

Classical Swine Fever in Catalonia

Epidemiological Study
of the Outbreak of June 2001

CReSA

ANIMAL HEALTH RESEARCH CENTER

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1. Introduction

On June 12, the laboratory of the Catalan Department of Agriculture, Livestock and Fisheries (DARP) in the Zona Franca area of Barcelona confirmed the diagnosis of Classical Swine Fever (CSF) in suspected samples sent by the Pathologic Anatomy Unit of the Faculty of Veterinary Science of the Autonomous University of Barcelona. The samples were from a farm in the town of Soses (Segrià). In the following days, new outbreaks of CSF were declared in the province of Lleida and in Vinaròs (Castellón). The DARP commissioned the Animal Health Research Center (CReSA) to conduct an epidemiological study of the outbreaks declared to try and clarify the relationships between them. On the part of the CReSA the work was carried out by Jordi Casal i Fàbrega and Mariano Domingo Álvarez.

2. Aims

The aims of this study are: (i) to compile the available information on the outbreaks of CSF that have appeared in the counties of Lleida during June 2001, (ii) to show the epidemiological relationships between the outbreaks.

3. Methodology

Gathering of information

In this report we have reviewed the documents pertaining to the CSF outbreaks in the files of the DARP Regional Office in Lleida, and specifically, the epidemiological surveys of the outbreaks, the inspection certificates, and lists of movements of vehicles and people.

At the same time, the data of the clinical records have been completed with information from the veterinarians of the farms and businesses affected. We have also included in the study, samples of tissue and serum from some of the farms affected, sent to the Autonomous University of Barcelona before the declaration of the CSF, through diagnostic studies or through contractual research work.

Graphic representation

The data on mortality on the farms, compiled from the inspection certificates, have been represented as dead pigs/day, including the rolling average, enabling the effects of chance to be reduced. The rolling average has been calculated as follows:

$$\text{Mortality on day } d \text{ (Mt}_d\text{)} = \text{Mt}_{d-2} + \text{Mt}_{d-1} + \text{Mt}_d + \text{Mt}_{d+1} + \text{Mt}_{d+2} / 5$$

The data from the CSF antigen and antibodies detection table have been represented as a percentage of positivity with regard to the total samples analyzed.

Definitions and abbreviations

Clinical signs characteristic of CSF

Fever, lethargy, loss of appetite, cyanosis of the ears, skin petechiae, lack of coordination, tremors, crowding.

CSF

Classical Swine Fever

ELISA-Ab

Enzyme immunoassay technique for detecting CSF antibodies.

ELISA-Ag

Enzyme immunoassay technique for detecting CSF antigen.

IS

Insufficient Sample.

Macroscopic lesions characteristic of CSF

Hemorrhages, generally petechial, to serous and mucous membranes, especially larynx, gall bladder, stomach, intestine, kidney, and heart. Hemorrhagic lymphatic ganglions, hyperplastic and congestive spleen.

NRL

National Reference Laboratory in Valdeolomos (Madrid).

PCV2

Porcine Circovirus 2.

PMWS

Postweaning Multisystemic Wasting Syndrome, equivalent to porcine circovirus or "dewaning" syndrome.

PRRS

Porcine Reproductive and Respiratory Syndrome

4. Individual Description of the Outbreaks

The following are the available data of the first fourteen outbreaks of CSF (Table 1), that have appeared since June 11, 2001. Focus 4/2001 is the one declared in Vinaròs, in the Valencian Community, and the data on it come from sources of the integrator company. For each of the outbreaks, we present the available clinical history, with the chronological mortality data, and the actions by the DARP until the diagnosis and slaughter of the animals was determined. Figure 7 shows comparative results of the CSF antigen and antibodies techniques carried out, where the results of both studies were available.

Table 1. Summary of the first 14 outbreaks of CSF in the June 2001 outbreak

# Outbreak	Farm	Integrator	Town	Date suspected	Date confirmed
1/2001	██████	██████████	Soses	06/12/01	06/14/01
2/2001	██████	██████████	Golmés	06/15/01	06/18/01
3/2001	██████	██████████	Vilanova de l'Aguda	06/15/01	06/18/01
4/2001	I	██████████	Vinaròs	06/15/01	06/18/01
5/2001	██████	██████████	Mollerussa	06/18/01	06/20/01
6/2001	██████	██████████	Golmés	06/18/01	06/22/01
7/2001	██████	██████████	Penelles	06/18/01	06/22/01
8/2001	██████	██████████	Castellserà	06/22/01	06/28/01
9/2001	██████	██████████	Sisteró	06/23/01	06/29/01
10/2001	██████	██████████	Castellserà	06/26/01	06/29/01
11/2001	██████	██████████	Penelles	06/21/01	07/05/01
12/2001	██████	██████████	Penelles	06/22/01	07/05/01
13/2001	██████	██████████	Castellserà	06/29/01	07/05/01
14/2001	██████	██████████	Arbeca	06/25/01	07/09/01

Outbreak 1/2001

Date suspected	06/12/01	Entry of animals	04/20/01 to 05/17/01
Date declared	06/14/01	Pigs entered	2051 (575 shed 14)
Farm Code	██████	Origin	██████ (Lleida)
Town	Soses (Segrià)	Pigs present	487 (shed 14)
Owner	██████████	Dead pigs	88
Integrator	██████████	Mortality	18%
Type of Farm	Fattening		

Clinical History:

The affected pigs arrived at the farm on 04/20/01 (575 pigs that went to shed 14), 04/27/01 (576 that went to shed 15), 05/11/01 (450 that went to shed 2), and 05/17/01 (450 went to shed 3).

The mortality observed (Figure 1, Annex 1) was in shed 14 of this farm, according to data from the epidemiological survey. On May 31 or June 1, the first symptoms of the disease were seen in the form of loss of appetite in some pigs, with no evident mortality. On June 4, morbidity was approximately 20%, which is attributed to an outbreak of septicemic salmonellosis. On June 8, morbidity was at 30-40% and there

were more losses, consequently the diagnosis or efficiency of the treatment were reconsidered.

On June 11, there were 88 losses out of 575 pigs (15%), all in shed 14. A pig was sent for anatomopathologic study to the Faculty of Veterinary Science of the Autonomous University of Barcelona. On the same day, the first sick animal in shed 15 appeared, which in the necropsy displayed lesions compatible with CSF.

On that day, mortality in shed 15 was 4.7% and in sheds 2 and 3 was 2.4%.

Figure 1. CSF 1/2001 (Soses). Daily mortality and rolling average (of 5 values)

[Key: Mortality
Rolling average (5)]

Chronology of the diagnosis and actions on the farm:

June 11:

The necropsy was carried out on the pig slaughtered on the farm at the Faculty of Veterinary Science of the Autonomous University of Barcelona (N-354/01, see report in Annex 2). The presumed diagnosis of CSF was established on the basis of microscopic lesions characteristic of the disease. The DARP laboratory was immediately informed of the suspected CSF.

June 12:

Samples were sent to the Animal Health laboratory in Barcelona's Zona Franca district, confirming the diagnosis of CSF by ELISA-Ag. In the afternoon of the same day, the Veterinary Services of the DARP inspected and immobilized the farm. A clinical examination was conducted, blood samples were taken from 15 pigs, tissue samples were taken from 3 pigs, and the epidemiological survey was carried out. The clinical inspection detected sick pigs, with symptoms of CSF in approximately half of the pigs in shed 14.

June 13:

The DARP laboratory in Barcelona's Zona Franca issued a positive CSF diagnosis in 85% of the samples (ELISA-Ag and PCR). Samples were sent to the NRL for confirmation of the CSF diagnosis.

Official notification of the outbreak was given (Royal Decree 2059/96) and the slaughter of the pigs on the farm began.

June 14:

Slaughter of the pigs ended. The NRL confirmed the CSF diagnosis and the official declaration of the outbreak was made according to Royal Decree 2459/96. Limits were demarcated of a 3-kilometer radius (protection) and a 10-kilometer radius (vigilance) around the outbreak, and the preventive slaughter of the pigs on farms in a radius of 1 kilometer from the affected farm was decided.

Table 2. Results of analyses (samples from 06/12/01)

Sample	#	Result	Technique
Tissue	1	+	ELISA -Ag
Tissue	1	+	PCT
Serum	1	+	ELISA -Ag
Serum	1	-	ELISA -Ab

Table 3. Results of analyses (samples from 06/13/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA -Ag
Tissue	3	+	PCR
Tissue	3	+	Viral isolation

Table 4. Results of analyses (samples from 06/13/01)

Sample	#	Result	Technique
Serum	13	+	ELISA -Ag
Serum	1	+/-	ELISA -Ag
Serum	1	-	ELISA -Ag
Serum	15	-	ELISA -Ab

Data of epidemiological interest

Available data indicate that the pigs came from a sow farm in the city of Lleida (████████). On the farm of origin, no signs of CSF had been observed, and all analyses carried out had given negative results. For reasons of prevention, the sow farm was slaughtered. Analyses on the sow farm gave negative results; it therefore seemed that the origin of the infection by CSF virus was not to be found at the farm of origin. According to reports by the DARP, a high number of pigs did not carry identification. The farm is large, with a capacity for 6000 pigs, and has numerous sheds. For this reason, the entry of many vehicles is recorded (feed, transport of pigs to the slaughter house, etc.). Transportes ██████████ (and subcontractors) move pigs around several farms. ██████████ received piglets on 05/18/01 (transported by ██████████). On the farm, there are other species, namely horses, sheep and cattle. There are entries recorded of horses from Rumania – Italy on 03/02/01 and 03/23/01, and several departures to the slaughter house.

Outbreak 2/2001

Date suspected	06/15/01	Entry of animals	04/19/01
Date declared	06/18/01	Pigs entered	1150
Farm Code	████████	Origin	Multiple (████████)
Town	Golmés	Pigs present	726
Owner	████████████████	Dead pigs	424
Integrator	████████████████	Mortality	37%
Type of Farm	Fattening		

Clinical History:

This is a fattening farm integrated by [REDACTED], that it filled with pigs from [REDACTED] on 04/19/01, with 1150 pigs arriving, bought indirectly from [REDACTED]. At the time of the inspection, 06/15/01, 726 pigs were still alive. Therefore, the total mortality was 37%. After the last vaccination against Aujeszky Disease, hemorrhagic diarrhea was noted in some pigs. When the farm was inspected by DARP technicians, symptoms of CSF were noted in approximately 60% of the pigs. Blood and tissue samples were collected for diagnosis. The daily mortality is shown in Figure 2 in Annex 1.

Figure 1. CSF 2/2001 (Golmés). Daily mortality and rolling average (of 5 values)

[Key: Mortality
Rolling average (5)]

Chronology of the diagnosis and actions on the farm:

June 15:

An alert was received from the owner of the farm of the existence of sick animals. The farm was visited, blood and bowel samples were taken, and the epidemiological survey was completed. On the same day, the laboratory confirmed the clinical suspicion of CSF.

June 16:

The whole of the farm was slaughtered (a further 19 pigs had died since the previous day).
New blood and tissue samples were taken.

June 18:

The NRL confirmed the CSF diagnosis, the outbreak was declared, and the 3- and 10-kilometer protection and vigilance zones were demarcated. At the same time, the slaughter of the pigs in farms less than 1 kilometer away was ordered.

Table 5. Results of analyses (samples from 06/15/01)

Sample	#	Result	Technique
Tissue	6	+	ELISA-Ag
Serum	1	+	ELISA-Ag
Serum	12	-	ELISA-Ag

Table 6. Results of analyses (samples from 06/16/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA-Ag
Serum	7	+	ELISA-Ag
Serum	3	+/-	ELISA-Ag
Serum	4	IS	ELISA-Ag
Serum	46	-	ELISA-Ag

Table 7. Results of analyses (samples from 06/16/01, [REDACTED])

Sample	#	Result	Technique
Serum	2	+	ELISA -Ag
Serum	4	+/-	ELISA -Ag
Serum	10	-	ELISA -Ag

Table 8. Results of analyses (samples from 06/16/01, [REDACTED])

Sample	#	Result	Technique
Serum	10	+	ELISA -Ab
Serum	2	+/-	ELISA -Ab
Serum	1	-	ELISA -Ab

Data of epidemiological interest

Numerous pigs did not display ear identification.

Entries of trucks are to bring feed (from the [REDACTED] company), and by [REDACTED] for the collection of bodies. Most of the pigs studied showed antibodies against CSF, but few had the virus, indicating that the farm was not in the initial phase of the infection.

The pigs on farm [REDACTED], which belongs to the same owner, had been slaughtered as prevention. Analyses resulted negative.

The company vaccinator visited the farm six times between 05/17/01 and 06/07/01.

Outbreak 2a/2001

Date suspected	06/20/01	Entry of animals	02/14/01; 02/21/01
Date declared	Outbreak 2 (06/22/01)	Pigs entered	1150
Farm Code	[REDACTED]	Pigs present	804
Town	Golmés	Dead pigs	346
Owner	[REDACTED]	Mortality	30%
Integrator	[REDACTED]		
Type of Farm	Fattening		

Clinical History:

This is a fattening farm located very near to the farm of Outbreak 2/2001, with the cycle about to be completed, as the pigs at the time of the suspected outbreak weighed 95 kg. According to the ear tags, the pigs came from farms [REDACTED], [REDACTED], [REDACTED], and [REDACTED]. There is no past history of the farm. At the time of the inspection, there were 30 pigs displaying symptoms of CSF. Over the last month, 22 pigs had died.

Chronology of the diagnosis and actions on the farm:

June 20:

The farm was inspected due to its proximity to Outbreak 2/2001. Pigs were observed with symptoms of CSF. Two necropsies were carried out and lesions characteristic of CSF were observed. Sixty blood samples, and kidney, lymphatic ganglion and spleen samples were taken.

The pigs were destroyed at [REDACTED].

Table 9. Results of analyses (samples from 06/20/01)

Sample	#	Result	Technique
Tissue	1	-	ELISA-Ag
Serum	9	+	ELISA-Ag
Serum	1	+/-	ELISA-Ag
Serum	1	IS	ELISA-Ag
Serum	49	-	ELISA-Ag

Data of epidemiological interest

Data on the entry of vehicles and people were not gathered. The most probable source of the entry of the CSF virus was taken to be the farm of Outbreak 2, given the proximity of both farms.

Outbreak 3/2001

Date suspected	06/15/01	Entry of animals	05/07/01
Date declared	06/18/01	Pigs entered	1450
Farm Code	[REDACTED]	Origin	[REDACTED] (Bellmunt)
Town	Vilanova de l'Aguda	Pigs present	1351
Owner	[REDACTED]	Dead pigs	99
Integrator	[REDACTED]	Mortality	6.8%
Type of Farm	Fattening		

Clinical History:

This is a fattening farm owned by [REDACTED], integrated in the [REDACTED] company, which was filled with pigs from a farm belonging to [REDACTED] located in the municipal district of Bellmunt (Lleida) on 05/07/01, when 1450 pigs entered. At the time of the inspection, on 06/15/01, 1351 pigs were still alive. The total mortality was, therefore, 6.8%.

The farm has two sheds (the new shed and the old shed, see Figure 3), and the pigs were placed according to their origin for the purposes of a study into the spread of PRRSV and PCV2 among the pigs on the farm (conducted by CReSA). Nine hundred pigs were housed in the new shed, with no significant problems associated with PRRSV and PCV2 during the transition. In the old shed were housed 550 pigs, in transition with problems associated with PPRSV and PCV2, and which were part of the above study. Blood had already been taken from these pigs three times (one at the birthing stall and two more at the transition stalls).

The pigs from the new shed did not display any signs of disease during the period under observation, and mortality did not exceed 1% up to the time of the slaughter due to CSF at the farm. In contrast, 15 days after entry, isolated cases of PMWS were found in the old shed. On May 14, 18, and 30, necropsies were carried out on pigs 390, 389, and 398, with the samples being set in formol and sent to CReSA for study of PRRSV and PCV2. In May, no symptoms of disease compatible with CSF were

observed. On June 5, the pigs in the study were bled, and no symptoms of disease compatible with CSF were observed. In contrast, on June 13, the farm manager noted an increase in mortality, and a different clinical behavior. On June 15, the [REDACTED] company was alerted by the person in charge of the farm of the worsening clinical situation. The company veterinarians visited the farm and, faced with the suspected CSF, notified the regional services of the DARP to establish the diagnosis.

Chronology of the diagnosis and actions on the farm:

June 15:

Notification was received by the veterinarian from the farm of the existence of pigs displaying symptoms of CSF. The DARP veterinarians inspected the farm and observed clinical symptoms characteristic of CSF. The epidemiological survey was carried out, and blood samples were taken from 21 pigs and tissue samples from 3 to detect CSF. In the afternoon, the DARP Laboratory in Lleida confirmed the diagnosis.

June 16:

The farm was visited again by the DARP, the count of pigs present was made (1351), and 61 blood samples were taken. The pigs were slaughtered and buried on the farm.

June 18:

The NRL confirmed the diagnosis of CSF, the outbreak was declared, and the 3- and 10-kilometer protection and vigilance zones were demarcated. At the same time, the slaughter of the pigs in farms less than 1 kilometer away was ordered.

Table 10. Results of analyses (samples from 06/15/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA-Ag
Serum	9	+	ELISA-Ag
Serum	1	+/-	ELISA-Ag
Serum	11	-	ELISA-Ag

Table 11. Results of analyses (samples from 06/20/01)

Sample	#	Result	Technique
Serum	14	+	ELISA-Ag
Serum	47	-	ELISA-Ag

Epidemiological study into PPRSV and PCV2, CReSA – [REDACTED]

CRESA and [REDACTED] carried out a study to detect PPRSV and PCV2 in the company’s production pyramid. To this end, they took blood samples from 20 sows, and from 60 piglets by these sows after one week of life (birthing stall), and after 1, 2 (transition stall), 3, 4 and 5.5 months of life (fattening).

The samples from the farm in Outbreak 3 (from the first 4 blood takings) were sent to the DARP central laboratory in Barcelona’s Zona Franca to be examined. The results are shown in the following table:

Table 12. Results of ELISA-Ag analyses (samples from the [REDACTED]-CReSA study)

	03/14/01	04/04/01	05/03/01	06/04/01
Positive	0	0	0	5
Negative	75	53	51	42
TOTAL	75	53	51	47

Table 13. Results of ELISA-Ab analyses (samples from the [REDACTED]-CReSA study)

	03/14/01	04/04/01	05/03/01	06/04/01
Positive	0	0	0	0
Negative	75	53	51	47
TOTAL	75	53	51	47

Likewise, samples from 3 pigs with ear tags 390 (71 days of life), 389 (75 days of life), and 398 (87 days of life), that had died respectively on 5-14-01, 5-18-01, and 5-30-01, were sent to CReSA as part of the above study. These samples (histological blocks of samples set in formol and included in paraffin) were studied to detect the antigen of the CSF virus with immunohistology. The results showed that pigs 390 and 398 were positive, whereas with pig 389 the result was negative. These three pigs were negative using ELISA for capturing antigen and detecting antibodies when blood was taken on 05/03/01; therefore, the infection very probably occurred around this date.

Data of epidemiological interest

April 30, 2001

[REDACTED]. Collection of pigs of lower growth that were still present in the farm from the previous cycle (7 days before the arrival of the pigs in the affected batch).

May 7, 8, and 11

Arrivals of pigs for fattening. According to the surveys, the pigs came from a farm ([REDACTED], owner [REDACTED]) that is very near to Outbreak 7 (Penelles, La Campanera). Transport was on May 7, 8, and 11. The vehicles with the pigs passed by this farm.

The farm of origin was visited by the DARP (the pigs present at the time of the visit were the next batch after the pigs from Outbreak 3). No symptoms of CSF were observed, but the farm was slaughtered as prevention when Outbreak 7 was declared, since the farm was within the 1-kilometer radius of the outbreak.

From this same farm, pigs went on May 7, 8, and 11 to another of the company's fattening farms ([REDACTED]). No symptoms of CSF were observed at this farm, and analysis of the blood samples taken were negative. It seems unlikely, therefore, that the transition farm was the origin of the infection.

May 30, 2001

Vaccination of the pigs against Aujeszky Disease (company vaccinator).

June 5

Extraction of blood for the CReSA study (carried out by [REDACTED], [REDACTED], [REDACTED].)

The origin of the infection in this farm is difficult to clarify. In geographical terms, it is far from the first two outbreaks; therefore, geographical proximity (and airborne transmission) can be ruled out in this case. The risks may be there due to the entry of people or the proximity of the transport of piglets from the farm of origin, very close to Outbreak 7 (La Campanera, Perelles). The entry of trucks (collection of remainders) may be a significant factor on this farm. The results of the laboratory studies (DARP Laboratory in Barcelona's Zona Franca) on the samples in the [REDACTED]-CReSA study showed that 5 out of the 47 pigs were already infected (antigen capture ELISA) on 06/04/01. All the infected pigs were still seronegative, which would indicate that the infection was recent. Immunohistochemical studies (detection of antigen in tissue set in formol and included in paraffin) on three dead pigs from this farm revealed the existence of one pig infected and dead a day.

Outbreak 4/2001

Date suspected	06/15/01	Entry of animals	05/18/01
Date declared	06/18/01	Pigs entered	450
Farm Code		Origin	Cuenca ([REDACTED])
Town	Vinaròs	Pigs present	350
Owner		Dead pigs	100
Integrator	[REDACTED]	Mortality	22%
Type of Farm	Fattening		

Clinical History:

This is a fattening farm with two sheds. The pigs, which were from farms in Barcelona and Tarragona, entered shed 1 (420 pigs) on 05/11/01, and pigs from the province of Cuenca (farm owned by [REDACTED]) entered shed 2 on 05/18/01. In shed 2, a total of approximately 100 losses were recorded.

Chronology of the diagnosis and actions on the farm:

The actions are unknown.

Results of analyses (samples from 06/18/01)

Unknown.

Data of epidemiological interest

There are few data available. There is no record of the arrivals and departures of trucks, veterinarians, vaccinators, etc. We have not been able to consult the epidemiological survey. The only relevant piece of data is the provenance of the pigs, namely from a farm in Cuenca, from an area and owner where there was an outbreak of CSF on July 11. Such a short space of time between the arrival of the animals and such an intense explosion of the disease suggests that the infection was already present in the pigs when they arrived at the farm and were divided among numerous sties. The other possibility is that it took place very shortly after arrival at the farm.

Outbreak 5/2001

Date suspected	06/18/01	Entry of animals	04/10/01 to 04/17/01
Date declared	06/20/01	Pigs entered	1773
Farm Code	██████████	Origin	██████████
Town	Mollerussa	Pigs present	1685
Owner	██████████	Dead pigs	88
Integrator	██████████	Mortality	5%
Type of Farm			

Clinical History:

This is a fattening farm owned by the ██████████ company, that at the time of the suspected CSF had 1685 pigs, each weighing 50 kg (approximately 60 days after arrival for fattening). The farm has 3 sheds (one with capacity for some 540 pigs and the other two with capacity for around 600 pigs each).

On Thursday June 14 at 7 a.m., the veterinarian visited the farm and observed 6 sties in shed 2 where some of the animals showed a general bad state and apathy. These animals had been medicated intramuscularly with antibiotics (Enrofloxacin) for 3 days for respiratory problems. Initially, CSF was not suspected as the symptoms observed were relatively non-specific and could even be said to be common in pigs of this age. Also, at that time, there was no known outbreak in the area. On Monday June 18, after the first outbreak in the Golmés area (Outbreak 2) had been declared, the veterinarian returned to the farm and slaughtered three animals that were displaying apathy and general ill health. Lesions compatible with CSF were observed in one of the three animals. This farm is approximately 800 meters from the ██████████ farm (Outbreak 2) where the first outbreak in the area was declared.

Figure 3. CSF 5/2001 (██████████). Accumulated mortality
[Key: Mortality]

Chronology of the diagnosis and actions on the farm:

June 18:

Notification was received from the integrator company that there was suspected CSF on the farm. The farm was visited, the epidemiological survey was conducted, and blood and tissue samples were taken for analysis. CSF lesions were observed in the necropsies carried out.

June 19:

All the animals on the farm were slaughtered, and new samples were taken for diagnosis.

Table 14. Results of analyses (samples from 06/18/01)

Sample	#	Result	Technique
Tissue	8	+	ELISA -Ag
Serum	12	+	ELISA -Ag
Serum	1	+/-	ELISA -Ag
Serum	5	-	ELISA -Ag

Table 15. Results of analyses (samples from 06/18/01, [REDACTED])

Sample	#	Result	Technique
Serum	5	+	ELISA -Ab
Serum	5	+/-	ELISA -Ab
Serum	8	-	ELISA -Ab

Data of epidemiological interest

The owner has a farm ([REDACTED]) included in the radius of 1 kilometer from Outbreak 2, that had, therefore, been slaughtered. Aujeszky vaccinations were administered on 05/11/01 and 06/02/01. Both this farm and that of Outbreak 6 are very near to the farm of Outbreak 2, and this fact is considered to be the most probable origin of the outbreak.

Outbreak 6/2001

Date suspected	06/18/01	Entry of animals	03/02/01 and 03/09/01
Date declared	06/22/01	Pigs entered	1429
Farm Code	[REDACTED]	Origin	Huesca
Town	Golmés (Pla d'Urgell)	Pigs present	1324
Owner	[REDACTED]	Dead pigs	105
Integrator	[REDACTED]	Mortality	7.3%
Type of Farm	Fattening		

Clinical History:

This is a fattening farm owned by the [REDACTED] company. The pigs came from the town of Estopiñán in Huesca on March 5 and 12, 2001. At the time of the suspected CSF, the farm had 1324 pigs of about 95-100 kg (105-110 days after arrival for fattening). It has two sheds with capacity for 700 pigs each. On the morning of Monday March 18, the veterinarian went to the farm and conducted three necropsies, of which one displayed lesions compatible with CSF. The afternoon of the same day, the company's chief veterinarian went to the farm and took blood and tissue samples from animals affected and sent them to the laboratory. These samples gave positive for CSF. The farm was some 1500 meters from Outbreak 2/2001 ([REDACTED]), and the owner was a relative of the owner of the farm in Outbreak 5.

The accumulated mortality observed at the farm, according to data from the epidemiological survey, is shown in Figure 5 and in Annex 1. On June 18, mortality was 2%. The symptoms of the disease began shortly before the declaration.

Chronology of the diagnosis and actions on the farm:

June 18:

Last thing, notification was received of the possible outbreak. The farm was visited on the same day, and the clinical inspection, epidemiological survey, and taking of samples was carried out. Twenty-six animals with symptoms compatible with CSF were detected, some of the animals were slaughtered and necropsy carried out, finding lesions also pertaining to the disease. In light of these results, the animals were counted and immobilized.

June 19:

The samples were sent to the Animal Health Laboratory in Lleida. The same day, the laboratory informed of the results (3 positive serums and 10 negatives for antigen; three tissue samples positive). Samples were sent to the NRL.

June 20:

The pigs on the farm were slaughtered. Samples were taken from them (3 positive serums, 1 doubtful and 56 negative for CSF antigen).

Figure 4. CSF 6/2001 ([REDACTED], [REDACTED]). Accumulated mortality
[Key: Mortality]

Figure 5. CSF 6/2001 ([REDACTED], [REDACTED]). Mortality and rolling average after 05/10/01
[Key: Mortality
Rolling average (5)]

June 22:

The NRL confirmed the results and the outbreak was officially declared. Since the farm was inside the radius of protection of Outbreak 2, the protection and vigilance zones around this outbreak were modified to include the new Outbreaks 5 and 6. The preventive slaughter of the pigs from two farms located at 130 meters and 500 meters (the only two located in a 1-kilometer radius) was carried out.

Table 16. Results of analyses (samples from 06/18/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA-Ag
Serum	3	+	ELISA-Ag
Serum	10	-	ELISA-Ag

Table 17. Results of analyses (samples from 06/20/01)

Sample	#	Result	Technique
Serum	3	+	ELISA-Ag
Serum	3	+/-	ELISA-Ag
Serum	56	-	ELISA-Ag

Data of epidemiological interest

Since the farm was inside the radius of protection of Outbreak 2, the protection and vigilance zones around this outbreak were modified to include the new Outbreaks 5

and 6. The preventive slaughter of the pigs from two farms located at 130 meters and 500 meters (the only two located in a 1-kilometer radius) was carried out. Taking into account that the mortality was not high, that there were few sick animals, and the laboratory results (many animals positive for antigen in blood), it is probable that the infection occurred recently. Apart from this, the farm was situated in the Outbreak 2 protection zone (where the animals were possibly infected before this outbreak was diagnosed); therefore, the most plausible hypothesis is that the farm had been infected by Outbreak 2.

Outbreak 7/2001

Date suspected	06/18/01	Entry of animals	Start of March
Date declared	06/22/01	Pigs entered	3888
Farm Code	██████	Origin	Multiple
Town	Penelles	Pigs present	3216
Owner	██████████	Dead pigs	672
Integrator	██████████	Mortality	17.3%
Type of Farm	Fattening		

Clinical History:

This is a fattening farm located in a high-density zone. The accumulated mortality observed on the farm, according to data from the epidemiological survey, is shown in Figure 6a and in Annex 1. Figures 6b and 6c display the data on mortality by shed. The total mortality of the fattening farm was 672 animals (17.3%).

Figure 6A. CSF 7/2001 (Penelles). Mortality and rolling average, all sheds.

[Key: Mortality
Rolling average (5)]

Figure 6B. CSF 7/2001 (Penelles). Mortality and rolling average by shed.

[Key: Shed 1
Shed 2 + 3
Shed 4]

Figure 6C. CSF 7/2001 (Penelles). Mortality and rolling average by shed.

[Key: Shed 5
Shed 6 + 8
Shed 7]

Pigs from numerous origins are fattened on the farm. From February 28, more than 23 arrivals from different origins were recorded, varying between 24 and 800 pigs in each arrival. The provenance was from more than 8 Spanish provinces, according to the guides of origin. One of the arrivals, of 300 pigs, dated from March 13 and was from the town of Honrubia in the province of Cuenca.

Chronology of the diagnosis and actions on the farm:

June 18:

Notification of the possible outbreak was received. The farm was visited on the same day, and the clinical inspection, epidemiological survey, and taking of samples was carried out. The prevalence of animals with symptoms compatible with CSF was close to 30%.

Some of the animals were slaughtered and necropsy carried out, finding lesions also pertaining to the disease. In light of these results, the animals were counted and immobilized.

June 19:

New samples were taken when the animals were slaughtered and were sent to the Animal Health Laboratory in Lleida. Of the 10 samples taken from the previous day, 2 were positive, 1 was doubtful and the rest were negative.

June 22:

The NRL confirmed the results and the outbreak was officially declared.

Table 18. Results of analyses (samples from 06/18/01)

Sample	#	Result	Technique
Serum	2	+	ELISA-Ag
Serum	1	+/-	ELISA-Ag
Serum	7	-	ELISA-Ag

Table 19. Results of analyses (samples from 06/19/01)

Sample	#	Result	Technique
Tissue	1	+	ELISA-Ag
Serum	10	+	ELISA-Ag
Serum	1	IS	ELISA-Ag
Serum	49	-	ELISA-Ag

There are no results of the detection of antibodies for these samples.

Data of epidemiological interest

Analyzing the mortality graphs, a high initial mortality is observed (an average of between 6 and 9 animals every day) and a decrease to lower levels until a rise at the end of May, start of June. If we analyze the mortalities for each shed, we can see a slight increase in sheds 5, 6, and 8 at the start of May, a slight increase in shed 7 in the middle of May, and a slight increase in sheds 1 and 4 at the start of June. The significant mortalities in June occurred especially in sheds, 1, 4, 5, and 7.

Supposing that these mortalities can be attributed to the swine fever, the early entry of the virus in the farm could be assumed for between early and mid April.

All of the farms that had some link with the above (proximity, feed truck, vaccinator, etc.) were analyzed and surveyed, two of which were positive (see Outbreaks 11 and 12).

Outbreak 8/2001

Date suspected	06/22/01	Entry of animals	No
Date declared	06/28/01	Pigs entered	No
Farm Code	██████	Origin	Own
Town	Castellserà (Urgell)	Pigs present	147 Sows 6 Boars, 240 male piglets, 210 female piglets
Owner	██████████	Dead pigs	20
Integrator	██████████	Mortality	4.4%
Type of Farm	Closed cycle		

Clinical History:

This is a piglet producing farm, where clinical sickness compatible with CSF was detected on 06/18/01. The first animal died on 06/21/01. The same day, the farmer notified the DARP of the existence of symptoms and of an abnormal increase in mortality on the farm.

Table 20. Results of analyses (samples from 06/22/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA-Ag
Serum	3	+	ELISA-Ag
Serum	3	+/-	ELISA-Ag
Serum	1	IS	ELISA-Ag
Serum	44	-	ELISA-Ag

There are no antibodies analyses available.

Chronology of the diagnosis and actions on the farm:

June 22:

The owner notified of the possible outbreak. The farm was visited on the same day, and the clinical inspection, epidemiological survey, and taking of samples was carried out. Twenty-eight piglets displayed symptoms compatible with CSF, lesions were found in 3 pigs during the necropsies. Mortality was 20 piglets.

June 23:

The Animal Health Laboratory in Lleida diagnosed positive in tissues and serum (3 positive out of 51). The farm was slaughtered.

June 28:

The NRL confirmed the result, and the official declaration was made.

Data of epidemiological interest

The study detected the recent departure of piglets to farm ████████. This farm was inspected on June 23, and the possibility of CSF was suspected (Outbreak 9/2001). The samples taken from the slaughter of the pigs gave a positive result. According to the documentation provided by the farmer, the movements of animals were:

05/25/01 and 06/01/01 to farm [REDACTED] (preventively slaughtered).
 06/08/01 and 06/15/01 to farm [REDACTED] (Outbreak 9, preventively slaughtered). Truck license number [REDACTED] carried the piglets from this outbreak to the other farms listed.

There were two other farms that had received piglets from this outbreak, but before the previous 30 days. They were visited and no symptoms were observed ([REDACTED] and [REDACTED]).

This leads to the conclusion that the infection on this farm was only one month old. The low prevalence of antigen would indicate that the infection was possibly recent on the farm (very approximately between 15 and 30 days).

Arrivals of trucks to bring feed were by [REDACTED], with the last one dated 06/06/01.

Movements of animals were carried out by the same transport ([REDACTED]), to transport both piglets and reject sows. The sow concentration center belongs to a company related to other outbreaks.

On 06/16/01, purines from this farm were dumped close to farm [REDACTED]. This farm was in the radius of vigilance of Outbreak 7.

Veterinarians from [REDACTED] visited the farm in 06/18/01 and 06/22/01.

There had been no arrivals of animals at the farm for a long time (over 2 years). The farm is close to a road leading to other outbreaks. There is a certain relation with the owner of [REDACTED] (Outbreak 7), as they are from the same town.

Outbreak 9/2001

Date suspected	06/23/01	Entry of animals	8, 06/15/01
Date declared	06/29/01	Pigs entered	214
Farm Code	[REDACTED]	Origin	Outbreak 8/2001
Town	Sisteró (Els Plans de Sió)	Pigs present	213
Owner	[REDACTED]	Dead pigs	1
Integrator	[REDACTED]	Mortality	0.5%
Type of Farm	Transition		

Clinical History:

The farm was visited on 06/23/01 due to epidemiological relation with the farm in Outbreak 8. On June 23, no symptoms were observed in the animals, and only one piglet had died, but on June 25, some 50 animals had symptoms of CSF.

Chronology of the diagnosis and actions on the farm:

June 23:

The clinical inspection, epidemiological survey, and taking of samples was carried out (60 blood samples and 1 tissue sample). The reason was that 102 animals from the farm of Outbreak 8 had entered the farm. No symptoms compatible with CSF were observed, but lesions were found in 3 pigs during necropsies. Mortality was of one piglet.

June 25:

The clinical inspection and taking of samples was carried out (60 blood samples and 1 tissue sample). There were 50 piglets displaying symptoms compatible with CSF, and lesions were found in 3 pigs during necropsies. Mortality had not risen. The Animal Health Laboratory in Lleida diagnosed tissue as positive (sample from 06/23). The farm was slaughtered.

Table 21. Results of analyses (samples from 06/25/01)

Sample	#	Result	Technique
Tissue	1	+	ELISA-Ag
Serum	30	-+	ELISA-Ab

* The test for antigen in the serums was not conducted.

Data of epidemiological interest

102 animals from Outbreak 8 had entered when the latter was incubating the disease, therefore the origin of the outbreak seems clear.

Outbreak 10/2001

Date suspected	06/26/01	Entry of animals	No
Date declared	06/29/01	Pigs entered	-
Farm Code	██████	Origin	-
Town	Castellserà	Pigs present	92 breeders 701 piglets and fattening
Owner	██████	Dead pigs	20
Integrator		Mortality	
Type of Farm	Closed cycle		

Clinical History:

This is a closed cycle farm with 90 sows, 2 boars, 241 piglets and 460 fattening pigs. No animals had entered recently. In June, fattening pigs (June 6) and a sow (June 14) were removed.

Chronology of the diagnosis and actions on the farm:

June 26:

The farm veterinarian alerted of the possible outbreak. In the afternoon, the official services inspected, and detected 30 piglets and 7 fattening pigs with compatible symptoms. There were 4 losses (3 piglets and 1 fattening pig). Necropsies were conducted on 3 animals and compatible lesions were found. Sixty samples were taken.

June 28:

The pigs on the farm were slaughtered.

Table 22. Results of analyses (samples from 06/26/01)

Sample	#	Result	Technique
Tissue	3	+	ELISA -Ag
Serum	1	+	ELISA -Ag
Serum	0	+/-	ELISA -Ag
Serum	9	-	ELISA -Ag

Data of epidemiological interest

The farm is close to Outbreaks 8 and 7.

Outbreak 11/2001

Date suspected	06/21/01	Entry of animals	February
Date declared	07/05/01	Pigs entered	2327
Farm Code	██████████	Origin	Not recorded
Town	Penelles	Pigs present	1136
Owner	████████████████████	Dead pigs	1191
Integrator	██████████	Mortality	51%
Type of Farm	Fattening		

Clinical History:

The farm was investigated on June 21 as it belonged to the same integrator company as Outbreak 7 and was less than 1 kilometer away. In the clinical inspection, only one pig displayed symptoms of CSF. The other pigs were healthy. In light of the high mortality recorded, the stockbreeder said that it was due to a strong case of circovirus.

Chronology of the diagnosis and actions on the farm:

On June 21, samples from a necropsy and serum samples were taken, and the farm was immobilized. On June 25, the presence of antibodies in all of the samples taken was confirmed.

Table 23. Results of analyses (samples from 06/21/01)

Sample	#	Result	Technique
Tissue	4	-	ELISA -Ag
Serum	0	+	ELISA -Ag
Serum	0	+/-	ELISA -Ag
Serum	55	-	ELISA -Ag
Serum	55	+	ELISA -Ab
Serum	0	+/-	ELISA -Ab
Serum	0	-	ELISA -Ab

Data of epidemiological interest

On June 21, samples were taken from 55 animals, all of which had antibodies but were negative for antigen.

Total mortality since the arrival of the animals was 51%. The breakdown of mortality was unknown, which could help fix approximately when the infection entered the farm, but it very probably occurred between at least one and two months before the date diagnosed. Clearly, the CSF virus had already circulated the farm and the animals present were convalescing. The appearance of antibodies after the infection by the CSF virus occurs after between 14 and 21 days. For 55 pigs out of 55 to give positive for antibodies at the same time as all of them giving negative for the presence of the virus in the blood, it must have occurred between 2 and 3 times this period, perhaps even more.

The three farms of this company (Outbreaks 7, 11, and 12) were infected in a possibly similar period, and it might even be possible that farm 11 was the index case. The farm owner () and his brother () are vaccinators for the company.

Outbreak 12/2001

Date suspected	06/22/01	Entry of animals	April
Date declared	07/05/01	Pigs entered	390
Farm Code		Origin	
Town	Penelles	Pigs present	387
Owner		Dead pigs	3
Integrator		Mortality	0.8%
Type of Farm	Fattening		

Clinical History:

The farm was investigated as it belonged to the same integrator company as Outbreak 7 and was less than 1 kilometer away. Also because the owner has a farm which had an outbreak (Outbreak 11).

Chronology of the diagnosis and actions on the farm:

On June 22, samples were taken from 15 animals. All gave negative for antigen, but 4 gave positive for antibodies and 4 were doubtful.

On June 28, the 387 pigs on the farm were slaughtered.

Table 24. Results of analyses (samples from 06/22/01)

Sample	#	Result	Technique
Serum	15	-	ELISA -Ag
Serum	4	+	ELISA -Ab
Serum	4	+/-	ELISA -Ab
Serum	7	-	ELISA -Ab

Data of epidemiological interest

On this farm, there was a similar situation to that of Outbreak 11 as regards the laboratory results. The presence of antibodies and the absence of antigen in the animals indicated that the infection had occurred some time before, at least around 2 months earlier or even more. One detail that was not consistent was the very low

mortality (only three animals) recorded in the farm's books (in Outbreak 11, the mortality was very high).

Outbreak 13/2001

Date suspected	06/29/01	Entry of animals	03/19/01 and 03/21/01
Date declared	07/05/01	Pigs entered	440
Farm Code	████████	Origin	████████
Town	Castellserà	Pigs present	373
Owner	████████	Dead pigs	67
Integrator	████████	Mortality	15%
Type of Farm	Fattening		

Clinical History:

This is a farm located 300 meters from Outbreak 8.

It is a fattening farm of the ██████████ company, that at the time of the suspected CSF had 373 pigs of around 90 kg in weight. The farm was visited as it was very close to other affected farms.

Chronology of the diagnosis and actions on the farm:

On June 29, the farm was visited because of its proximity to an outbreak, and 60 blood samples were taken. Necropsies were carried out on 2 pigs, but no evident lesions of CSF were found. Samples were taken.

The result was positive, and it was decided to slaughter the pigs.

Table 25. Results of analyses (samples from 06/27/01)

Sample	#	Result	Technique
Serum	10	-	ELISA-Ag
Serum	27	+	ELISA-Ab
Serum	1	+/-	ELISA-Ab

Table 26. Results of analyses (samples from 07/02/01)

Sample	#	Result	Technique
Tissue	2	-	ELISA-Ag
Serum	30	+	ELISA-Ab
Serum	0	+/-	ELISA-Ab
Serum	0	-	ELISA-Ab

Data of epidemiological interest

This farm was in a similar situation to that of Outbreaks 11 and 12. It displayed antibodies in a very high proportion of animals (practically all of them), and did not display antigen. The infection was, therefore, old on this farm. It is unknown when the mortality observed occurred.

Outbreak 14/2001

Date suspected	06/25/01	Entry of animals	?
Date declared	07/09/01	Pigs entered	?
Farm Code	██████	Origin	
Town	Arbeca	Pigs present	167
Owner	██████	Dead pigs	?
Integrator	██████	Mortality	? %
Type of Farm	Fattening		

Clinical History:

This is a fattening farm of the ████████ company, that at the time of the suspected CSF had 167 pigs of around 97 kg in weight. The farm was inspected because of epidemiological relation. No records of animals entering were found.

Chronology of the diagnosis and actions on the farm:

On June 25 and 29 blood and tissue samples were taken.

Table 27. Results of analyses (samples from 06/25/01)

Sample	#	Result	Technique
Serum	2	+/-	ELISA-Ag
Serum	58	-	ELISA-Ag

Table 28. Results of analyses (samples from 06/29/01)

Sample	#	Result	Technique
Tissue	2	-	ELISA-Ag
Serum	0	+	ELISA-Ag
Serum	0	+/-	ELISA-Ag
Serum	8	-	ELISA-Ag
Serum	6	+	ELISA-Ab
Serum	2	+/-	ELISA-Ab
Serum	22	-	ELISA-Ab

Data of epidemiological interest

On this farm, positivity was found for antibodies, without the presence of antigen in blood. This indicated that the infection was not recent. As the mortality and other data on the clinical symptoms were unknown, it was not possible to reach a hypothesis on the disease in this farm. In any event, the infection was not recent. It is possible that this farm was a “hospital” farm, which is banned under current regulations.

Figure 7. Percentage of positivity of ELISA-Ag (antigen) and ELISA-Ab (antibody) in the outbreaks of CSF.

[Key: Antigen
Antibody
F1, etc. = Outbreak 1, etc.]

5. Epidemiological relationships between the outbreaks

CATALAN	ENGLISH
Contaminació inicial (procedencia desconeguda: Europa de l'Est?)	Initial contamination (unknown origin: East Europe?)
Granges de Conca (?)	Farms in the Cuenca region (?)
Venda de garrins	Sale of piglets
Vehicles de Transport	Transportation Vehicles
FOCUS 7 (Penelles) [REDACTED]	OUTBREAK 7 (Penelles) [REDACTED]
FOCUS 1 (Soses) [REDACTED]	OUTBREAK 1 (Soses) [REDACTED]
FOCUS 2 (Golmès) [REDACTED]	OUTBREAK 2 (Golmès) [REDACTED]
FOCUS 3 (Vil_Aguda) [REDACTED]	OUTBREAK 3 (Vil_Aguda) [REDACTED]
FOCUS 4 (Vinaròs) [REDACTED]	OUTBREAK 4 (Vinaròs) [REDACTED]
Proximitat a la granja de transició origen	Proximity to the transition farm of origin
FOCUS 2 (Golmès) [REDACTED]	OUTBREAK 2 (Golmès) [REDACTED]
Proximitat	Proximity
FOCUS 5 (Mollerussa) [REDACTED]	OUTBREAK 5 (Mollerussa) [REDACTED]
Mateixa integració	Same integration
FOCUS 6 (Golmès) [REDACTED]	OUTBREAK 6 (Golmès) [REDACTED]

FOCUS 7 (Penelles) [REDACTED]	OUTBREAK 7 (Penelles) [REDACTED]
Mateixa integració	Same integration
Mateix propietari Proximitat	Same owner Proximity
FOCUS 14 (Arbeca) [REDACTED] (possible granja hospital)	OUTBREAK 14 (Arbeca) [REDACTED] (possible hospital farm)
FOCUS 11 (Penelles) [REDACTED]	OUTBREAK 11 (Penelles) [REDACTED]
FOCUS 12 (Penelles) [REDACTED]	OUTBREAK 12 (Penelles) [REDACTED]
FOCUS 7 (Penelles) [REDACTED]	OUTBREAK 7 (Penelles) [REDACTED]
FOCUS 7.1.3	OUTBREAK 7.1.3
Vehicles de Transport	Transportation Vehicles
Proximitat	Proximity
FOCUS 8 (Castellserà) [REDACTED] (Granja de mares)	OUTBREAK 8 (Castellserà) [REDACTED] (Sow farm)
Proximitat	Proximity
FOCUS 10 (Castellserà) [REDACTED]	OUTBREAK 10 (Castellserà) [REDACTED]
Proximitat	Proximity
Envio de garrins	Shipment of piglets
FOCUS 9 (Sisteró) [REDACTED]	OUTBREAK 9 (Sisteró) [REDACTED]
FOCUS 13 (Castellserà) [REDACTED]	OUTBREAK 13 (Castellserà) [REDACTED]

6. Timescale of the outbreaks of CSF

The following timescale has been established on the basis of objective data (arrivals, diagnoses, slaughter), some others contain a degree of error (start of symptoms/mortality), and others are speculative (possible date of infection); for the latter, we have made the following suppositions:

- The incubation period in an animal is at least between 4 to 8 days.
- It is supposed that mortality occurs 3 days after the start of the symptoms.
- In cases where the disease has been less severe, it is considered that the period is extended by 2 to 4 days.
- The swine fever behaves like an epidemic by propagation, in other words, there are primary cases (a few individuals who are infected initially, and who usually go unnoticed), and secondary cases, which is when the disease is usually detected as it affects a significant number of animals. Therefore, we suppose that the infection enters the farm between 9 and 15 days before the clinical suspicion (12 to 18 before the start of mortality).
- When antibodies, but not antigen, are detected, it is considered that the secondary cases are infected a minimum of 20 days before (therefore, the infection has occurred a minimum of 30 days previously).
- When both antibodies and antigens are detected, the infection in the animals has occurred approximately 15 days previously (therefore, the infection entered the farm some 25 days previously).
- The main problem in establishing the start of the infection lies in that it is not possible to be sure that the clinical symptoms and the mortality observed were only due to the CSF.

There were not sufficient data about **Farm 2A**, but the infection probably occurred some time near to the infection of Farm 2.

With regard to **Farm 3**, according to the laboratory data from the blood samples from 06/04/01, and the preliminary immunohistology results, 5 live animals (06/04/01) and 2 dead animals (05/14/01 and 05/30/01) were infected. This allows us to conclude that the infection occurred when the animals arrived, or even some days earlier.

There were no data for **Outbreak 4** (Vinaròs).

The data for **Farm 7** are difficult to interpret. Two hypotheses are established: that the disease began in shed 5 (start of mortality attributed to primary cases after April 29), or that it began in shed 4 (a rise in mortality after May 25 was observed).

7. Studies pending

At the time of presenting this report, additional study results are pending for the detection of the CSF virus in tissue samples from pigs which had died on farms in the province Lleida. These samples were received by the Veterinary Pathology Diagnosis Service at the Autonomous University of Barcelona as part of routine diagnoses for clients before the CSF was declared. The samples (Table 29), are histological blocks from pigs on farms integrated by [REDACTED], sent by a veterinary services company, with the request for diagnosis of porcine circovirus and/or PRRS, and samples from the [REDACTED] integrator for animals in Outbreak 3.

The techniques carried out, immunohistology (detects CSF virus antigen) and RT-PCR (detects CSF virus genome) are not usual and require standardization.

Table 29. Samples of pigs under investigation for CSF of Pinsos YAK

AUB Ref.	Client Ref.	Owner	Date Arrived
B-00368/01	704	[REDACTED]	01/26/01
B-01018/01	2234	[REDACTED]	03/21/01
B-01023/01	2236	[REDACTED]	03/21/01
B-01024/01	1758	[REDACTED]	03/21/01
B-01026/01	1759	[REDACTED]	03/21/01
B-01027/01	2238	[REDACTED]	03/21/01
B-01272/01	2989	[REDACTED]	04/18/01
B-01275/01	3037	[REDACTED]	04/18/01
B-01278/01	2988	[REDACTED]	04/18/01
B-01280/01	2990	[REDACTED]	04/18/01
B-02123/01	5200	[REDACTED]	06/25/01

To date, preliminary immunohistology results have been available for the only [REDACTED] sample analyzed (B-01272/01, [REDACTED]), and the samples from the integrator, [REDACTED] (see Outbreak 3). The [REDACTED] sample was positive, and therefore, and pending confirmation of this result by RT-PCR, it could mean that the CSF was already in Lleida before April 18. The conclusions about the timescale of the CSF in Lleida are preliminary and are therefore awaiting the conclusion of these studies.

8. Conclusions

1. It does not seem probable that any of the first three cases of CSF (Outbreaks 1 to 2) are the primary case of the disease. The oldest of the three seems to be that of Golmés, even though all three were detected around the same days. The fast disappearance of the disease in the areas of Outbreaks 1 and 3, and the appearance of only two more outbreaks near Outbreak 2, indicates that these must have been isolated and recent outbreaks (a high positivity of antigen, little or hardly any antibodies), where CSF occurred accidentally and which was excluded by the control measures.
2. It seems probable that the disease entered the area of Outbreak 7 (if the first hypothesis is considered in relation to this farm), or by some other farm unknown at the time but related to it (of the same integrator, with commercial relationships, etc.), possibly also in the Castellserà-Penelles area.
3. It cannot be excluded that the infection was also old on Farms 11, 12, and 13 (where the animals only had antibodies).
4. The appearance of other outbreaks in the province of Cuenca make it possible that the initial outbreaks were related to infected farms in that province. Outbreak 4 (Vinaròs) had brought in pigs from farms in the Cuenca region, as had Outbreak 7. At the same time, it appears that there were commercial relationships between the owners of the Cuenca farms and Outbreaks 1 and 2.
5. Animal transportation vehicles played a leading role in spreading the disease in the earliest phase. During the second phase, the proximity of the farms, above all in the Castellserà-Penelles area, took on significance.
6. The existence of other diseases during the fattening phase made recognition of CSF extremely difficult.
7. The possible date for the initial infection could be put during the second fortnight of April. The results of the studies pending could even place this date in March.
8. There is no assurance that the first cases of CSF in Spain were those of Lleida.

Bellaterra, September 17, 2001

Mariano Domingo Alvarez
Director of the CReSA

CASTILIAN	ENGLISH
MISMA EMPRESA DE TRANSPORTES	SAME TRANSPORTATION COMPANY
Relación comercial	Commercial relationship
FOCO N° 1 SOSES	OUTBREAK # 1 SOSES
FOCO N° 2 GOLMÉS	OUTBREAK # 2 GOLMÉS
Misma integradora	Same integrator
CERCANÍA	PROXIMITY
FOCO N° 3 VILANOVA DE L'AGUDA	OUTBREAK # 3 VILANOVA DE L'AGUDA
FOCO N° 5 MOLLERUSSA	OUTBREAK # 5 MOLLERUSSA
FOCO N° 6 GOLMÉS	OUTBREAK # 6 GOLMÉS
FOCO N° 7 PENELLES	OUTBREAK # 7 PENELLES
SOSPECHA MIRALCAMP	SUSPECTED MIRALCAMP
GRANJA SOSPECHOSA ██████	SUSPECTED FARM ██████
FOCO N° 11 PENELLES Mismo titular	OUTBREAK # 11 PENELLES Same owner
FOCO N° 12 PENELLES	OUTBREAK # 12 PENELLES
FOCO N° 14 ARBECA	OUTBREAK # 14 ARBECA
FOCO N° 16 SANT GUIM	OUTBREAK # 16 SANT GUIM
FOCO N° 15 ARBECA	OUTBREAK # 15 ARBECA
FOCO N° 8 CASTELLSERÀ	OUTBREAK # 8 CASTELLSERÀ
FOCO N° 13 CASTELLSERÀ Transporte Lechones	OUTBREAK # 13 CASTELLSERÀ Transportation of piglets
FOCO N° 10 CASTELLSERÀ	OUTBREAK # 10 CASTELLSERÀ
SOSPECHA CASTELLSERÀ	SUSPECTED CASTELLSERÀ
FOCO N° 9 SISTERÓ (Plans de Sió)	OUTBREAK # 9 SISTERÓ (Plans de Sió)
SOSPECHA LES PALLARGUES (Plans de Sió)	SUSPECTED LES PALLARGUES (Plans de Sió)
SOSPECHA VALLBONA DE LES MONGES	SUSPECTED VALLBONA DE LES MONGES
SOSPECHA TORA	SUSPECTED TORA