

E(23)

SUMMARY OF THE HOG CHOLERA CAMPAIGN IN MEXICO

Mexico established its National Hog Cholera Campaign in March of 1980. The campaign was updated in 1992.

According to the Official Publication of the Hog Cholera Campaign in Mexico, the country is divided into three zones according to its hog cholera status: free, eradication, and control. The states within the control zone are further categorized by three stages, according to the prevalence of the disease and efforts being made to eradicate it.

The free zone includes the states of Baja California Norte and Sonora. Baja California Sur was also considered free of HC until an outbreak occurred La Paz, in May of 1993. The free zone represents 8.5% of the total swine population of Mexico. Territory is not considered free until, "according to registrations and epizootic studies from Animal Health General Directorate (DGSA) where 24 months of activities in the eradication zone have passed and hog cholera's absence has been officially certified."

The eradication zone includes the states of Baja California Sur, Sinaloa, and Chihuahua. These three states represent 4.5% of Mexico's total swine population. Together, the free and eradication zones produce 19.7% of Mexico's swine. The eradication zone consists of territory where "according to registrations and epizootic studies from DGSA, hog cholera has not been detected for the past 12 months, vaccination is prohibited and strict interstate control for wine, its products and by-products is established."

The control zone comprises the vast majority of Mexico's swine population (86.8%) and production (80.3%). The states within the control zone fall into one of three stages, under control, intensive control, and last intensive control. States in the last intensive control stage include: Coahuila, Nuevo Leon, Tamaulipas, Campeche, Quintana Roo, Tabasco, and Yucatan. These states are expected to join the eradication zone as soon as appropriate quarantine points are reinforced. The intensive control stage includes the states of Guanajuato, Hidalgo, Jalisco, Mexico, Michoacan, Morelos, Puebla, Wuretaro, and Tlaxcala. This part of the country is considered the primary endemic area for HC, with the highest swine population in the smallest area. Activities in this area consist of massive swine vaccination, epizootiological surveillance, notification and control of outbreaks, and control of animal movements. The remaining states are in the under control stage: Aguascalientes, Chiapas, Durango, Colima, Mexico City, Guerrero, Nayarit, Oaxaca, San Luis Potosi, Veracruz, and Zacatecas. The swine production in this area is almost 85% rural (small, backyard producers) and only 13.8% of the population is vaccinated for hog cholera. Isolated disease outbreaks are characteristic of this area and disease control will not be likely until vaccination begins in earnest.

1992 HC Info from SARH	Total Population	% Population	% Production	% Vaccination	% Rural	% Commercial
Free-Zone	1,310,161	8.5%	19.7%	0%	22.4%	77.6%
Eradication-Zone	683,670	4.5%		0%	69%	31%
Last Control	1,496,708	9.8%	7.7%	31%	79.1%	20.9%
Intensive Control	6,350,161	41.5%	5.5%	62%	41%	59%
Under Control	5,424,955	35.5%	17.5%	13.8%	84.7%	15.3%
TOTAL	15,265,655	99.8%	100%	37.5%	60%	40%

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E(26) PREVALENCE AND DISTRIBUTION OF HOG CHOLERA AND FACTORS AFFECTING THE RISK FROM THE ENTRY OF PORK AND OTHER CARRIER MATERIALS INTO THE U.S. FROM MEXICO.

INTRODUCTION

Hog cholera virus is a small RNA containing enveloped animal virus, classified in the family *Togaviridae*, genus *Pestivirus*. Hog cholera is a highly contagious disease infecting domestic swine of all ages and breeds, mortality following an outbreak may be as high as 100% within a herd. Hog cholera virus is able to replicate in animals other than pigs but it does not produce illness or spread easily (Carbrey 1990). The disease is thought to have originated in the U.S. as early as 1810, and remained in the domestic swine population until 1976. Although the hog cholera virus is still prevalent in the wild swine populations of Europe, wild swine have not remained a reservoir in the U.S. (Nettles et al., 1989).

The economic importance of hog cholera is closely associated with the size of the pig population and the standards of pig farming within a country. In the United States, with an industrialized production system, and a susceptible swine population, the financial losses following an outbreak could be enormous.

DISTRIBUTION-WORLDWIDE

The disease is enzootic in most countries of continental Western Europe, South America, the Far East, and Africa. According to the FAO-WHO-OIE Animal Health Yearbook 1989 (Anonymous 1989), the disease is present in 36 countries and suspected in two more. Ten countries are currently vaccinating where eradication of hog cholera has been achieved. Hog cholera free countries include: Australia, Canada, Denmark, Dominican Republic, Fiji, Finland, Great Britain, Haiti, Iceland, Isle of Man, New Zealand, Northern Ireland, Norway, Republic of Ireland, Scotland, Sweden, the Trust Territories of the Pacific Islands, the U.S., and Wales (USDA 1992). The eradication program in the United States was started in 1962 and successfully completed in 1976 at a total cost of \$140 million (Terstra 1988). Hog cholera has been declared an exotic disease in the United States and restrictions apply to imports of swine from countries where the disease is still prevalent.

DISTRIBUTION AND PREVALENCE-MEXICO

already had → According to S.A.R.H. (Secretaria de Agricultura Y Recursos Hidraulicos) Mexico experienced 133 outbreaks of hog cholera in 1990, 40 in 1991, 42 in 1992, and 5 in first half of 1993. The OIE Foreign Animal Disease Bulletins report that the outbreaks occurred in the following Mexican states: Guanajuato, Hidalgo, Tlaxcala, Districto Federal, Mexico, Queretaro, Veracruz, Michoacan, Puebla, and Jalisco. The prevalence of hog cholera in Mexico's wild swine population is unknown but it is felt, by S.A.R.H. officials, that the population numbers are too low to be of concern. The prevalence of hog cholera within Mexico's domestic swine population is highly variable, depending on location within the country, and the level of commercialization present. Two states, Baja California Norte and Sonora have ceased vaccination and have

declared themselves free of the disease. In contrast, central Mexico is co-endemic area for the disease containing the majority of the swine population production systems. using both OIE and S.A.R.H. figures from 1989 to prevalence rate for Mexico of(.....infected animals.1000 animals) w

SURVIVABILITY OF THE HOG CHOLERA VIRUS

The virus may remain infective for some time in the environment, depending upon the ambient temperature and the medium in which the virus is found: blood, feces, or saliva. The virus may successfully over-winter in contaminated outdoor pens in colder areas of the United States (Terpstra 1988). Exposure to extremely acidic or basic environments (pH > 10 or < 4), detergents, various disinfectants and heat will render the virus non-infective. Temperature and length of exposure determines how rapidly the infectivity of the virus is destroyed: 60 minutes at 56°C; 10 minutes at 60°C; 3 days at 50°C; and 15 days at 35°C (Carbrey 1990). Hog cholera is fairly resistant in a protein rich environment and can survive the processing methods used for most pork and pork products. Survival can be prolonged for months or years when meat is stored cooled or frozen. In this way, the virus can be transported over long distances and introduced into virus-free areas or countries, making it a virus of great epizootologic importance (Terpstra 1988).

The following chart was prepared by VS, APHIS, USDA, and published in the Hog Cholera Emergency Disease Guidelines, Revised 1992.

Hog Cholera Virus Survival

Item	Survival Time in Days	Conditions of Storage	*References
Blood	8	natural conditions 37.5~C pH 5.2-	(Nikitin and Valdimirov 1961)
Blood	270	-20~C	
Blood	180	dried, in ice box	
Blood	720	4~C to 8~C	
Blood	7-14	in putrefied blood and organs buried in soil	
Blood	90	room temperature	
Carcasses	95	refrigerator	(Comm. Eur. Commun. 1975)
Carcasses	7	buried and uburied summer	

Carcasses	(Sev. mos.)	buried, winter	
Carcasses	26	deep-freezer	
Meat	33	chilled	(OIE 1960)
Meat	1,594 (4 yrs)	-11~C, frozen	(McKercher et.al.1980)
Meat	73	dried, salted, or pickled	(Zeller and Beller 1929)
Pork	1,460	-10~C	(OIE 1960)
Pork	73	-10~C to -3~C	
Muscle	95	cured with salt and brine	(McKercher et al. 1980)
Ham	84	brining and curing	McKercher 1987)
Ham, shoulder	52	in brine	McKercher et al. 1980)
Ham, shoulder	55	in hickory smoke	
Bone marrow ham	73	salt cured	(Zeller and Beller 1929)
Bone marrow	73	-3.3~C	
Bacon	27-57	processed	
Sausage	180	processed	
Casings	86	stripped at room temp.	(Comm. Eur. Commun. 1975)
Lymph node	3,285 (9 yrs)	frozen	
Skin	33	4~C	(Lange 1978)
Serum albumin	1,095 (3 yrs)	sprayed dried with incoming air 140-160~C & outgoing air 70-80~C	(Comm. Eur. Commun. 1975) (Blood and Radostits 1990)
Eye and nasal secretions	2	-10 to 18~C	
Swine urine	21	room temperature	
Swine urine	23	in ice box	

Blood with 0.5% phenol	100	refrigerator	(Wittman 1962)
Contaminated pens		hot weather	(Lange 1978)
Contaminated stab	7	not described	
Contaminated pens	14	thoroughly C&D	(Slavin 1938)
Excreta & bedding	38	not described	(Prost 1967)
Pork	7	composted with garbage, except in winter	(Pehl and Goldmann 1955)
Organs	1.75 (42 hrs)	18-C	(Comm. Eur. Commun. 1975)

*References are obtainable from the EPIC Data Bank, EPS, VS, Hyattsville, MD

TRANSMISSION

Hog cholera may be transmitted both directly and indirectly. Direct transmission, contact between infected and susceptible pigs, is the primary method of transmission as the virus is continuously shed in all body secretions and excretions from actively infected pigs (USDA 1992). Chronically infected and recovered pigs may shed infective amounts of virus intermittently, depending upon the virus strain. These unthrifty pigs are often sold through communal stock yards and represent the most common method of viral dissemination within a local area. An infected pig may also shed the virus during the incubation period before clinical signs are obvious (Terpstra 1988).

Indirect transmission can occur many different ways. The feeding of raw or undercooked garbage to pigs containing the virus infected pork can introduce or spread the disease. Humans, birds, flies, and mosquitos can act as physical carriers of the virus as well as contaminated trucks carrying animals, feed, or bedding materials (USDA 1992).

CONCLUSION

The prevalence of hog cholera in Mexico, the daily pedestrian, railroad and vehicle traffic crossing the border, the highly concentrated, susceptible domestic swine population, and the survivability of the virus, are all factors affecting the risk from the entry of pork and other carrier materials into the U.S. from Mexico.

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E(28) HOG CHOLERA IN MEXICO

OUTBREAKS AND CASES REPORTED BY S.A.R.H. (*) OR OIE (#)

1986 Total = 27 Outbreaks*

1987 Total = 25 Outbreaks*

1988 Jan-Mar Disease present but reported without numbers#
 Apr-Jun Disease present but reported without numbers#
 Jul-Sep Disease present but reported without numbers#
 Oct-Dec 19 Outbreaks# 274 Cases#

1989 Total = 511 Outbreaks#

Month	Outbreaks#	Cases#	Swine Exposed#
Jan	2 outbreaks#		
Feb	12 outbreaks#	2286	
Apr-Jun	24 outbreaks#	909	6483
Jun-Jul	7 outbreaks#	286	2365
Aug	115 outbreaks#	792	3255
Sep	240 outbreaks#	1011	
Oct	18 outbreaks#	785	
Nov	80 outbreaks#	88	
Dec	13 outbreaks#	678	14616

1990 Total = 133 Outbreaks*

Month	Outbreaks*	Cases#	Swine Exposed#
Jan	19 outbreaks#	1601	19011
Feb	19 outbreaks#	690	4426
Mar-May	65 outbreaks#	14795	
Jul-Sep	24 outbreaks#		
Sep		480	
Oct-Dec	6 outbreaks#		
Oct		592	

1991 Total = 40 Outbreaks*

Month	Outbreaks*	Number of Swine in New Outbreaks#
Jan	3 Outbreaks#	958
Feb	5 Outbreaks#	2965
Mar	2 Outbreaks#	400
Apr	6 Outbreaks#	1572

May	2 Outbreaks#	7800
Jun	3 outbreaks#	
Jul	2 Outbreaks#	920
Aug	4 Outbreaks#	20560
Sep	6 Outbreaks#	565
Oct	4 Outbreaks#	974
Nov	2 Outbreaks#	
Dec	No Data	

1992 Total = 42 Outbreaks*

Month	Outbreaks*	Number of Swine in New Outbreaks#
Jan	2 Outbreaks#	808
Feb	3 Outbreaks#	142
Mar	7 Outbreaks#	396
Apr	6 Outbreaks#	120
May	No Data	
Jun	2 Outbreaks#	14
Jul	3 Outbreaks#	3688
Aug-Dec	No Data	

1993 Total = 5 Outbreaks* (Jan-Jun)

PREVALENCE OF HC IN MEXICO

Year	No. of Months Reporting Data	Cases (Including Exposed)		Adjusting for Total Cases per Months w/o Data	Year adjusted for 12 Months
1989	10	33554	+	3657.2(2)	= 40,868.4
1990	7	41595	+	3657.2(5)	= 59,881.1
1991	9	36714	+	3657.2(3)	= 47,685.7
1992	6	5168	±	3657.2(6)	= 27,111.3
Total	32	117,031			

117,031 cases were reported in 32 months so
 $117,031/32 = 3657.2$ average cases per month
 3657.2 was used for the months that had no reported data.

Total population as reported by S.A.R.H.(*) or the FAO Production Yearbooks(+).

1987 18,721,799(*)
1988 15,884,397(*)
1989 16,157,000(+)
1990 15,202,700(*)
1991 15,902,000(+)
1992 16,429,613(*)

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