

**Medical and pathological investigations on seabirds stranded on the Belgian coast
during the Tricolor oil spillage**

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THE southern North Sea, and more obviously the Channel, is a major shipping route with one of the highest traffic density worldwide. In December 2002, the Tricolor ship collided in the Channel and in January started to lost oil. Thousands of birds, mostly guillemots were oiled and stranded, dead or alive, on the continental coastline of the southern North Sea. The only rehabilitation centre along the Belgian coast could not accept all the birds and disaffected city building was adapted for the situation. All birds arriving alive in the rehabilitation centre were medically examined and treatment was adapted following clinical examination. Some dead birds were necropsied during and after spillage crisis. Although small amount of oil leaked, the consequences were significant as the spillage occurred in near the Flemish banks, an important area for wintering seabirds.

The present paper describes medical evaluation of seabirds stranded on the Belgian coast after the Tricolor spillage, more obviously on guillemots *Uria aalge*, and post-mortem investigations performed on dead animals.

Material and methods

Oil spillage

On December 14, 2002, the car carrier Tricolor collided with the containership Kariba in the Channel (51°12,7' N; 002°12,7' E) along the French coastline at ca 19 nautical mile of Dunkerque harbour and 4,5 nautical mile of the boarder with Belgian waters. The Tricolor sank in shallow waters while the Kariba was towed to Antwerpen harbour. After, two other ships, the Nicola and the Vicky, struck with the Tricolor, respectively on December 16, 2002 and January 1, 2003, but without significant consequences. Finally, on January 22, around 170 tonnes of fuel leaked from the wreck during salvage operations.

Collection of birds

Due to strong onshore winds, most of the birds stranded directly after the spillage on the continental coastline of the southern North Sea and more obviously on the Belgian coast. Birds, dead and alive, were collected along the Belgian coastline by volunteers and were transported to a specifically dedicated rehabilitation centre. Indeed, the rehabilitation centre of Ostend could not accept large number of birds as in 2 days more than 500 alive birds were collected. To compensate such infrastructure deficit, a deserted municipal building was opened and converted to receive and rehabilitate birds. On

January 25, first birds were admitted in the improvised facilities. On January 27, a very rudimentary veterinary clinic was established and around 1800 birds could be medically examined.

Medical evaluation

The birds were examined as following: all were weighted, the body temperature was taken and the oil contamination was evaluated in term of percentage of body surface. In addition, body openings including buccal cavity, eyes, cloacae as well as feet and wings were examined. For logistical reason, haematocrit was not controlled. Following medical evaluation, each bird was ranked in one of 4 categories (Table 1) leading to the follow-up care of the birds. For guillemots, in the category 1 were birds with good medical parameters with a body weight > 800g. In the category 2 were guillemots with a body weight around 800 g and with good medical parameters (category 2a) or worse (2b). Finally, guillemots with low body weight (<800 g) or low body temperature (<38°C) were ranked in the category 3. In the category 1, birds could be transported to another rehabilitation facilities in Belgium or in United Kingdom and The Netherlands. Indeed, the main rehabilitation center was overloaded and birds should be selected to be rehabilitated in other centers ; in the category 2a, birds should be washed directly; in the category 2b, the birds should be medically stabilized; and finally, birds in the category 3 were euthanized by intra-thoracic injection of T61[®] (Intervet, Mechelen, Belgium). In other category, medical treatment was based on individual examination.

Birds necropsy

Some birds dead during rehabilitation process were selected and necropsied ; other were frozen untill necropsy. They were necropsied using a consistent protocol {000101,000329}. They were weighed, oil contamination on plumage and/or in intestinal tract was recorded and lesions were noted. A "emaciation scale" was used to evaluate emaciation (1: absence of subcutaneous and abdominal fat, light atrophy of pectoral muscles; 2: absence of subcutaneous and abdominal fat, moderate atrophy of pectoral muscles; 3: absence of subcutaneous and abdominal fat, severe atrophy of pectoral muscles). Non cachectic birds were rated as cachexia 0. Birds were sexed by examination of gonads and age was determined by the presence (juvenile) or the absence (adult) of Fabricius bursa. Tissues were collected and processed as previously described for histopathological, bacteriological and parasitological examinations {000122,000329,000228}.

Results

Birds collection

From January 23 to February 15, 9176 birds were collected on Belgian beaches, 4980 were alive and 4196 were dead (Figure 1). Two peaks of stranding occurred, one at the end of January, the second at the end of the first week of February. Most frequent species were guillemot (n=5875;), razorbil *Alca torda* (n= 2094), crested grebe *Podiceps cristatus* (n= 310) and common scotter *Melanitta nigra* (n= 125); other species (n=28) being less frequent (<1%). During the first days, the survival rate on beach (proportion of alive birds versus total) was rather high ($\geq 90\%$), but after January 27, the survival rate

dropped and reached less than 20% on January 31. After February 3, it was stabilized at around 50%.

Medical evaluation

The veterinary clinic was organized with 6 teams of veterinarians, biologists or people with expertise in birds rehabilitation. All were volunteers. The first major challenge was to check all the birds as soon as possible after their contamination but some of them were oiled for 4 days. After one week, all the birds that were admitted during the first days were examined and new birds were medically evaluated the day following their admittance. During the first week, the mean number of birds admitted every day was 176. The second major medical challenge was to regularly re-examine birds to follow their clinical evolution. A new peak of birds stranding appeared when the first wave stopped, increasing the crisis.

Results of medical evaluation are given in table 2. During the first days, the repartition within the 4 categories was 10% of guillemots in the category 1; 35% in the category 2a; 30% in the category 3b and 25% in the category 3. But, as no washing was organized during the first days in the rehabilitation centre, birds re-evaluation indicated a shift toward lower category, some previously 2a birds having medical parameters of 2b and some 2b having now parameters of 3. The major consequence was increasing of mortality by spontaneous death or by euthanasia. Euthanasia being 25% reached after 5 days 40%. Indeed, on 24 birds re-examined on January 30, 14 lost body weight, three had low body temperature and only seven stayed in their previous medical category.

Most frequent clinical observations were cases of diarrhea frequently hemorrhagic, irritation of eyes, feet swelling, respiratory distress. Some cases of bone fractures were observed and animals were euthanized.

Treatment (Chapitre pour Sylvie)

Prophylactic treatment for aspergillosis was given when first cases of the fungal disease appeared among guillemots. Itraconazole (Sporanox[®], Janssens-Cilag, Berchem, Belgium) was given *per os* (3mgSporanox/day/birds) mixed in the 45 ml of food received force-feed every day. Birds with evidence of severe respiratory distress were selected, medically examined and euthanized.

Birds necropsy

Necropsies performed during the rehabilitation process revealed that the main lesions and associated causes of death during the first days were lung oedema and congestion, acute haemorrhagic gastro-enteropathy. Some birds were fat with presence of subcutaneous and/or abdominal fat while some others were emaciated. The percentage of emaciated guillemots increased with the time. After the second week (February 6), the first cases of respiratory aspergillosis appeared. The characteristic lesions were pneumonitis and aerosacculitis with greenish white nodules and plaques in lung and airsacs. *Aspergillus fumigatus* was isolated from the tissues.

Discussion

Number of stranded birds

Mortality and causes of death

Improving protocol

Included in the conclusion the main role of medical evaluation for the selection of birds able to “survive” the stressful situation of the rehabilitation process as well as the rule of direct post-mortem investigation to evaluate to main “target” of oil.

Such medical evaluations help us to have a prognostic, using 4 categories. After the medical examination, birds were kept together in same room based on that evaluation.

FIGURES & TABLE FOR TRICOLORVETREC

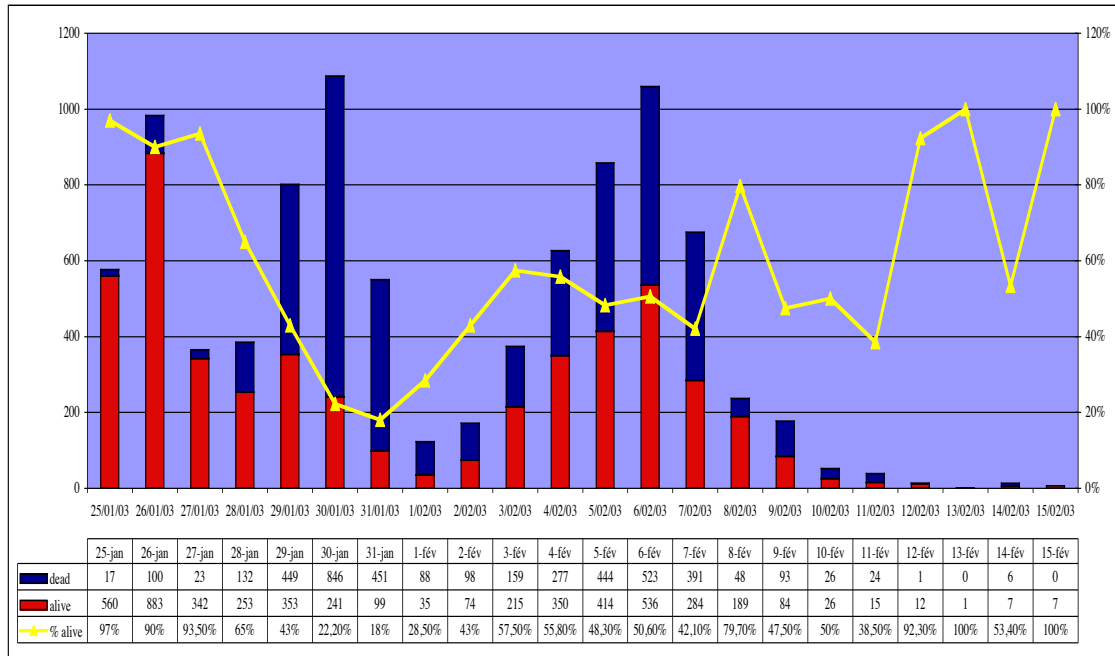


Figure 1 : Repartition of dead and alive stranded birds on the Belgian coast during the Tricolor oil spillage (from January 25 to February 15).

Body weight	Body temperature	Oiling surface	Behaviour	Category	Follow-up
> 800 g	≥40°C	<40%	good	1	transfert
±800 g	39-40°C	>40%	good	2a	washing
±800 g	39-40°C	>40%	bad	2b	stabilization
< 800 g	<39°C	>40%	bad	3	euthanasia

Table 1 : Categories and follow-up care based on medical evaluation of guillemots

	Body weight	Body temperature	Oiling surface	Spontaneous mortality
1	892 g	40,6	23,3%	6%
2a	845 g	40,3	45%	9,5%
2b	746 g	39,9	44,5%	39,5
3	685 g	38,8	28%	euthanasia

Table 2 : Means medical parameters following birds ranking.

Ship	Spillage			Birds		
	Year	Place	Volume (m ³)	Stranded dead	Stranded alive	Release %
Erika	1999	France (Brittany)	10000	26800	36200	6%
Prestige	2003	Spain (Gallicia)		15977	5561	
Tricolor	2003	France- Belgium	170			

Table 3 : Means medical parameters following birds ranking.