	2532.8	34616	3221	877	12.72	9.30	27.23
Total	184	49133.5	81785	11466	2105	2.33	14.02	18.36

... No information.

TABLE 9. Vesicular siease morbidity in goats. South America, 1986.

Country	Population				Rates		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population morbidity (0/000)	Internal morbidity (0/0)	Lethality (0/0)
Argentina	3100.0	-	-	-	-	-	-
Bolivia	3200.0	-	-	-	-	-	-
Brazil	9037.0	2071	469	75	0.52	22.65	15.99
Colombia	654.9	298	6	-	0.09	2.01	-
Chile	1134.5	-	-	-	-	-	-
Ecuador	280.0	-	-	-	-	-	-
Paraguay	145.0	-	-	-	-	-	-
Peru	2021.4	253	-	-	-	-	-
Uruguay	12.0	-	-	-	-	-	-
Venezuela	1057.4	10	-	-	-	-	-
Total	20642.2	2632	475	75	0.23	0.18	0.16

TABLE 10. Vesicular disease morbidity in horses. South America, 1986.

Country	Population				Rates		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population morbidity (0/000)	Internal morbidity (0/0)	Lethality (0/0)
Argentina	3355.0	50	10	-	0.30	20.00	-
Bolivia	991.0	-	-	-	-	-	-
Brazil	5260.0	...	213	1	0.40	...	0.47
Colombia	2830.6	4270	98	2	0.35	2.29	2.04
Chile	538.0	-	-	-	-	-	-
Ecuador	450.0	-	-	-	-	-	-
Paraguay	373.0	-	-	-	-	-	-
Peru	1326.6	153	-	-	-	-	-
Uruguay	453.1	-	-	-	-	-	-
Venezuela	452.8	104	-	-	-	-	-
Total	15577.4	4577	321	3	0.21	7.01	0.93

... No information.

TABLE 11. Monthly distribution of bovine herds affected by vesicular diseases. South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	13	60	25	17	50	136	76	73	140	148	34	15	787
Bolivia	-	5	2	1	2	1	1	1	-	2	3	-	18
Brazil	99	129	185	283	255	174	200	155	91	80	44	33	1728
Colombia	283	206	67	63	67	67	118	135	158	86	111	72	1433
Ecuador	7	4	14	3	6	7	7	2	8	2	5	17	82
Paraguay	-	2	-	-	1	3	3	-	2	-	1	-	12
Peru	7	9	10	19	13	2	-	1	-	-	15	17	93
Uruguay	-	-	3	8	4	2	24	11	3	2	1	-	58
Venezuela	16	9	4	8	6	6	5	9	4	6	5	2	80
Total	425	424	310	402	404	398	434	387	406	326	219	156	4291

TABLE 12. Monthly distribution of bovine herds affected by FMD virus "O". South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	1	-	-	1	13	1	3	8	1	1	1	30
Bolivia	-	-	-	-	-	-	-	-	-	-	2	-	2
Brazil	8	12	17	18	9	15	20	15	2	7	2	1	126
Colombia	11	26	16	12	10	15	16	10	12	11	19	9	167
Ecuador	3	-	2	-	-	-	-	-	-	-	-	1	6
Paraguay	-	-	-	-	1	1	1	-	-	-	1	-	4
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	2	-	-	-	-	-	-	-	-	-	2
Venezuela	1	2	-	1	-	1	1	1	-	1	-	-	8
Total	23	41	37	31	21	45	39	29	22	20	25	12	345

TABLE 13. Monthly distribution of bovine herds affected by FMD virus "A". South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	-	-	-	-	-	-	2	2	6	-	1	11
Bolivia	-	4	2	-	1	1	-	-	-	1	-	-	9
Brazil	3	6	14	17	13	10	19	6	7	5	1	1	102
Colombia	46	32	6	6	13	10	19	41	62	18	12	11	276
Ecuador	-	1	4	1	3	3	-	-	4	-	1	2	19
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	7	10	17
Uruguay	-	-	-	1	-	-	-	-	-	-	-	-	1
Venezuela	1	1	1	2	-	-	-	1	1	-	-	-	7
Total	50	44	27	27	30	24	38	50	76	30	21	25	442

TABLE 14. Monthly distribution of bovine herds affected by FMD virus "C". South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	4	8	6	11	24	65	30	41	71	52	2	1	315
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	2	1	5	5	1	1	1	1	-	-	17
Colombia	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	1	7	3	2	11	2	1	1	-	-	28
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4	8	8	19	32	72	42	44	73	54	2	1	360

TABLE 15. Monthly distribution of bovine herds affected by vesicular stomatitis, New Jersey type. South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	15	8	-	-	7	4	27	13	19	6	19	7	125
Ecuador	-	-	-	-	-	-	-	-	-	-	-	1	1
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	1	2	1	2	-	-	-	-	-	-	6
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	-	-	-	-	-	-	-	-	1	1	2	1	5
Total	15	8	1	2	8	6	27	13	20	7	21	9	137

TABLE 16. Monthly distribution of bovine herds affected by vesicular stomatitis, Indiana type. South America, 1986.

Country/ /Mounth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	4	-	-	-	-	-	-	-	-	-	-	4
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	13	8	7	3	1	1	-	-	-	-	-	-	33
Colombia	32	18	9	3	4	6	18	29	10	16	14	12	171
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	1	3	1	4	2	-	-	-	-	-	1	-	12
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	46	33	17	10	7	7	18	29	10	16	15	12	220

TABLE 17. Number of herds affected by vesicular stomatitis, according to country and virus type. Central America, Panama and Mexico, 1986.

Country	Vesicular Stomatitis		No Diagnosis (Negative)	Total
	New Jersey	Indiana		
Belice	1	-	3	4
Costa Rica	29	1	13	43
El Salvador	31	11	18	60
Guatemala	49	9	19	77
Honduras	45	1	56	102
Mexico	34	7	53	94
Nicaragua	8	-	2	10
Panama	5	-	6	11
Total	202	29	170	401

TABLE 18. Coverage by programs for the prevention of FMD. South America, 1986.

Country	Area (Km^2)		Bovine herds		Bovine population (x 1000)	
	Total	Program	Total	Program	Total	Program
Argentina	2779892	2779892	290294	290294	50567.0	50567.0
Bolivia	1098581	318664	97748	10995	5851.0	500.0
Brazil	8511970	3029412	2822050	1612500	134500.0	86653.0
Colombia	1141748	686743	498679	441818	23971.2	16393.5
Chile	757720	757720	189044	189044	3818.7	3818.7
Ecuador	267000	267000	246628	246628	3402.8	3402.8
Paraguay	406752	406752	187608	187608	7148.4	7148.4
Peru	1282120	1282120	463182	463182	3391.5	3391.5
Uruguay	162500	162500	52460	52460	9303.0	9303.0
Venezuela	911930	911930	160173	160173	11843.6	11843.6
Total	17320213	10602733	5007866	3654702	253797.2	193021.5

TABLE 19. Vacination coverage of cattle against foot-and-mouth disease. South America, 1986.

Country	Bovine population under program (x 1000)	Available vacine doses (x 1000)	Doses/ /Bov.
Argentina	50567.0	142191.9 (126692.0)/1	2.50
Bolivia	500.0	260.0	0.52
Brazil	86653.0	208325.2	2.40
Colombia	16393.5	29081.5 (26497.4)/2	1.62
Ecuador	3402.8	1541.0	0.45
Paraguay	7148.4	10729.7	1.50
Peru	3391.5	668.4	0.20
Uruguay	9303.0	27330.8 (18267.3)/1	1.96
Venezuela	11843.6	9244.9 (8452.1)/3	0.71

/1 Doses injected in cattle. Sheeps are also vaccinated in Argentina.
/2 Number of doses sold by VELCO laboratory.
/3 Doses injected in cattle.

TABLE 20. Production, control, internacional comercialization and disponibility of FMD vaccine. South America, 1986.

Country	Vaccine			Dosis		
	Produced	Controlled	Approved	Exported	Imported	Available
Argentina	149566550	149566550	142191935	-	-	142191935
Bolivia	-	-	-	-	260000	260000
Brazil	236436800	236436800	208325245	-	-	208325245
Colombia	30529378	29649830	29503460	422000	-	29081460
Chile	-	-	-	-	50000	50000
Ecuador	941000	941000	941000	-	600000	1541000
Paraguay	9729750	9729750	9729750	-	1000000	10729750
Peru	1140240	768440	768440	100000	-	668440
Uruguay	33076060	28949100	28212850	882000	-	27330850
Venezuela	7644950	7644950	7644950	-	1600000	9244950
Total	469064728	463686420	427317630	1404000	3510000	429423630

TABLE 21. Human resources inventory. Foot-and-mouth disease prevention and control program. South America, 1985-1986.

Country	1985				1986			
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	1606	50	169	1387	1589	111	20	1458
Bolivia	182	69	57	56	159	...	...	...
Brazil	...	...	...	...	8156	52	...	8104
Colombia	809	21	12	776	806	66	16	724
Chile	183	2	2	179	183	2	2	179
Ecuador	359	65	...	294	345	41	11	293
Paraguay	579	178	86	315	558	154	85	319
Peru	514	5	8	501	518	5	8	505
Uruguay	663	86	107	470	595	88	86	421
Venezuela	400	15	...	385	402	17	...	385
Total	5295	491	441	4363	13311	536	228	12388

... No information.

TABLE 22. Resources of foot-and-mouth disease prevention and control programs. South America, 1986.

Country	Filds Operating Units	Human Resourses					
		Professionals			Others		
		Central	Laborat.	Field	Central	Laborat.	Field
Argentina	298	29	3	285	82	17	1173
Bolivia	18	...	...	...	...	...	...
Brazil	1191	27	...	2305	25	...	5799
Colombia	111	21	7	167	45	9	557
Chile	56	1	1	60	1	1	119
Ecuador	60	13	11	70	28	-	223
Paraguay	44	29	34	61	125	51	258
Peru	144	2	4	92	3	4	413
Uruguay	41	12	15	85	65	71	347
Venezuela	149	11	...	177	6	...	208
Total	2112	145	75	3302	380	153	9097

... No information.

TABLE 23. Vehicles inventories. Foot-and-mouth disease prevention and control programs. South America, 1985-1986.

Country	1985				1986			
	Area Total Km^2	Total	Aut.	Moto.	Area Total Km^2	Total	Aut.	Moto.
Argentina	2779892	1247	1247	-	2779892	1292	...	...
Bolivia	276550	23	23	-	318664	26	...	...
Brazil	2235617	1138	973	165	3029412	...	...	...
Colombia	686743	365	157	208	686743	360	132	210
Chile	757820	9	9	-	757720	11	11	-
Ecuador	267000	48	48	-	267000	54	54	-
Paraguay	406752	65	49	16	406752	69	46	23
Peru	1282120	145	29	116	1282120	145	27	118
Uruguay	162500	113	102	11	162500	150	75	75
Venezuela	911930	325	325	-	911930	314	314	-
Total	9766924	3478	2962	516	10602733	2421	659	426

... No information.

TABLE 24. Finacial resources inventories (Us$). Operating expenses. Foot-and-mouth disease prevention and control programs. South America, 1985-1986.

Country	1985				1986			
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	19239843.0	...	...	...	16751400.0	1172400.0	4283900.0	11295100.0
Bolivia	193594.4	74735.1	34595.6	84263.7	309156.0	...	...	...
Brazil	...	...	...	...	31046000.0	...	...	...
Colombia	5813687.3	1006712.7	150007.3	4656967.3	4832266.8	675414.3	69817.6	4087034.9
Chile	493415.0	15068.0	21842.0	456505.0	304761.9	50266.7	27276.2	227219.0
Ecuador	1157824.0	138487.0	-	1019337.0	1846641.0	571366.9	-	1275274.1
Paraguay	2203040.0	756761.0	376403.0	1069876.0	1790058.0	677932.0	270559.0	841567.0
Peru	208214.0	...	...	...	1020428.6	17142.8	23285.8	980000.0
Uruguay	2373400.0	240900.0	417725.0	1714775.0	...	...	...	...
Venezuela	...	...	...	...	865600.1	59550.9	59914.5	746134.7
Total	31683017.7	2232663.8	1000572.9	9001724.0	58766312.4	3224073.6	4734753.1	19452329.7

... No information..

TABLE 25. Financial resources inventories (Us$). Capital expenses. Foot-and-mouth disease prevention and control programs. South America, 1985-1986.

Country	1985				1986			
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	834368.0	...	...	...	1059800.0	-	1040500.0	19300.0
Bolivia	36020.0	18373.0	-	17647.0	40000.0	...	...	...
Brazil	...	...	...	...	1634000.0	...	...	...
Colombia	120829.0	...	...	...	203814.4	199645.6	4168.8	-
Chile	11800.0	-	9379.0	2421.0	12285.7	-	9761.9	2523.8
Ecuador	62176.2	18652.9	-	43523.3	...	...	...	...
Paraguay	581885.0	122512.0	219163.0	240210.0	1079879.0	376031.0	311969.0	391879.0
Peru	-	-	-	-	69285.7	-	-	69285.7
Uruguay	-	-	-	-	...	...	...	...
Venezuela	305647.8	107049.8	...	198598.0	186666.8	9600.0	170177.8	6889.0
Total	1952726.0	266587.7	228542.0	502399.3	4285731.6	585276.6	1536577.5	489877.5

... No information.

TABLE 26. Cattle and bovine semen imported.
South America, 1986.

Importing Country	Country of origin	Number of Bovnes	Semen[a]
Argentina	Canada	14	x
	F. R. Germany	20	x
	USA	41	x
Bolivia	...	...	...
Brazil	Argentina	127	x
	Australia	-	x
	Bolivia	28000	-
	Canada	628	-
	England	66	x
	France	4	x
	F. R. Germany	-	x
	Italy	-	x
	Paraguay	167640	-
	Switzerland	-	x
	Uruguay	174	-
	USA	1196	x
Colombia[1]	Canada, Chile, Costa Rica, Panama and USA	3363	x
Chile	Canada	-	x
	New Zealand	-	x
	USA	-	x
Ecuador	Canada	174	-
	Cuba	158	-
	USA	4554	-
Paraguay	Argentina	112	-
	Brazil	661	x
	England	-	x
	Germany, R. F.	-	x
	Uruguay	531	-
	USA	-	x

TABLE 26. (Continuation).

Importing Country	Country of origin	Number of Bovnes	Semen/a
Peru	Argentina	2209	-
	Australia	-	x
	Brazil	1350	-
	Canada	790	x
	Colombia	36	-
	Chile	83	-
	F. R. Germany	-	x
	Panama	1530	-
	Spain	246	-
	Uruguay	3600	-
	USA	1835	x
Uruguay	Argentina	12	-
	USA	12	x
	Paraguay	10	-
Venezuela	Canada	5264	x
	Cuba	820	-
	England	-	x
	New Zealand	3167	-
	USA	7087	-

/a "x" indicates presence of trade.
/1 No quantities specified for each country.
... No information.

TABLE 27. Swine importation.
South America, 1986.

Importing Country	Country of origin	Number of swines
Argentina	USA	95
Bolivia	...	...
Brazil	USA	25
Colombia/1	USA and Panama	1010
Chile	USA	53
Ecuador	-	-
Paraguay	Brazil	133
Peru	Chile	108
	Panama	15
	Uruguay	32
	USA	559
Uruguay	Argentina	10
Venezuela	USA	401

/1 No quantities specified for each country.
... No information.

TABLE 28. Sheep importation.
South America, 1986.

Importing Country	Country of origin	Number of sheeps
Argentina	Australia	22
	F. R. Germany	4
Bolivia	...	...
Brazil	Argentina	7
	Australia	41
	New Zealand	71
	Uruguay	70029
Colombia	-	-
Chile	-	-
Ecuador	-	-
Paraguay	Argentina	273
	Uruguay	135
Peru	Argentina	6000
	Australia	163
	Cuba	1772
	Ecuador	4
	Uruguay	5085
	USA	194
Uruguay	Argentina	3
	Australia	6
Venezuela	-	-

... No information.

TABLE 29. Goat importation.
South America, 1986.

Importing Country	Country of origin	Number of goats
Argentina	-	-
Bolivia	...	...
Brazil	Canada	119
	France	643
	Switzerland	137
Colombia/1	France and USA	759
Chile	USA	12
Ecuador	-	-
Paraguay	-	-
Peru	-	-
Uruguay	-	-
Venezuela	-	-

/1 No quantities specified for each country.
... No information.

TABLE 30. Horses importation.
South America, 1986.

Importing Country	Country of origin	Number of horses
Argentina	USA	166
	Uruguay	87
Bolivia	...	...
Brazil	Argentina	118
	Belgium	61
	Canada	4
	Chile	23
	England	8
	France	35
	F. R. Germany	34
	Italy	9
	Peru	13
	Poland	3
	Portugal	13
	Spain	3
	Sweden	12
	Uruguay	925
	USA	196
	Venezuela	5
Colombia/1	Brazil, England, France, F. R. Germany, Panama, Peru, USA and México.	79
Chile	Argentina	22
	Belgium	1
	Brazil	3
	Colombia	3
	France	13
	Peru	3
	Uruguay	2
	USA	10
	Venezuela	3
Ecuador	Peru	19
	USA	6
Paraguay	Argentina	91
	F. R. Germany	6
	Uruguay	599

TABLE 30. (Continuation).

Importing Country	Country of origin	Number of horses
Peru	Argentina	120
	F. R. Germany	8
	Brazil	5
	Chile	14
	England	3
	Irlanda	2
	Panama	1
	Spain	6
	Uruguay	4
	USA	113
	Venezuela	6
Uruguay	Argentina	191
	Brazil	27
	England	3
	Paraguay	59
	USA	17
Venezuela	-	-

/1 No quantities specified for each country.
... No information.

TABLE 31. Cattle and bovines semen exports. South America, 1986.

Exporting Country	Importing Country	Number of bovines	Semen/a
Argentina	Brazil	350	-
	Peru	882	-
Bolivia	...	...	...
Brazil	Argentina	6	-
	Bolivia	12	-
	Guiné-Bissau	-	x
	USA	-	x
	Uruguay	17	-
Colombia/1	Curazao and Peru	168	-
Chile	Colombia	120	-
Ecuador	-	-	-
Paraguay	Brazil	35	-
	Uruguay	19	-
Peru	Bolivia	7	-
Uruguay	Argentina	25	x
	Bolivia	366	-
	Brazil	174	-
	Paraguay	431	x
	Peru	168	-
Venezuela	-	-	-

/a "x" indicates presence of trade.
/1 No quantities specified for each country.
... No information.

TABLE 32. Swine exports.
South America, 1986.

Exporting Country	Importing Country	Number of swines
Argentina	-	-
Bolivia	...	...
Brazil	-	-
Colombia	-	-
Chile	Bolivia	17
	Peru	40
Ecuador	-	-
Paraguay	-	-
Peru	Bolivia	26
Uruguay	-	-
Venezuela	Colombia	11238

... No information.

TABLE 33. Sheep exports.
South America, 1986.

Exporting Country	Importing Country	Number of sheeps
Argentina	Paraguay	292
	Peru	600
Bolivia	...	...
Brazil	Uruguay	10
Colombia	-	-
Chile	Argentina	4
Ecuador	-	-
Paraguay	-	-
Peru	-	-
Uruguay	Argentina	43022
	Brazil	27
	Peru	1929
Venezuela	Aruba	80

... No information.

TABLE 34. Horses exports.
South America, 1986.

Exporting Country	Importing Country	Number of horses
Argentina	England	188
	Uruguay	298
	USA	692
Bolivia	...	...
Brazil	Argentina	66
	Belgium	24
	Bolivia	16
	Canada	4
	Chile	9
	F. R. Germany	9
	England	35
	Italy	5
	Panama	8
	Peru	8
	Portugal	16
	Uruguay	48
	USA	39
	Venezuela	6
Colombia/1	USA, Spain, Panama, Rep. Dominicana, Ecuador, Venezuela, Puerto Rico, Bolivia, México, France , Peru y Germany R.F.	340
Chile	Argentina	5
	Brazil	9
	Ecuador	12
	England	2
	France	1
	Italy	6
	Panama	26
	Peru	14
	Spain	31
	Uruguay	2
	USA	39
	Venezuela	14
Ecuador	-	-

TABLE 34. (Continuation).

Exporting Country	Importing Country	Number of horses
Paraguay	Argentina	11
	Brazil	29
	Uruguay	29
Peru	Argentina	34
	Bolivia	13
	Brazil	18
	Chile	11
	Colombia	1
	Costa Rica	14
	Ecuador	91
	Panama	20
	Paraguay	1
	USA	61
	Venezuela	9
Uruguay	Argentina	1093
	Brazil	773
	Chile	2
	France	4
	Italy	5678
	Panama	7
	Paraguay	650
	Spain	34
	USA	4
	Venezuela	9
Venezuela	-	-

/1 Sin especificar las cantidades por país.
... No information.

TABLE 35. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Reception level and delays of transmission of weekly reports of outbreaks by grid squares of the map. South America, 1986.

Country	Weekly reports				Days Delayes								
	Received		Published/a		Until receipt./b			Receipt. Publication			Total		
	Nr.	%	Nr.	%	Md	Mx	Mn/c	Md	Mx	Mn	Md	Mx	Mn
Argentina	52	100	52	100	20	42	7	3	7	-	21	45	14
Bolivia	50	96	45	87	18	73	3	3	6	-	21	77	7
Brazil	52	100	52	100	10	14	5	4	9	-	14	18	10
Colombia	52	100	52	100	6	14	5	1	7	-	7	21	7
Ecuador	52	100	52	100	7	32	5	1	7	-	8	35	7
Paraguay	52	100	52	100	4	11	3	3	6	-	7	14	7
Peru	50	96	50	96	9	39	5	1	6	-	14	45	7
Uruguay	50	96	50	96	7	31	-	2,5	8	-	14	32	7
Venezuela	52	100	52	100	12	19	6	3	7	-	14	21	7

a/ Number of weekly report published in proportion to those recived.
b/ Time elapsed between the last day of the week coovered by the report and receipt thereof by the PAFMDC.
c/ Md = Median; Mx = Maximum; Mn = Minimum. Figure represent the number of days.

TABLE 36. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Reception level and delays of transmission of monthly reports of affected herds and diagnosis by political division. South America, 1986.

Country	Nr. Received	Nr. Published	Months not received
Argentina	12	10	-
Bolivia	12	8	-
Brazil	12	12	-
Colombia	12	12	-
Ecuador	11	11	1
Paraguay	12	12	-
Peru	11	11	1
Uruguay	12	12	-
Venezuela	8	8	4

TABLE 37. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Number of days delays in receipt of monthly reports. South America, 1986.

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Mediana
Argentina	46	18	58	28	59	29	76	64	72	66	72	42	58.50
Bolivia	21	70	39	162	131	101	32	29	126	96	65	35	67.50
Brazil	47	39	35	34	40	31	34	32	62	33	45	30	34.50
Colombia	38	33	36	27	32	5	35	37	36	41	47	36	36.00
Ecuador	119	91	60	30	9	113	82	51	21	50	39	NR	51.00
Paraguay	31	38	28	37	37	32	40	37	58	38	56	51	37.50
Peru	66	98	67	37	53	86	55	24	58	95	65	NR	65.00
Uruguay	59	70	35	9	55	72	68	99	69	84	54	23	63.50
Venezuela	81	53	67	37	27	NR	95	64	34	NR	NR	NR	58.50
Mediana	47	53	39	34	40	52	55	37	58	58	55	36	

NR = No receipt.

TABLE 38. Epidemiological surveillance activities: Indicators of laboratory confirmation of herds affected by vesicular disease. South America, 1986.

Country	Affected herds			Percentaje	
	Total	Sampled	Positive diagnosis	Sampled	Posistive diagnosis
Argentina	819	512	360	63	44
Bolivia	22	19	14	86	64
Brazil	1746	522	295	30	17
Colombia	1623	1042	765	64	47
Ecuador	85	46	26	54	30
Paraguay	12	5	4	42	33
Peru	93	45	35	48	38
Uruguay	58	35	31	60	53
Venezuela	94	55	28	59	30
Total	4552	2281	1558	50	34

TABLE 39. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Reception level and delays of transmission of weekly reports of outbreaks by grid squares of the map. Central America, Panama and Mexico, 1986.

Country	Weekly reports				Days Delayes								
	Received		Published/a		Until receipt. /b			Receipt. Publication			Total		
	Nr.	%	Nr.	%	Md	Mx	Mn/c	Md	Mx	Mn	Md	Mx	Mn
Belice	-	-	-	-	-	-	-	-	-	-	-	-	-
Costa Rica	52	100	4	8	121	299	20	1	1	1	32	42	21
El Salvador	51	98	51	98	17	61	5	2	5	-	17	63	7
Guatemala	52	100	51	98	28	206	6	2	5	-	31	70	7
Honduras	37	71	37	71	6	47	1	2	8	-	7	49	7
Mexico	52	100	52	100	18	41	10	3	7	-	21	42	14
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-	-
Panamá	50	96	50	96	10	84	5	2	7	-	14	84	7

a/ Number of weekly report published in proportion to those recived.
b/ Time elapsed between the last day of the week coovered by the report and receipt thereof by the PAFMDC.
c/ Md = Median; Mx = Maximum; Mn = Minimum. Figure represent the number of days.

TABLE 40. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Reception level and delays of transmission of monthly reports of affected herds and diagnosis by political division. Centrl America, Panama and Mexico, 1986.

Country	Nr. Received	Nr. Published	Months not received
Belice	-	-	12
Costa Rica	12	12	-
El Salvador	12	12	-
Guatemala	12	12	-
Honduras	12	12	-
Mexico	12	12	-
Nicaragua	-	-	12
Panamá	12	12	-

TABLE 41. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Number of days delays in receipt of monthly reports. Central America, Panama and Mexico, 1986.

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Mediana
Belice	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	-
Costa Rica	20	47	38	33	40	10	53	50	55	94	57	68	49
El Salvador	52	47	38	33	58	28	53	50	55	94	57	68	53
Guatemala	52	47	38	33	24	28	20	18	62	94	19	13	33
Honduras	52	47	38	33	58	28	53	50	55	94	57	68	53
Mexico	216	188	157	127	96	66	35	36	27	40	23	51	59
Nicaragua	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	-
Panamá	75	47	38	22	58	28	29	10	23	28	15	26	28
Mediana	52	47	38	33	58	28	53	31	55	94	40	59	51

NR = No receipt.