

## Pulmonary diseases in seals—a histopathological review

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Pulmonary diseases in seals between the ages of six months and two years are very important. As an introduction on this subject a review of the numbers of seals on which autopsy has been carried out during 1985 and 1986 is given in Table 1a and Table 1b.

For the sake of completeness, in Table 2a and Table 2b are given the autopsy findings in seals younger than three months and older than three months during those years. Marked with an asterisk are those, which have been taken in by the Seal Nursery in Pieterburen or the Governmental Institute for Nature Control at Texel.

As can be seen a big number has pulmonary disease caused by lungworm infection namely 27 out of 77, i.e. 35%, and if one draws away the 12 unfit for autopsy and the 11 that drowned, the percentage is even 50%—a figure worth to pay attention to!

**Table 1a.** Number of common seals (*Phoca vitulina*) younger than three months on which autopsy has been carried out in 1985 and 1986

Year	Sex			Total
	Male	Female	Unknown	
1985	13	10	1	24
1986	12	10	2	24
Total	25	20	3	48

Also 1 grey seal (unknown) and 1 monk seal (female)

**Table 1b.** Number of common seals (*Phoca vitulina*) older than three months on which autopsy has been carried out in 1985 and 1986

Year	Sex			Total
	Male	Female	Unknown	
1985	15	16	3	34
1986	17	16	4	37
Total	32	32	7	71

Also 5 grey seals (4 male, 1 female) and 1 ringed rob (female)

Three species of parasites can be found in the lungs, as Table 3 shows.

**Otostromylus**, occurring in the bronchi and bronchioli, can cause an obstruction resulting in inflammation and forming of abscesses. The worms may be coughed up and spat on the floor (Fig. 1).

**Parafilaroides**, occurring in the bronchioli and the alveoli, can cause a heavy bronchopneumonia with microscopical neutrophiles, lymphocytes, eosinophiles, macrophages, and now and then giant cells. The interstitial septa are oedematic (Figs 2 and 3).

Often the worms can be found in the lung-tissue, giving no reaction (Fig. 4).

**Dipetalonema**, occurring in the right ventricle and the *A. pulmonalis*, is rather harmless but can in case of large numbers cause obstruction in the lungs, inflammation etc. (Figs 5 and 6).

Beside these lungworms in some cases also bacteria were isolated, namely haemolytic streptococci (3x),

**Table 2a.** Autopsy findings in seals younger than three months in 1985 and 1986

	1985	1986
Clostridium perfringens infection	1	—
Colibacillosis	1*	—
Bronchopneumonia (BE: 1x haemolytic streptococci)	2	—
Pericarditis (BE: 1x Pseudomonas)	1*	—
Peritonitis (BE: 2x haemolytic streptococci)	—	3 (2*)
Gastroenteritis	1	—
Hernia mesenterialis	1*	—
Cachexia	6	13 (1*)
Still-birth	4	—
Atresia ani	—	1*
Autolysis	6	7
No diagnosis	2 (1*)	1
Total	25	25

\*From the Seal Nursery in Pieterburen

**Table 2b.** Autopsy findings in seals older than three months in 1985 and 1986

	1985	1986
Bronchopneumonia (lungworms)	8 (5*)	19 (13*)
Bronchopneumonia (heartworms)	1*	—
Sepsis (BE: 2x haemolytic streptococci)	—	2*
Heart failure	1*	1*
Leucosis	1*	—
Peritonitis (uterine rupture)	2	—
Torsio intestini	1	1*
Hernia diaphragmatica	—	1
Adenocarcinoma	—	1
Hepatitis	1	—
Ascariasis	—	1
Tracheal obstruction (fish)	—	1
Wounded	1*	2 (1*)
Drowned	8	3
Autolysis	5	7
No diagnosis	7 (6*)	2 (1*)
Total	36 (15*)	41 (19*)

\*From the Seal Nursery in Pieterburen or the Governmental Institute for Nature Control at Texel.

**Table 3.** Species of parasites found in the lungs of seals**Otostrongylus circumlitus** (large lungworm)

Morphology: L 3–6 cm, B 1 mm

Localization: bronchi and bronchioli

Life-cycle: unknown, larviparous

**Parafilaroides gymnuris** (small lungworm)

Morphology: L 1.5–2 cm, B 0.15 mm

Localization: bronchioli and alveoli (lung-tissue)

Life-cycle: unknown, larviparous

**Dipetalonema spirocauda** (heartworm)

Morphology: L 9–15 cm, B 0.5 mm

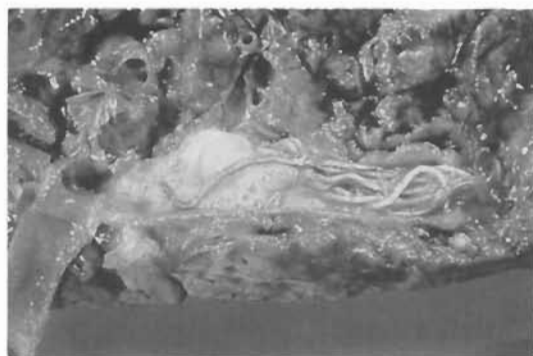
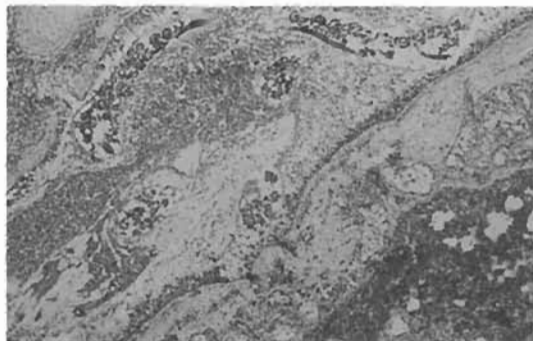
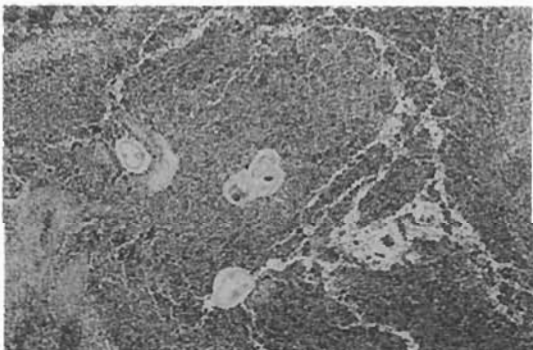
Localization: right ventricle and A. pulmonalis

Life-cycle: intermediate host? (louse, mosquito?),

Microfilaria

haemolytic staphylococci (1x), *Corynebacterium pyogenes* (1x) and *Escherichia coli* (1x). Also once *Aspergillus fumigatus*, a mould species, and twice the SeHV virus were isolated.

In the Seal Nursery, to complete the diagnosis, sputum and faeces are examined for larvae, swabs for

**Figure 1.** Lung with *Otostrongylus circumlitus*.**Figure 2.** Lung tissue with *Parafilaroides gymnuris*.**Figure 3.** Inflammation of lung tissue with *Parafilaroides gymnuris*.

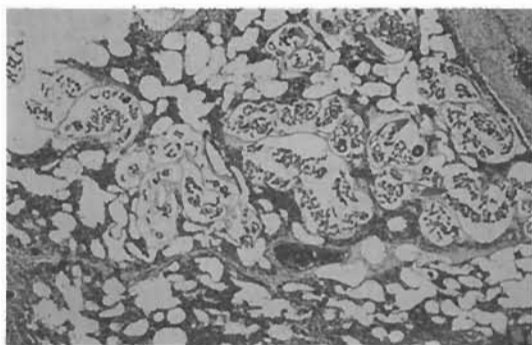


Figure 4. Lung tissue with *Palaefilaroides gymnurus* (adults and larvae) showing no reaction.

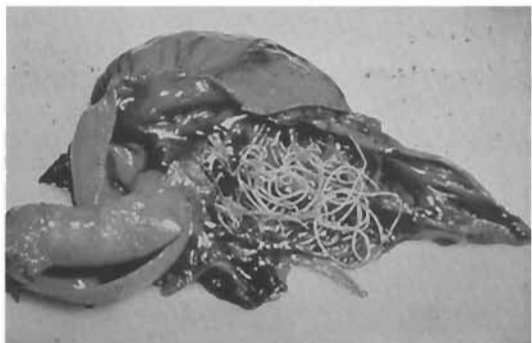


Figure 5. Heart (right ventricle) with *Dipetalonema spirocauda*.

bacteriological examination are taken and a therapy is started (see Table 4).

And the results? In the beginning of 1986 the so-called Medical Advice Board was set up. Thanks to the enthusiasm of Mrs Lenie 't Hart and her co-operators, and also by the support and advice of the just mentioned Board, in the summer of 1986 only 4 out of 39 young seals, taken in the Seal Nursery, died.

And as for the older seals . . . From 1 October 1986 till 1 March 1987 autopsy has been carried out on 6 seals. From these 4 were found dead and 2 had been in the Seal Nursery just a few hours. Death cause: bronchopneumonia with lungworms. In the same period in 1985-1986 this amount was 22 and from

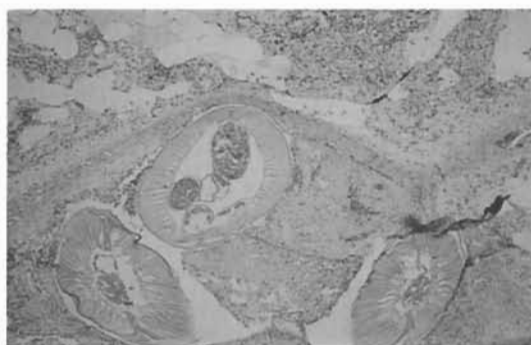


Figure 6. Pulmonary artery with *Dipetalonema spirocauda*.

Table 4. Therapy

**Dexamethason** (to remove the respiratory distress)  
1 mg/kg body weight i.m., repeat after two hours

**\*Oral Rehydration Salts** per os. (to remove the dehydration)  
Per 100 ml: 3.64 g glucose  
0.10 g KCl  
0.10 g NaCl  
0.40 g Na lactate

†**Mucocil** (to dissolve the mucus)  
3 ml/nose duct, twice a day  
Also Fluimucil, Briconyl or Brontine can be used

**Prednison** (to prevent shock)  
1 mg/kg body weight i.m.

**Antibiotica** (Antibiogram) (to suppress inflammation)

‡**Ripercol** (to remove the lungworms)  
Low dosage 0.25-0.35 ml/10 kg per os.,  
repeat once or more times

\*from NV Nutricia-Zoetermeer.

†'Mucomyst' (Acetylcysteine) Bristol-Myers BV-Weesp  
'Fluimucil'-Inpharzam Nederland BV-Almere

‡from Janssen Pharmaceutics-Beerse

these 14 had been in the Seal Nursery. In 10 cases the death cause was bronchopneumonia with lungworms and bacteria.

In this way more seals in a good condition will be brought back to the Waddensea and that is the point!