Some epidemiological aspects of classical swine fever in Croatia (2006-2008)

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ABSTRACT

The aim of this study was to present some aspects of epidemiological features of the classical swine fever (CSF) epidemic in Croatia between 2006 and 2008. Pig production before the CSF epidemic in the Vukovar-Sirmium County and the influence of some risk factors such as swill feeding and contact with wild boars, as well as temporal characteristics of the occurrence of CSF outbreaks have been investigated. The temporal data related to the occurrence of CSF outbreaks in Croatia and the data on pig production in the Vukovar-Sirmium County have been analyzed. The data related to pig production included the number of agricultural households keeping pigs, that is, the number of small pig farms and number of pigs in the Vukovar-Sirmium County. The data related to the occurrence of the CSF epidemic in Croatia included the days of occurrence of outbreaks and the time interval between two outbreaks from 17 July 2006 until 7 May 2008. The first outbreak of CSF occurred in the eastern part of Croatia in three municipalities of the Vukovar-Sirmium County, then spread into another 11 counties. At the time of CSF occurrence, there were 1,178 small pig farms observed and 16,034 pigs in that area. From the point of view of risk factors, at 532 (45.16%) out of the 1,178 observed pig farms, pigs were kept extensively while at 252 of them (21.39%) pigs were swill-fed. The analysis of the distribution of the number of CSF outbreaks by day diagnosed shows that new outbreaks were recorded 70 times at intervals of a minimum of one day and maximum of 86 days during the 621 days of the epidemic. The time interval between two new outbreaks was usually up to 10 days, mostly one day. The highest number of new outbreaks registered in the same day was 8 on the 235th day from the beginning of the epidemic.

Key words: classical swine fever, Croatia, occurrence, time interval, risk factors

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Introduction

Classical swine fever (CSF) is the most important contagious viral infectious disease affecting domestic pigs as well as wild boars world-wide. The disease is caused by the classical swine fever virus belonging to the *Pestivirus* genus of the *Flaviviridae* family (VAN OIRSCHOT, 1992; MOENNIG, et al., 2003; PATON and GREISER-WILKE, 2003).

CSF occurs world-wide, including Europe, Central and South America, Asia and Africa (EDWARDS et al., 2000). The disease was eradicated in Australia in 1963, Canada in 1964 and the United States in 1977 (ELBERS et al., 1999). The European Union (EU) also succeeded in eradicating CSF and reaching the status of CSF free countries (OIE, 2008). In the early 1990s, the EU control program was based on a strategy of non-vaccination, stamping-out and intensive surveillance supported by veterinary legislation and zoo-sanitary measures (ELBERS et al., 1999; MOENNIG et al., 2003). However, the virus was periodically reintroduced into domestic pigs through wild boars (KADEN, 1999; FRITZMEIER et al., 2000; VOS et al., 2003) or through imported pigs and pig products (GIBBENS et al., 2000; VOS et al., 2003), swill feeding (FRITZEMEIER et al., 2000; MOENNIG, 2003; VOS et al., 2003) and semen (ELBERS et al., 1999; HENNECKEN et al., 2000). According to data of the World Organization of Animal Health (OIE), in the period between 1996 and 2009, following the EU policy of non-vaccination, intensive surveillance and eradication, CSF outbreaks were observed in 24 European countries, including 16 EU member states (Table 1). The most numerous and economically most important outbreaks occurred in industrialized countries such as Germany, the Netherlands, Belgium, Spain and Italy (MEUWISSEN et al., 1999; FELIZIANI et al., 2005; BOLZONI and DE LEO, 2007). Several CSF epidemics occurred in the Netherlands in 1997-1998. A total of 429 outbreaks was observed and approximately 700,000 pigs from these herds were slaughtered, consequently causing important economic losses (ELBERS et al., 1999; PLUIMERS et al., 1999; MANGEN et al., 2002; KLINKENBERG et al., 2005; VOS et al., 2005). In Belgium, in 1997 eight herds in different locations were confirmed to be positive and 46,561 pigs were slaughtered in order to put the epidemics under control (MINTIENS et al., 2001). In Spain in 2001-2002, the disease was confirmed in 49 herds and 291,058 animals were slaughtered (ALLEPUZ et al., 2007). The eradication of CSF is especially challenging in countries where CSF is spread in wild boar populations, which could be the main source of infection (LADDOMADA, 2000; ARTOIS et al., 2002; ŽUPANČIĆ et al., 2002; ROIĆ et al., 2007). In Germany between 1990 and 1998 there were 424 outbreaks of CFS in domestic pigs and most of them were due to direct or indirect contact with infected wild boars (FRITZMEIER et al., 2000).

In Croatia the strategy of non-vaccination and eradication was introduced in January 2005. Until then vaccination and eradication were the main preventive measures applied in order to prevent the introduction and spread of CSF in the country. In spite of obligatory

vaccination, several outbreaks of CSF at small farms were recorded in 1996 and 1997 (Table 1) (JEMERŠIĆ et al., 2003). After introducing the policy of non-vaccination, CSF was detected for the first time on 17 July 2006 in the Vukovar-Sirmium County lasting until 7 May 2008, when it was finally resolved. From 17 July 2006 until 30 March 2007 there were 106 outbreaks of CSF and 3,917 pigs were destroyed. Between July and December 2006, 11,945 pigs were destroyed at 91 locations in four counties. From 1 January 2007 until 25 March 2007, CSF was detected in 59 small private farms in 9 counties (PAVLAK et al., 2007a; 2007b). According to the report of the World Organization of Animal Health, in the course of the CSF epidemic in Croatia, there were 129 outbreaks including 13,796 susceptible domestic pigs. Out of that number, 727 pigs showed clinical symptoms while 318 died. Another 12,297 pigs were destroyed and 3 animals slaughtered.

CSF causes important economic losses to the pork industry world-wide, especially in an export-oriented country (ELBERS et al., 1999; MEUWISSEN et al., 1999; EDWARDS et al., 2000). Therefore it is advisable to analyze the economic impacts and epidemiological characteristics of CSF epidemic. The aim of this study is to present some epidemiological features of the CSF epidemic in Croatia in 2006-2008. First, we analyzed the pig production in the Vukovar-Sirmium County, taking into account the number of agricultural households and number of pigs. Furthermore, we analyzed some risk factors such as swill feeding and contact with wild boars at the beginning on the CSF epidemic in the Vukovar-Sirmium County. Finally we analyzed the temporal characteristics of the occurrence of outbreaks during the CSF epidemic in Croatia in 2006-2008.

Materials and methods

The data related to the occurrence of the CSF epidemic in Croatia as well as the data related to pig production in the Vukovar-Sirmium County, where the CSF epidemic started, have been analyzed. These data include the total number of agricultural households, the number of agricultural households keeping pigs, e. g. number of small pig farms and the number of pigs in the Vukovar-Sirmium County. The data were collected from the Central Bureau of Statistics of the Republic of Croatia.

The data used for risk assesment, such as swill feeding and extensive farming where contact with wild boars was possible, were based on the information collected by the State Veterinary Administration at the beginning of the CSF epidemic in the Vukovar-Sirmium County in 2006, through a questionnaire within the framework of the control of the CSF epidemic. The response rate for the answer about swill feeding was 91% and for the type of farming (extensive or intensive farming) was 79%.

In the analysis of the occurrence of the CSF epidemic in Croatia four variables were considered: the number of occurrence of new outbreaks, e. g. the number of confirmed CSF outbreaks by day diagnosed (Var1), the number of new outbreaks (Var2), the intervals

between two new outbreaks in days (Var3) and the cumulative interval between two outbreaks in days (Var4). The data used included the period between 17 July 2006 and 7 May 2008. The data about the number of occurrences of CSF outbreaks were obtained from the State Veterinary Administration of the Ministry of Agriculture, Fisheries and Rural Development and from the World Animal Health Information Database of the World Organization for Animal Health

All results were analyzed by Statistica 8.0 and Excel 2002. The risk factors were estimated through the odd ratio based on the ratio of probability of an event occurring to the probability of it not occurring (MARTIN et al., 1988; THRUSFIELD, 1995) using WinEpiscope 2.0.

Results

The first outbreak of CSF, after a 7 year absence in the country (Table 1), occurred in 2006 in the eastern part of Croatia in the Vukovar-Sirmium County, spreading into 11 other counties in the central part of the country. In the Vukovar-Sirmium County herds located in three municipalities were struck, one of which (Municipality 1) is the area with the highest number of pigs in this county. The number of pigs in this municipality amounted to 26,134 which was 13.94% of the total number of pigs in the Vukovar-Sirmium County in 2003. The total number of agricultural households, the total number of agricultural households keeping pigs, that is, the number of small pig farms and the number of pigs in this county and in the affected municipalities are presented in Table 2. It may be seen that out of 26,316 agricultural households in this county, 16,915 of them (64.28%) are small pig farms. Out of total number of small pig farms in the Vukovar-Sirmium County, 2,235 farms (13.21%) were located in three municipalities with CSF outbreaks. Out of the total number of pigs in the Vukovar-Sirmium County in 2003, 33,137 pigs (17.67%) were located in these three municipalities and out of that number 78.87% pigs were located in Municipality 1.

When the CSF epidemic started, 1,178 pig farms and 16,034 pigs were observed. In 55 (4.69%) observed farms, 868 pigs (5.41%) were euthanized (Table 3).

According to breeding type, piglets and breeding pigs are the most frequent types of pigs in households. Consequently piglets and breeding pigs were the most frequent types of pigs euthanized during the eradication (Table 4).

From the point of view of risk factors, out of 1,178 observed pig farms, on 532 farms (45.16%) pigs were kept extensively, while on 252 farms (21.39%) pigs were swill-fed (Table 5). Extensive farming means that pigs were kept free on land where contact between domestic pigs and wild boars was possible.

Basic statistic data of the occurrence of CSF outbreaks in Croatia from 2006 to 2008, including the number of the occurrence of new outbreaks e. g. number of confirmed

Table 1. Classical swine fever outbreaks in domestic swine in European countries in period from 1992 to 2008

Country	Year												
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Albania	3	-	-	-	-	-	3	-	-	-	-	-	-
Austria	2	-	-	-	-	1	-	-	-	-	-	-	-
Belgium	-	8	-	-	-	-	1	-	-	-	-	-	-
Bosnia and Herzegovina	-	43	-	-	1	52	78	84	23	-	-	-	-
Bulgaria	1	8	8	4	1	1	32	11	4	-	3	2	1
Croatia	7	10	-	2	-	-	-	-	-	-	14	115	-
Czech Republic	2	2	21	13	-	-	-	-	-	-	-	-	-
F Y Republic of Macedonia	-	-	-	19	15	32	12	3	8	-	-	-	-
France	-	-	-	-	-	-	9	13	7	-	-	-	-
FRY (Serbia and Montenegro)	118	73	62	69	172	128	52	44	110	-	-	-	-
Germany	4	44	11	415	176	378	462	38	3	-	8	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	-	61	81
Italy	49	55	18	9	3	5	-	1	-	-	-	-	-
Latvia	2	-	-	-	-	-	-	-	-	-	-	-	-
Luxemburg	-	-	-	-	-	7	77	1	-	-	-	-	-
The Netherlands	-	424	5	-	-	1	54	155	182	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	26	10	11	14	16	14	-	6	4	3	-	8	1
Slovakia	25	96	90	14	21	40	48	37	12	-	-	-	3
Slovenia	1	-	-	-	-	-	-	-	-	-	-	-	-
Spain	-	78	21	-	-	33	16	-	-	-	-	-	-
Switzerland	-	-	-	49	-	-	-	-	-	-	-	-	-
Ukraine	1	-	47	-	-	2	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	16	-	-	-	-	-	-	-	-

Table 2. Number of agricultural households and pig in Croatia, in Vukovar- Sirmium County and in the three affected municipalities before the occurrence of CSF epidemic

	No. of agricultural households	No. of agricultural households keeping pigs	Number of pigs
Republic of Croatia	448.532	214.814	1.726.895
Vukovar-Sirmium County	26.316	16.915	187.497
Municipality 1	1.703	1.182	26.134
Municipality 2	1.058	636	4.271
Municipality 3	1.223	417	2.732
Total in three municipalities	3.984	2.235	33.137

Source: Agricultural Census 2003, Crostat Databases - Central Bureau of Statistics, Republic of Croatia

Table 3. Number of observed households keeping pigs and number of pigs as well as number of euthanized pigs in the affected municipalities in the Vukovar-Sirmium County at the beginning of the epidemic

District	No. of observed households keeping pigs	No. of observed households by euthanized pigs		No. of observed pigs	No. of euthanized pigs	
	N	N	%	N	N	%
Municipality 1	426	2	0.47	8.802	47	0.53
Municipality 2	459	41	8.93	4.406	592	13.44
Municipality 3	293	12	4.10	2.826	229	8.10
Total	1.178	55	4.67	16.034	868	5.41

Table 4. Number of observed households and number of observed and euthanized pigs according to municipalities in relation to breeding type at the beginning of the epidemic

	Municipality 1			Municipality 2			Municipality 3		
	No. of observed	No. of euthanized	% of euthanized	No. of observed	No. of euthanized	% of euthanized	No. of observed	No. of euthanized	% of euthanized
Sows	1178	3	0.25	788	126	15.99	392	52	13.27
Piglets	3000	40	1.33	1963	211	10.75	1592	126	7.91
Breeding pigs	4577	4	0.09	1639	253	15.44	833	45	5.40
Boars	47	0	0	16	2	12.50	9	6	66.66
Total	8802	47	0,53	4406	592	13.44	2826	229	8.10

Table 5. Number of observed households by type of farming and by pigs fed with swill in the CSF affected municipalities in the Vukovar-Sirmium County at the beginning of CSF epidemic

Municipality	No. of households keeping pigs	Type of farming			Swill feeding		
		Intensive farming	Extensive farming	No data	Yes	No	No data
Municipality 1	426	144	199	83	69	305	52
Municipality 2	459	108	277	74	131	289	39
Municipality 3	293	137	56	100	52	222	19
Total	1178	389	532	257	252	826	110

Table 6. Basis statistic data of occurrence of CSF outbreaks in Croatia from 2006 to 2008

Variables*	N	Mean	Confidence + 95%	Confidence - 95%	Min	Max	Range	Variance	SE	Skewness	Kurtosis
Var2	70	1,89	1,53	2,24	1,00	8,00	7,00	2,25	0,18	2,09	4,26
Var3	70	8,87	5,30	12,45	1,00	86,00	85,00	224,95	1,79	3,20	11,72
Var4	70	304,03	269,18	338,88	1,00	621,00	620,00	21362,00	17,47	-0,18	-0,41

* Var2- number of new outbreaks; Var3- interval between two new outbreaks (days); Var4- cumulative interval between two new outbreaks (days)
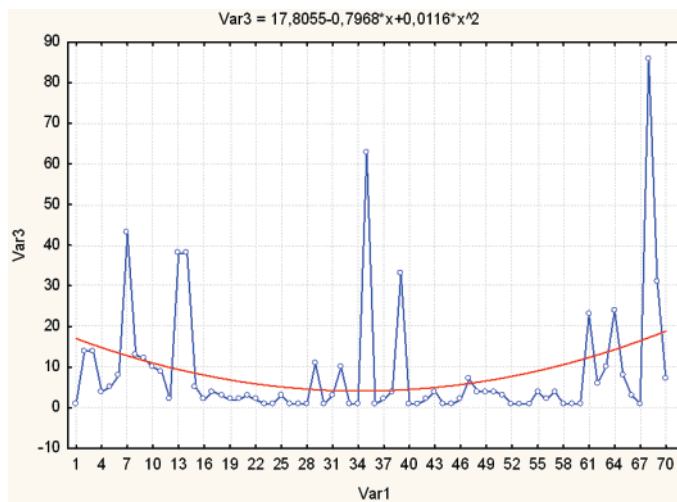
Var1:Var3: r = 0.0363; P = 0.7658; y = 7.923 + 0.0267*x

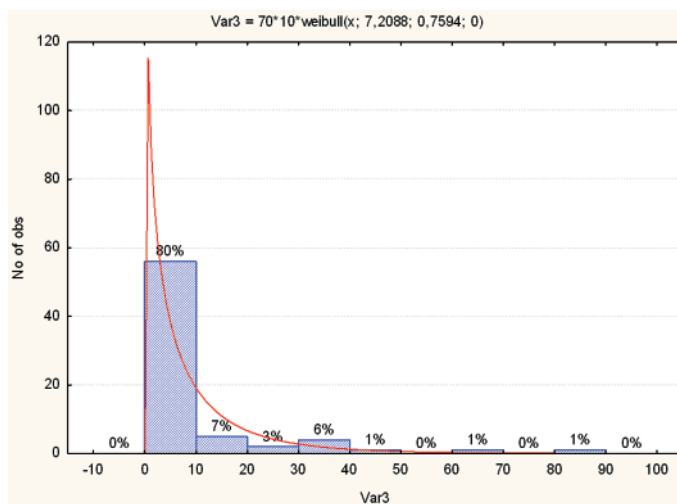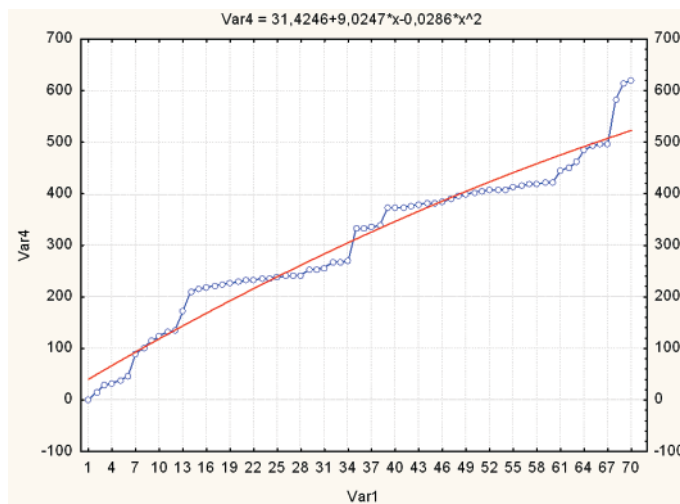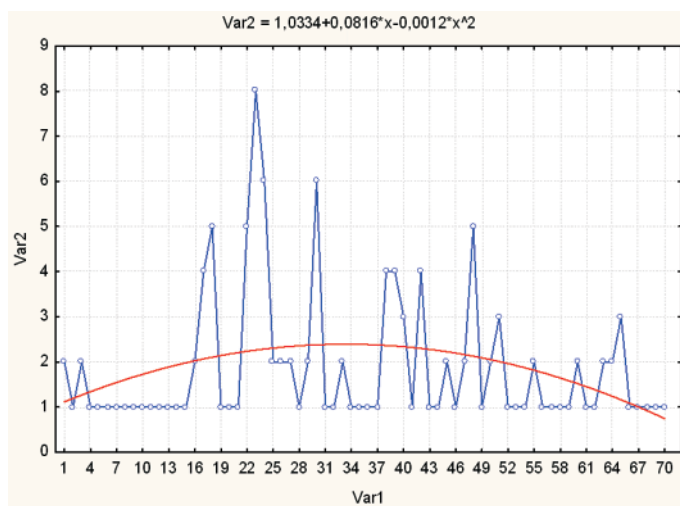Fig. 1. Time distribution of CSF new outbreaks (Var3) by days diagnosed in 2006-2008 in Croatia

Fig. 2. Time frequency (in days) between new CSF outbreaks in 2006-2008 in Croatia

Var1:Var4: r = 0,9735; P = 00,0000; y = 55,8199 + 6,9918*x

Fig. 3. Cumulative time distribution of occurrence of CSF new outbreaks in 2006-2008 in Croatia

Var1:Var2: r = -0,0732; P = 0,5473; y = 2,077 - 0,0054*x

Fig. 4. Distribution of number of CSF outbreaks (Var2) by ordinal number of days diagnosed (Var1) in 2006-2008 in Croatia
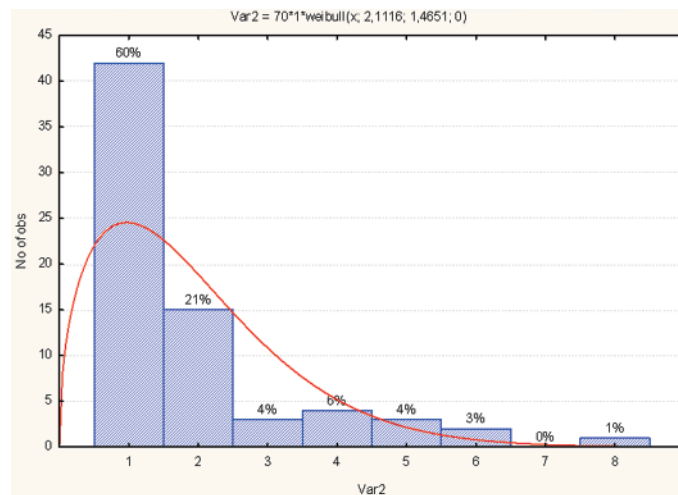
Fig. 5. Frequency of new outbreaks of CSF in 2006-2008 in Croatia

CSF outbreks by day diagnosed (Var1), the number of new outbreaks (Var2), the interval between two new outbreaks in days (Var3) and the cumulative interval between two new outbreaks in days (Var4) are presented in Table 6. The time distribution of CSF outbreaks is shown in Figures 1-4. It may be seen that 70 new outbreaks by day diagnosed were recorded (Fig. 1). The interval between two new outbreaks was a minimum of 1 day and a maximum of 86 days (Fig. 2) during the 621 days of the epidemic (Fig. 3). The most frequent interval between two outbreaks was one day (Fig. 1). Most of the new outbreaks were observed within a 10-day period. Only in a few cases was the time interval between two new outbreaks longer than 10 days (Fig. 2).

The pattern of outbreaks in relation to the time of occurrence of new outbreaks is presented in Figures 4 and 5. It shows that one new outbreak per day was identified 42 times. On the other hand, 8 new outbreaks in the same day were observed only once. The highest number of outbreaks (8 outbreaks in the same day) was observed on the 235th day of the epidemic.

Discussion

In the early 1990s, the EU adopted a non-vaccination control policy (Council Directive 2001/89/EC), e. g. the control strategy was based on eradication and intensive surveillance supported by veterinary legislation and zoo-sanitary measures. This involved

movement restrictions and culling of infected and healthy but susceptible animals within a 3 km area from the source of the infection (ELBERS et al., 1999; MOENNIG et al., 2003; COHEN et al., 2007). The advantage of this strategy is in the stimulation of free market trade of animal products between countries who have adopted this strategy. Economic calculations indicated that the costs of vaccination could be higher than costs of application of control measures (COHEN et al., 2007).

After introducing the policy of non-vaccination in Croatia in January 2005 (Official Gazette, 187/04), CSF was detected for the first time on 17 July 2006 in the Vukovar-Sirmium County, located in the eastern part of Croatia. The outbreaks were observed in three municipalities located in the eastern part of the Vukovar-Sirmiumin County with numerous households keeping pigs, i.e. small pig farms, in a relatively small area.

According to the Agricultural Census of Central Bureau of Statistics of the Republic of Croatia, the Vukovar-Sirmium County is one of three counties with the highest number of pigs in Croatia. In 2003, 7.87% of agricultural householders keeping pigs and 10.85% of pigs in Croatia were located in the Vukovar-Sirmium County. Out of the total number of pigs in the Vukovar-Sirmium County, 13.21% of small pig farms and 17.67% of pigs were located in three municipalities affected by CSF. The total area of these three municipalities is 251.51 km^2, where there were 2,235 small pig farms and 33,137 pigs in 2003. Most of pig farms (1,182 or 52.86%) were located in Municipality 1 (area of 122.89 km^2) with the highest number of pigs (26,124) in the Vukovar-Sirmium County. However, the primary outbreaks were observed in Municipality 2 which covers a much smaller area (28.36 km^2) with a much smaller number of pigs (4,271), but in this municipality there are many small pig farms located at a short distance from each other. Consequently, most of observed households, as well as most households where the method of eradication was applied, were in Municipality 2. Out of 1,178 observed households and out of 55 observed households with euthanized pigs, 38.96% households and 74.55% households with euthanized pigs were located in Municipality 2 (Table 3). The highest number of euthanized pigs (68.20%) was also observed in this area. The CSF occurrences in other European countries (ALLEPUZ et al., 2007; BOLZONI and DE LEO, 2007; FELIZIANI et al., 2005; MEUWISSEN et al., 1999; MINTIENS et al., 2001) show that most CSF infections persisted and spread in the areas with high pig density. Since pig density is an important risk factor associated with the occurrence and spread of CSF infection, it can explain the occurrence of primary outbreaks in that County after the introduction of the non-vaccination strategy. On the other hand, there was a likelihood of CSF occurrence in this area since the Vukovar-Sirmium County is located in the eastern part of Croatia bordered by a country with no CSF free status. The occurrence of CSF outbreaks in this region with numerous small pig farms and the application of the control measures in the infected and restricted areas caused important losses in pig production in Croatia. According

to TADIĆ et al. (2007) the direct and indirect losses from CSF occurrence and control consequences on the infected householders amounted to 1,583.98 kunas (287.1 USD) per animal eradicated. At the beginning of the epidemic in the Vukovar-Sirmium County, 868 (5.41%) pigs from 55 (4.67%) households were euthanized (Table 3). According to PAVLAK et al. (2007a), there were 106 affected households and 3,917 euthanized pigs in the Vukovar-Sirmium County in 2006 and 2007. 51.89% households were struck by CSF and 22.16% of pigs euthanized at the beginning of the epidemic, i.e. in the first 14 days of the epidemic. Due to control measures including eradication of diseased and healthy animals, occurrence of CSF epidemic causes great economic losses to the pork industry, especially in agricultural areas. Therefore, in the Vukovar-Sirmium County, which is one of the largest agricultural counties in Croatia, the CSF epidemic presented a great problem since 88.29% of all agricultural households are small pig farms.

Risk factors such as swill feeding and extensive farming, where contact with wild boars is possible, have been estimated by odds ratio as a relative measure of association (THRUSFIELD, 1995; MARTIN et al., 1988). For this purpose was used a case-control study design including the data on pig farms on which pigs showed or did not show clinical symptoms e. g. the disease was present or not. These two groups were considered in relation to the number of farms on which the pigs were swill-fed or not and kept extensively or intensively. Out of the 1,178 pig farms observed, in 252 households (21.39%) pigs were swill-fed. No association between swill feeding and disease development was found. Only on two farms were diseased pigs fed with swill, while on 13 farms diseased pigs were not swill-fed. Out of 1,178 observed pig farms, on 532 farms (45.16%) pigs were kept extensively. Extensive farming has been analyzed as a risk factor of exposure to contact between domestic pigs and wild boars. Most of the pig farms which kept pigs extensively were located in Municipality 2 with a high pig density and where the first outbreaks were noted. Consequently, in this area the highest number of pigs was covered by eradication control measures. Out of 41 observed households with euthanized pigs in this municipality, there were 17 households (41.46%) with extensive farming. Municipality 1 is the area with the highest number of pigs in the Vukovar-Sirmium County (Table 2) and also with a high number of households with extensive farming. But in this area only 0.53% of observed pigs were euthanized. On the other hand in Municipality 3 there is much more intensive than extensive farming and here the association between extensive farming and disease was noted. The odds ratio in this area was 2.47. This means that in Municipality 3 the probability of the disease in extensive farming was about twice as high as the probability of the disease in intensive farming. The differences in the probability of exposure to the risk factor in Municipality 3 in comparison to other two municipalities may be explained by the number of extensive and intensive farms. Although in all three municipalities the number of farms affected by the disease was similar, there was a much

lower number of extensive than intensive farms in Municipality 3, unlike in the other two municipalities.

According to the statistical data on CSF time distribution in Croatia, during the CSF epidemic from July 2006 to April 2008, new CSF outbreaks (Var1) occurred 70 times. During these 70 occurrences, a minimum of one and a maximum of eight new CSF outbreaks were identified (mean = 1.89, Confidence 95% = 1.53-2.24). Out of all observations of CSF outbreaks, in 60% of cases one new CSF outbreak was identified and in 21% two new CSF outbreaks were found per day. The highest number of outbreaks identified in one day was eight, which was observed on the 235th day of the epidemic, or on day 23 according to the ordinal number of new outbreak occurrence. The most frequent interval (80%) between two new outbreaks was within a 10-day period (mean 8.87 days, Confidence 95% = 5.3-12.45 days). These data show a long-term CSF epidemic with numerous outbreaks, mostly occurring separately, e. g. one outbreak per day. In the first two weeks, the epidemic spread in the area around the primary outbreak and during this period a high number of euthanized pigs was observed. However after the primary outbreaks, the CSF epidemic spread into another 11 Counties of Croatia. On the same day eight outbreaks were observed in three different Counties. The occurrence of new CSF outbreaks in other parts of Croatia after the application of control measures in the area of the primary outbreaks could be explained by swill feeding and indirect contact with the primary or secondary outbreak areas, through transportation before the CSF was diagnosed or before the restricted zone was established. The transport of infected animals in the infectious period before the disease was diagnosed, as well as illegal transport of animals through the restricted zone could favor a long-term epidemic curve. This is in accordance with the CSF epidemic observed in the Netherlands where purchase of infected animals and direct and indirect contact by transport vehicles and persons was defined as the main source of infection. The movement of pigs which are incubating the disease or are persistently infected is the most common mode of CSF spread, especially at the beginning of outbreaks (ELBERS et al., 1999). Similar data have been obtained in Germany where swill feeding was estimated as a primary source of CSF epidemic and contacts with infected domestic pigs and wild boars were the main routes of the spread of the CSF epidemic (FRITZEMEIER et al., 2000; MOENNIG et al., 2003).

The CSF epidemic in Croatia in 2006-2008 spread to a large number of small pig farms including three different counties at the same time and showed a long-term characteristic. The long-term epidemic curve can be explained by the many small pig farms in a relative small area, where direct and indirect contacts were much more possible and presented the main routes of transmission. The long-term epidemic curve, as well as the high number of euthanized pigs, led to a considerable decrease of pork production in the agricultural counties as well as in the whole country.

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SAŽETAK

Prikazana je epidemiološka procjena pojave klasične svinjske kuge (KSK) u Republici Hrvatskoj od 2006. do 2008. godine sa stajališta vremenskoga pojavljivanja. Analizirana je brojnost svinja prije pojave KSK u Vukovarsko-srijemskoj županiji i utjecaj nekih rizičnih čimbenika kao što su hranjenje pomijama i mogućnost dodira s divljim svinjama na pojavu i širenje KSK. Za analizu proizvodnje svinja u području Vukovarsko-srijemske županije uzeti su podatci o brojnosti gospodarstava koja drže svinje te podatci o broju svinja po gospodarstvima i po kategorijama. Podatci na temelju kojih se temeljila epidemiološka analiza pojave i širenja KSK u razdoblju od 17. srpnja 2006. do 7. svibnja 2008. godine uključivali su točan datum pojave pojedinih žarišta, vrijeme između pojave pojedinih žarišta i vrijeme trajanja žarišta te broj zabilježenih žarišta u jednom danu. Prva žarišta KSK u Hrvatskoj zabilježena su na istoku zemlje u Vukovarsko-srijemskoj županiji u tri općine, a tijekom vremena proširila se na 11 županija. Analizirajući rizične čimbenike na području Vukovarsko-srijemske županije, ustanovljeno je da su se u 532 (45,16%) od 1.178 promatranih gospodarstava svinje držale ekstenzivno dok su se u 252 (21,39%) gospodarstva svinje hranile pomijama. Analizirajući vremensko pojavljivanje KSK u razdoblju od 2006. do 2008. godine, pojava novih žarišta KSK zabilježena je 70 puta i to u razdoblju od najmanje jednog i najviše 86. dana tijekom 621 dana trajanja epidemije. Broj žarišta zabilježen u jednom danu najčešće je bio jedan. Najviše žarišta zabilježenih u jednom danu bilo je osam i to 235-og dana od početka pojave epidemije.

Ključne riječi: klasična svinjska kuga, Hrvatska, vremensko pojavljivanje, rizični čimbenik