

Waterfowl mortality due to botulism (type C) in Lake Koronia - Macedonia - Northern Hellas and the actions of local hunting federation

Birtsas, P., C. Sokos and K. Skordas

**Hunting Federation of Macedonia & Thrace,
173 Ethnikis Antistasis, 55 134, Thessaloniki, Hellas**

Corresponding author: Dr Pericles Birtsas, Tel.: +30-2310477128 (204), Fax.: +30-2310473863, e-mail: pbirtsas@hunters.gr

Lake Koronia situated in the Region of Central Macedonia, northern Hellas, is a part of a National Wetland Park, which is considered as a valuable place for large populations of resident and migratory birds. It is a Ramsar site that is also covered by the Directives 79/409 EEC and 92/43 EEC. In 2002 the lake was almost dried but the following year water started accumulating again and today the maximum depth is about 0.8 m (Moustaka-Gouni et al. 2004). Human activities (industries, water pump, irrigation, soil fertilization etc.) are disrupting wetland life and disturb the ecological balance (Tsiouris et al. 2001, Tsiouris et al. 2002, Tzionas et al. 2004).

Avian botulism, a disease caused by *clostridium botulinum*, has been recognized as a major cause of mortality in waterbirds since the early 1900s (Githkopoulos et al. 1983). *Clostridium botulinum* is classified into seven types (A-G) by using characteristics of the neurotoxins that are produced (Rocke and Friend 1999). These neurotoxins causes a progressive paralysis of muscles, beginning in the legs and the wings, then the neck and finally the muscles used for breathing (Smith 1976, Githkopoulos et al. 1983, Rocke and Friend 1999). An outbreak of type C botulism in waterbirds was investigated at Lake Koronia from August to October 2004. The outbreak was associated with a falling water level, alkaline pH and extensive decomposition of plant material and dead invertebrates (Galvin et al. 1985, Rocke and Friend 1999, Rocke et al. 1999).

According to our field work, in autumn 2004, more than 35.000 birds (41 species – mainly waterfowl and shorebirds) died from avian botulism – type C. This is the second report of avian botulism in Hellas and the first in Lake Koronia (Githkopoulos et al. 1983). Birds found dead were studied by the scientists of Hunting Federation of Macedonia and Thrace, a non governmental self-financing organization that is supported from volunteer hunters.

The local public services of the Thessaloniki Prefecture and the Ministry of Rural Development and Foods provided help for the restriction of the outbreak. Immediately after the appearance of the first dead birds the Hunting Federation informed the relevant services and institutes. Samples of dead birds were sent for analysis and thousands of carcasses were burned while 40 propan sound-cans were installed to the banks of the lakes in order to keep of birds (Rocke and Friend 1999). Despite these, the local people were informed about the potential dangers from Game Wardens of the Hunting Federation of Macedonia and Thrace. Other actions of public awareness, like meetings, press conferences, press releases took place and highlighted the importance of this environmental crisis (Christopoulou and Tsachalidis 2004). It is estimated that these actions deteriorated the waterfowl mortality and contributed to the public information.

Table 1. List of bird species affected from *Clostridium botulinum* toxin.

	Scientific name	Common name	Number
1	<i>Acrocephalus arundinaceus</i>	Great Reed Warbler	+
2	<i>Anas acuta</i>	Pintail	++
3	<i>Anas clypeata</i>	Shoveler	+++
4	<i>Anas crecca</i>	Teal	+++
5	<i>Anas penelope</i>	Wigeon	++
6	<i>Anas platyrhynchos</i>	Mallard	+++
7	<i>Anas strepera</i>	Gadwall	++
8	<i>Ardea cinerea</i>	Gray heron	++
9	<i>Aythya ferrina</i>	Pochard	+
10	<i>Aythya nyroca</i>	Ferruginous Duck	+
11	<i>Calidris alba</i>	Sanderling	+
12	<i>Calidris alpina</i>	Dunlin	+
13	<i>Calidris minuta</i>	Little Stint	+
14	<i>Cettia cetti</i>	Cetti's Warbler	+
15	<i>Charadrius dubius</i>	Little Ringed Plover	++
16	<i>Chlidonias niger</i>	Black Tern	++
17	<i>Egretta alba</i>	Great White Egret	+
18	<i>Egretta garzetta</i>	Little Egret	++
19	<i>Falco tinunculus</i>	Kestrel	+
20	<i>Fulica atra</i>	Coot	++
21	<i>Gallinago gallinago</i>	Common Snipe	++
22	<i>Gallinula chloropus</i>	Moorhen	+
23	<i>Himantopus himantopus</i>	Black- Winged Stilt	+
24	<i>Larus cachinans</i>	Herring Gull	+++
25	<i>Larus minutus</i>	Little Gull	+
26	<i>Larus rindibundus</i>	Black Headed Gull	+++
27	<i>Pelecanus crispus</i>	Dalmatian Pelican	238
28	<i>Phoenicopterus ruber</i>	Greater Flamingo	+
29	<i>Platalea leucorodia</i>	Spoonbill	+
30	<i>Phillomachus pugnax</i>	Ruff	+
31	<i>Recurvirostra avocetta</i>	Avocet	++
32	<i>Sterna caspia</i>	Caspian Tern	+
33	<i>Sterna hirundo</i>	Common Tern	+
34	<i>Sturnus vulgaris</i>	Starling	+
35	<i>Tatona tadorna</i>	Shelduck	++
36	<i>Tringa erythropus</i>	Spotted Redshank	+
37	<i>Tringa glareola</i>	Wood Sandpiper	+
38	<i>Tringa ochropus</i>	Green Sandpiper	+
39	<i>Tringa stagnatilis</i>	Marsh Sandpiper	+
40	<i>Turdus merula</i>	Black Bird	+
41	<i>Turdus philomelos</i>	Song Thrush	+

+ individuals

++ dozens

+++ hundrents

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