STUDY ON THE CONTROL
OF VIRAL HAEMORRHAGIC SEPTICAEMIA (VHS)
IN POLAND

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Abstract

In 2000 the Department of Fish Diseases of the National Veterinary Research Institute started monitoring the frequency of the presence of viral haemorrhagic septicaemia (VHS) virus in 140 Polish salmonid farms which makes about 70\% of all salmonid farms in the country. Special attention was paid to 19 farms situated in A river catchment (river name is coded) and in these farms we started in 1999 the realization of the first in Poland experimental VHS control programme. The routine monitoring performed in other 121 farms (independently of the farms situated in A river) gave encouraging results i.e. resulted in gradually decrease in the prevalence of VHS cases in Poland. These results have shown that the simple monitoring connected with immediate eradication could decrease the prevalence of VHS virus but not in such an extent as might have been achieved by applying the established programme of VHS control in which all fish farms located in certain river catchment participate in its realization.

Key words: fish, viral haemorrhagic septicaemia, disease control.

Viral haemorrhagic septicaemia (VHS) is the most serious disease of farmed rainbow trout but affects also some other inland and marine fish species. The disease is widespread in the world and causes significant production losses and for that reason is listed in OIE Aquatic Animal Health Codes (8) and in EU Directives (6, 7).

Many countries run a control programme on VHS and as result some of them achieved the status officially free of this disease. Officially there are no VHS free farms or river catchments in Poland though the disease cases are decreasing (1, 5). Therefore the Fish Disease Department of the National Veterinary Research Institute started VHS monitoring in the whole country and, independently, together with the Veterinary Inspectorate in Szczecin, experimental programme of controlling this disease in one chosen river catchment.

Material and Methods

In 2000 the Department of Fish Diseases of the National Veterinary Research Institute started examining the frequency of VHS virus prevalence in 140 Polish salmonid farms which makes about 70\% of all salmonid farms in the country.

Special attention was payed to 19 farms situated in A river catchment (river name is coded) and in these farms in which the realization of the first in Poland experimental VHS control programme has begun already in 1999. All fish farmers, which were users of A river and its tributaries, regional fish disease specialist and the head of the Fish Disease Department of the National Veterinary Research Institute accepted the principles of the programme realization based on the EU Directives and eradication methods which had been applied in Denmark since 1965 (9, 10).

The particular hatcheries supplied with well water were appointed as the source of fishes for restocking the ponds after eradication. One isolated farm (number 1, Table 1) situated as the last one near the outlet of the A river, and supplied with water from a small tributary was chosen as a place in which quick fattening of fish survivors of the VHS infection took place.

Twice a year, since 1999 up to now, in spring and autumn, at the water temperature below 15°C, regional fish disease specialist surveyed all farms in A river catchment and selected 140 – 150 fryes and fingerlings or 30 two year old fish from each farm for virological investigations. Sampled fishes were euthanized and sent to the Fish Disease Department in containers cooled inside to 4 - 8°C.
In the laboratory the fish internal organs were pooled, homogenized and subsequently supernatants were used for the inoculation of the BF – 2 and RTG – 2 cell line cultures. VHS virus was identified using ELISA and RT-PCR methods. Besides regular monitoring in each case of VHS suspicion, 30 fish with clinical symptoms were sampled and immediately examined in regional laboratory using quick direct ELISA method, then the samples were sent to the Fish Disease Department of the National Veterinary Research Institute for confirmation. Occasionally the smoked rainbow trouts were checked on the eventual symptoms changes characteristic of viral diseases.

The fish farms were being closed each time when suspicion of the VHS virus presence had been noted i.e. when clinical signs in fish or cytopathic effect in cell culture had appeared. The eradication ensued if the VHS virus presence was confirmed.

Since 2000, independently of realization of the VHS control programme in A river catchment, also the routine monitoring has started in other 121 farms. In this case the samples of 30 fish were being collected twice a year and sent to above mentioned Fish Disease Department for virological examinations. Furthermore, in each case of VHS suspicion 30 fish with clinical symptoms were sampled and examined virologically. In the majority of cases samples consisted of rainbow trout. During 6 years of this monitoring brook trout was sent from 12 farms and brown trout from 6 farms only.

### Results

Cases of VHS virus infections accompanied with clinical symptoms were detected only in rainbow trout. In some cases the haemorrhagic changes were also observed in rainbow trouts after smoking. Numbers of VHS virus infected rainbow trout farms in A river catchment in 1999 – 2005 are presented in Fig. 1. VHS prevalence in rainbow trout farms in A river catchment in 1999 – 2005 is shown in Table 1 and the results of monitoring of VHS in 121 farms in Poland are depicted in Fig. 2. Typical, most often observed symptoms of VHS in live rainbow trouts are illustrated in Figs 3, 4, 5 and in smoked fish in Fig. 6.

### Discussion

Up to this time in Poland clinical symptoms of VHS has been observed only in rainbow trout and this phenomenon confirmed that this fish is most susceptible to VHS virus infection. In one case the presence of the virus was found in symptomless brook trout kept in the ponds neighbouring those in which VHS had appeared in rainbow trout. It suggests that the brook trout could be infected with the virus from rainbow trout and could be a potential carrier of VHS virus later.
Fig. 1. Numbers of VHS infected rainbow trout farms in A river catchment in 1999 – 2005.

Fig. 2. The results of monitoring of VHS in 121 salmonid farms in Poland excluding farms situated in A river catchment (National Veterinary Research Institute data).

Fig. 3. Haemorrhages in the base of breast fins in VHS affected rainbow trout.

Fig. 4. Haemorrhages in rump muscles in VHS affected rainbow trout.
In the course of VHS in farmed rainbow trout high morbidity and mortality rates were observed which usually exceeded 50% of affected trout population. The direct economic impact of the disease was linked to its morbidity, mortality and degraded quality of fish meat. For instance, the petechiae which are caused by the virus infection in live fishes can be also observed in smoked ones (Fig. 6).

In farms which purchased mainly eyed ova for the first stage of production (farms 3, 4, 5, 7, 9, 15, 16, 19, Table 1) the prevalence of VHS cases was much lower than in farms which were getting only fryes or fingerlings for quick fattening (farms 2, 6, 8, 10, 11, 12, 13, 14, 17, 18). In the first group during 7 year observation only 3 VHS cases were recorded i.e. approximately 0.4 case per one farm whereas in the second group 14 VHS cases have appeared that makes 1.4 case per one farm.

During the first five years of programme realization in some farms (farms 2, 11, 12 and 13) the recurrence cases of VHS were observed every second year after eradications had been completed and in one farm (farm 11) additional two cases of VHS were identified in two consecutive years (Table 1). It was found that the uncertified fishes had been used for restocking these farms, contrary to the previously made decisions that fishes for restocking must be delivered from virus free farms fed from brooks or wells.

According to regional fish disease specialist who was supervising the realization of the programme, the disinfections were being performed adequately but in farms 11, 12, 13 the majority of VHS cases appeared in short time after introduction of uncertified fishes which were apparently harbouried by the virus. This was obviously the cause of VHS recurrence.

In three other cases the relationship between the introduction of carps (as additional fish) to salmonid farms and VHS appearance was suspected. The facilities used for carp transportations were utilized previously for rainbow trout delivery so it is quite possible that contaminated water and lack of proper disinfection were responsible for the case of VHS occurrence.

The random examinations of free living rainbow trout in A river did not show the presence of VHS virus in these fishes (unpublished data) so they possibly could not be the source of infections.

The routine monitoring performed in other 121 farms (independently of the farms situated in A river) gave encouraging results i.e. a gradual decrease in VHS cases in Poland was observed (Fig. 3). The number of infected farms in the consecutive years of the monitoring realization (2000 – 2005) was the following 13, 15, 13, 8, 4 and 4.

These results have shown that the simple monitoring connected with immediate eradication could decrease the prevalence of VHS virus but not in such an extent as might have been achieved by applying the established programme of VHS control in which all fish farms located in certain river catchment participate in its realization.

The reason of a dramatic decrease in VHS cases in Poland was probably the change in sampling procedures that has taken place since the half of 2003. The results of this study showed, however, that one of the main factor which positively influence VHS statistic in Poland is the decrease in VHS cases in river A catchment owing to the realization of the regular VHS control programme.

The results we have achieved during programme realization in A river catchment were quite encouraging considering that for many years this region was the most intensively affected one with VHS in Poland. The lack of quite satisfactory results i.e. numerous VHS recurrence cases was caused by some farmers, who did not apply to the rules and stocked their pond with uncertified (cheap) fishes. Water from not adequately disinfected transport facilities being the source of infection could also cause VHS recurrence.

The positive and negative experience which have been gained by the participants of this first experimental programme could be applied in the near future for the eradication of the disease in other Polish river catchments. The results of this programme convinced the fish breeders and field veterinarians that eradication of VHS in Polish salmonid farms could be
possible, however, in the long run, provided that during realization of such a programme all farmers will apply to the established rules based on the principles presented in EU Directives and also those which take into account specificity of particular river catchments.

References