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RESEARCHES INTO THE PREVALENCE OF TRICHINOSIS IN ANIMALS IN ARCTIC AND ANTARCTIC WATERS

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From The State Veterinary Laboratory of Northern Norway, Harstad.

Researches into the Prevalence of Trichinosis in Animals in Arctic and Antarctic Waters.

By *K. Thorshaug* and *A. Fr. Rosted*.

Our researches into the prevalence of trichinosis in Arctic waters started in spring 1950. At that time we were not aware of the already well advanced Danish investigations in Greenland, led by Dr. phil. *H. Roth*. Our investigations cover, however, quite different regions of the Arctic, namely the Eastern, Northern, and Western Ice, and also Newfoundland. In addition comes a smaller area round the Maudheim grounds in the Antarctic. From Denmark Strait we also have some specimens. Our work should, therefore, prove helpful in serving the joint purpose of making clear the prevalence of trichinosis in Arctic waters.

In order to procure adequate working material, it proved necessary to enter into close co-operation with a number of institutions, trading companies and hunters. We address our special thanks to the State Research Fund for Veterinary Science and the Ministry of Agriculture for financial support, sympathy and kind services. We also thank the Weather Forecast Institution of Northern Norway and Arctic station for all assistance, also Arctic Association, Tromsø, Brødr. Jakobsen, ship owners, Tromsø, Messrs. Odd and Thor Lønø, Horten, Skipper Karl Nikolaisen, Tromsø, and all others who have helped and supported us in our work.

Brief Historical Review.

In 1909, *J. Böhm* demonstrated trichinosis in polar bears in captivity. Since then, trichinosis in polar bears in captivity has been demonstrated several times and the common assumption was that polar bears became infected, either through fodder infested with trichinae or through catching and eating rats infested with the disease. In Stuttgart about 100 people were taken ill and 13 died of trichinosis after consumption of smoked polar bear meat. The polar bear came from a zoological garden. *Parnell* reported in 1934 that he had demonstrated trichinae in wild polar bears and assumed that walruses and possibly seals might be carriers as well. He suggested that trichinosis might be the cause, and not meatpoisoning, when entire family communities were wiped out among the North Canadian Eskimos. The Englishman *Leiper* maintained in 1938 that the frequent occurrence of trichinosis in polar bears and Arctic foxes from Arctic parts must be indicative of their carrying the infection from those regions. From Norway we know that German soldiers stationed on Franz Josef Land during the last world war — winter 1943—1944 — were seriously affected by trichinosis after consumption of polar bear meat. *Eieland* pointed out in 1948 that 7 out of 9 polar bear skins from Spitsbergen were infested with trichinae. *Henderson* has proved trichinosis in polar bears in Finland. *Aaser* has also ascertained the existence of trichinosis in 3 polar bears and 2 Arctic foxes from specimens handed over by the Norwegian Polar Institute. The specimens came from North-eastern Greenland. Just before the last world war some serious cases of trichinosis were noted among the population of North-eastern Siberia round Bering Strait. The cases were caused by consumption of polar bear meat. In the series of investigations made by *Roth* on material from East and West Greenland during the term 1948—50, he found the percentage of trichinosis to be as follows: dogs 66.5, polar bears 27.7, Arctic foxes 1.1, walruses 0.9, bearded seals 1.8, and ringed seals 1.9. It was the widespread and very serious epidemic round Disko Bay in West Greenland that brought about investigations on a broad basis. Of well over 300 Greenlanders affected by trichinosis 33 died.

In the Arctic parts of Alaska and Canada some minor group investigations have been made in order, if possible, to form an idea of the frequency of trichinosis. One used partly skin specimens and partly precipitin reaction with living larvae and antigen. The reaction percentage varied to some extent — 27 % -46 % — but was on the whole high. Viewed in the light of the results of these investigations one may with good reason presume that trichinosis is of common occurrence among Arctic people.

Personal Investigations.

The part of the Arctic fleet equipped in Tromsø carry on their hunting partly in the Northern, Eastern and Western Ice, partly on Newfoundland. Through the Arctic Association, Tromsø, we soon got into touch with a number of skippers operating in polar parts. The skippers were requested to collect specimens from polar bears, bearded seals, bladder-noses, Greenland seals, ringed seals, and walruses. Special barrels were marked and distributed for collection of specimens from diaphragms. Collected material was to be kept in brine. This collecting was not very successful the first year. Specimens were few and generally too large. The hunters have to work at forced speed and time for collecting is therefore limited. A certain reserve towards the investigations also made itself felt, the reason for this being possible economical consequences. On the whole it was more difficult to obtain specimens from the Western Ice than from the Northern and Eastern Ice. This may naturally be ascribed to the hunting conditions and highly forced working speed. In order to procure sufficient and usable material for examination we were present at the arrival of the vessels and inspected the flensing. The specimens were taken from muscular and sinewy parts round the attachment of the flippers and salted for later examination.

The collection of specimens from the Newfoundland grounds was made by District Veterinary Røsted, Tromsø, who by kindness of Brødr. Jakobsen, ship owners, Tromsø, was permitted to travel with the vessel "Norsel" from Las Palmas to the sealing grounds. Unacquaintance with the hunting and working methods created to begin with some difficulties in the collecting

work. During large-scale hunting up to 30 men might advance on a front line of 3-4 km and about 3,400 seals might be killed during one single day.

The muscle specimens were easily taken out of the killed and skinned seal. *Crura diaphragmaticae* were muscular with slight signs of transition into sinews. The specimens were, therefore, by preference taken from the part of the diaphragm attached to the costal curvature, the transition into sinews here being more marked. From older seals some double specimens were taken, partly from diaphragm, partly from the flippers where the musculature is strong, rich in blood, and having distinct transition into sinews. Trichinoscope for direct current was installed on board the ship. The specimens to be examined from the Newfoundland grounds were practically all of them taken from Greenland seals. Bladder-noses were rather scarce and the number of specimens came to 68 only.

The specimens from polar bears came partly from the Eastern and Northern Ice as far north as $80^{\circ}15'$ lat. N. and $46^{\circ}30'$ long E., towards Novaya Zemlya, Franz Josef Land, Kvitøya (White Island), Kong Karls Land, Edgeøya, Hopen, Bjørnøya (Bear Island), Duvefjorden on Nordaustlandet, partly also from the Western Ice. The material consisted partly of skinned skulls, partly of specimens from salted hides. In skulls muscles of mastication were examined and from salted hides specimens were taken of muscle — sinew remnants round the claws. Unfortunately skinned skulls were every now and then thrown over board immediately before arrival at Tromsø. Presumably this was caused by a certain risk of confiscation of skins or meat of polar bears. The meat of young animals is considered a delicacy and may be sold at good price. On inquiry whether the vessel carried salted polar bear meat or not, we regularly got negative answers.

The specimens from walruses all came from the Eastern and Northern Ice, with the exception of one single specimen from the Western Ice. The investigations were gradually extended to include finbacks and sperm whales as well. The hunting takes place off the coast of Northern Norway towards Spitsbergen. Specimens from white whale came from an enormous catch in Billefjorden in Vestspitsbergen. The greater part of Greenland

shark was caught in Denmark Strait and the rest in Barents Sea.

From the Antarctic altogether 101 specimens from seal have been examined (Ross seal, Weddell seal, Leopard seal). The material was at request kindly collected and handed over to us by the crew on "Norsel", some seals having been caught during the voyage to Maudheim.

The usual technique of examination has been the compressorium trichinoscope-method with 12—14 sections from the individual specimens. In cases of negative specimens from polar bears as much as 300—400 sections were taken. To begin with we certainly erred somewhat by not making a sufficient number of sections. Quite a number of specimens have at the same time been examined by the digesting method, which in the case of examinations on a large scale does not seem to be particularly suitable.

Examinations on Occurrence of Trichinae 1949—1953
in Arctic and Antarctic Waters.

	Total	pos.	%
Polar bear (<i>Thalarchos maritimus</i>)	278	163	58.63
Walrus (<i>Odobenus rosmarus</i>)	74	7	9.46
Bearded seal (<i>Erignathus barbatus</i>)	300	0	0
Bladder-nose (<i>Cystophora cristata</i>)	192	0	0
Greenland seal (<i>Phoca groenlandica</i>)	1955	0	0
Ringed seal (<i>Phoca foetida</i>)	8	0	0
Weddell seal	101	0	0
Leopard seal			
Ross seal			
Finback (<i>Balaenoptera physalus</i>)	26	0	0
Sperm whale (<i>Physeter macrocephalus</i>)	23	0	0
White whale (<i>Delphinapterus leucas</i>)	175	0	0
Greenland shark (<i>Somniosus microcephalus</i>)	66	0	0
Dog (<i>Canis familiaris</i>)	4	1	25
	3202	171	5.3

Polar bears show an average percentage of infection of 58.63. As previously mentioned, the first negative specimens from polar bears were not so thoroughly examined as were later specimens. We are, therefore, of opinion that the figure 58.63 %

may be rather low. The degree of infection varied much. Some of the examined animals must be described as very slightly affected. In one case trichinae were not found until more than 300 sections had been made, in a few other cases only after some 200 sections. In the greater part of examined animals the affection must be said to be of a medium degree. Some animals — particularly old ones — were highly affected, showing a typical series of reinfections.

From the Western Ice we have only 4 specimens, all negative. The material is not sufficient to give information of real value about conditions in this region. The rest of the specimens came from the Northern and Eastern Ice, practically equal amounts from both regions. The Spitsbergen area and adjacent waters are well-known for their abundance of polar bears and the specimens from that region present a clear and convincing picture of the prevalence of trichinosis.

At the taking out and delivery of specimens we never got information of the age of the animals. The brothers *Odd* and *Thor Lønø*, Horten, who wintered at Tjuvfjorden on Edgeøya 1950—1951, and skipper *Karl Nikolaisen*, Tromsø, have, however, kept accurate daily records of the polar bear hunting and the presumed age of the killed animals. Assuming that the determination of age is correct and that by young animals is meant 1- and 2-year-old ones, we get the following table for these catches:

	Number	pos.	neg.	% pos.
Young animals	12	2	10	16.67
Older animals	29	23	6	79.31

The figures are in good agreement with the average percentage of all specimens from polar bears and with the fact that more older animals are caught than young ones. If a certain little error in percentage calculation is taken into account, we may assume that more than 80 % of older animals in these waters are infected with trichinosis. As an instance of verification may be cited that the Weather Forecast Institution of Northern Norway in 1952 sent 18 specimens from polar bears from Hopen, 17 of which (94.4 %) showed infection. Examinations of polar bears in Greenland made by *Roth* showed an

average infection frequency of 27.7 %. This relatively high percentage figure does, however, not nearly cover the conditions in the Spitsbergen area and adjacent waters eastwards.

Of walruses are examined a total number of 74, one of which came from the Western Ice and negative in regard to trichinosis. The remaining 73 animals were caught in the Northern and Eastern Ice and showed an infection percentage of 9.6.

Roth's examinations in the Greenland area include 207 walruses, 0.9 % of which were infected. The Northern and Eastern Ice areas are thus showing a remarkably higher infection percentage. All positive trichinosis specimens in walruses came from older animals.

The investigations seem to indicate that it is not a matter of indifference from which part of musculature specimens are taken, some parts being apparently free from trichinae, others being heavily infected. It therefore proved necessary to examine sections from different parts of musculature.

Of specimens from dogs we have only had four, one of which showed trichinae.

Odd and *Thor Lønø* who wintered on Edgeøya 1950—51 have, with intention or not, apparently carried out a practical test of feeding dogs on frozen polar bear meat. According to the diary 3 dogs were fed on raw polar bear meat, for the most part deeply frozen. Examinations show that 10 carcasses must have been infested with trichinae, and 2 or 3 of them to a high extent. Post mortem and other examination of the dogs showed that one only was slightly affected, the other 3 were apparently free from trichinae.

Roth demonstrated trichinosis in one bearded seal from the Thule grounds in North-western Greenland and in one ringed seal caught at Clavering Island in East Greenland. If seals were frequent and important carriers of trichinae, we might certainly count on positive finds of trichinosis in these animals from the Northern and Eastern Ice where the stock of polar bears evidently is highly affected with trichinosis. Any confirmation of this has, however, not been established so far. As the matter of trichinosis in seals to some extent has caused a number of hunters to refuse to eat the meat, even of quite young animals, we would like to point out that the consumption of this kind

of meat must be considered free from risk. In this connection we are dealing with the meat of cubs of seal, such as whitecoats and bluebacks.

According to *Roth*, Dr. *Brandly* and Dr. *Rausch* have demonstrated trichinosis in a white whale caught near Wainwright on the Arctic coast of Alaska. This information caused us, partly on account of the frequency of trichinosis in the Northern and Eastern Ice, partly in the light of the special condition of ocean currents in these waters, to extend our investigations to include finback, sperm whale, white whale and Greenland shark. Trichinae were not demonstrated in any of these animals. All the same, one should reckon with the possibilities of infection in these animals also.

Our material on Greenland seal and bladder-nose is hardly sufficiently large and comprehensive to permit quite reliable conclusions to be drawn. We are of opinion, however, that on the whole one may expect the races living respectively in the Western Ice and on Newfoundland to be free from trichinae. *Roth's* demonstration of trichinosis in seals shows, however, that occasionally, and in certain chance circumstances, they may become infected and so be a source of infection. It is, therefore, not unlikely that seals, and in the first instance bearded seals and perhaps ringed seals localized to the Northern and Eastern Ice where trichinosis is very prevalent among bears and partly also among walruses, occasionally may be infected.

In contrast with the Greenland seal and the bladder-nose which live mainly on pelagic animals, the bearded seal has to go down to the bottom of the sea to find its food. This may also to a certain extent apply to the ringed seal living in the coastal and fjord regions of Spitsbergen. These animals will then, in the same way as walruses, be exposed to infection, although to a much less extent.

On Newfoundland *Rosted* got evidence of the fact that seals feed on meat remnants, as flippers cut from killed and flensed cubs of white whale were eaten by seals lying safe on an ice floe.

Trichinosis in dogs is common in Arctic regions. Considering the great prevalence of trichinosis among polar bears and not

infrequently in walruses this is quite natural as the flesh of these animals constitutes an essential part of the food of dogs. Also, it not infrequently happens that dogs eat the flesh of dogs.

The fox becomes infected, partly by eating meat remnants infested with trichinae around settlements, partly by eating of infested carcasses that it comes across by chance.

Any spreading of trichinosis on a large scale can not occur through dogs or foxes. They may at most contribute to the keeping up of trichinosis in a small measure.

The polar bear and — as conditions are gradually developing — the walrus, have, according to our present knowledge, to be considered the largest and most important factor of spreading and maintenance of trichinosis in Arctic regions. That polar bears eat the flesh of polar bears does not offer a convincing or satisfactory explanation of the frequency of trichinosis in these animals.

The polar bear is a rambler, and a great one. Dependent on ice, currents, winds and feeding circumstances, the greater part of the animals make their year by year wanderings, visiting, by chance, hunting-huts and -places. Like the dog and the fox a certain percentage of polar bears will be infected by eating trichinae-infested remnants thrown about in these places. Skinned carcasses thrown over board are continually causing reinfection and perhaps the more so if the polar bear is to be considered the garbage collector of the polar sea. Still it is to be doubted whether this explanation gives sufficient and wholly reliable data to go upon. What part does the walrus play in the life cycles of trichinae? It is a fact that great packs of polar bears will gather in hunting places where immense heaps of walrus cadavers are lying about. As previously mentioned, we found that about 10 % of examined specimens from walrus were infested with trichinae. Knowing that the weight of one single of these huge animals may amount to about 2 tons, the possibility of a large scale transmission of infection is certainly present.

The walrus lives in the drift ice not far from the coast and is mainly feeding on a variety of animals at the bottom of the sea such as crayfish, sea cucumbers, mussels, shells, etc. With its big tusks it rakes up the bed of the sea and may sop up

rotten parts carried by the currents towards shore or shoals. The walrus also attacks and eats smaller species of seal. Professor *H. U. Sverdrup* mentions this in his book: *Tre år i isen med "Maud"*. (Three Years in the Ice with "Maud".) *Sverdrup* also mentions that walruses have eaten blubber and pieces of skin from other walruses sliced on board of "Maud" and thrown into the sea. *Nikolaisen*, Tromsø, has also reported seeing walruses sopping up remnants of cadavers lying on the ice. In a letter *Anders K. Orvin* refers to an interesting observation transmitted to Professor *Sverdrup* by natives on the Siberian coast. These were of opinion that only some few walruses would attack other animals, mainly walruses with teeth placed evenly and close together, enabling them easily to gash and tear out pieces of attacked animals. In connection with the subsisting possibilities of the walrus one must necessarily point out the possible part played by the great Siberian rivers in the life cycle of trichinae. These great rivers carry every year huge quantities of waste matter into the polar sea.

It is self-evident that in drawing exact conclusions as to conditions of infection and communication of trichinosis, difficulties will occur and caution should be exercised. A variety of circumstances and factors may play a decisive part. It is true that we at present know something about the problem but not nearly enough. Our investigations compared with earlier results of research reveal in an obvious manner the necessity of carrying into effect prophylactic measures in order to prevent infection by trichinae in Arctic regions. The problem is not easily solved. Hunters, and others persons living in the Arctic, winterers, and all others directly or indirectly connected with activities in the Arctic should naturally be thoroughly acquainted with the peril trichinosis means and how it may quite simply be prevented by boiling, sufficiently roasting or refrigerating for a long time the meat for consumption. In this connection we leave emergency situations out of account.

Generally all consumption of polar bear meat ought to be prohibited. In the case of polar bear meat being imported it ought at any rate to be most strictly inspected.

In order to be able to control and extend our knowledge of the prevalence and possible fluctuations of trichinosis in polar

bears, it would be desirable and necessary to adopt compulsory inspection of all skins brought ashore. Such a control would, however, hardly give exact results. A really effective control — which in our opinion appears necessary — might easily be established through orders to the skippers in charge, imposing not only the duty to take out a certain prescribed specimen from a killed bear, but also to report the locality where the bears have been shot or killed in other ways.

By Order in Council of June 20th 1953 all hunting of walrus is prohibited until further notice. When the hunting is decontrolled, it will be necessary to extend the duty of taking out specimens and reporting position to include that species as well. As the skinning of walruses is not carried out very accurately, there will as a rule be big enough muscle remnants left on the blubber and round about the flippers to permit a sufficiently reliable specimen to be removed before flensing. If this is carried out on board the vessel, it will automatically involve the duty of specimen-taking and clear indication of required information. If the specimen-taking is planned in advance, practically no inconvenience should arise in this connection.

Concerning meat of bearded seal and whale, there may be a matter of discussion whether compulsory inspection in regard to trichinae should be established or not.

Parnell's theory of 1934 that trichinosis might be the cause, and not meat poisoning, when entire family communities of North Canadian Eskimos were wiped out — and later *Roth's* theory that some cases of disease, previously defined as scurvy, in reality must have been trichinosis — seem without doubt to be true. No doubt one may also maintain that in the case of a number of hunters and winterers, often seriously troubled with "rheumatism", these have in reality been touched by trichinosis. In this field unsolved problems still seem to be left for the medical profession.

Our investigations should not be considered complete or exhaustive. It will be necessary to continue and extend the research in this particular field.

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 Dr. phil. *H. Roth* has in his papers on trichinosis given exhaustive literature references, to which we refer.

Summary.

In a brief review is mentioned the American and Canadian group examinations of the local population in the Arctic parts of Alaska and Canada, where (27—46 %) of examined individuals reacted positively to trichinosis.

During the period 1949—53 the authors made investigations into the prevalence of trichinosis in some animal species from the Northern, Eastern, and Western Ice, Newfoundland, Denmark Strait, and a limited area round Maudheim in the Antarctic. The method of procedure was section of muscles from the individual specimens, compressorium and trichinoscope. In cases of negative specimens from polar bears, up to 300—400 sections have been examined. The digesting method has been applied for control and in doubtful cases. With the exception of 4 specimens from the Western Ice, which turned out to be negative, all specimens from polar bears came from the Northern and Eastern Ice. Of 278 specimens from polar bears 58.63 % showed presence of trichinae, and for the Northern and Eastern Ice alone 59.5 %. Specification of age was submitted in the case of 41 animals. Young animals — 1- and 2-year-old — showed an average infection rate of 16.67 %, older animals 79.31 %. From Hopen 18 specimens were examined, 17 of which showed trichinae.

The greater part of polar bears examined must be described as affected to a medium degree. From the Northern and Eastern Ice 73 walruses have been examined, 9.6 % of which showed trichinae. Of 4 specimens from dogs, trichinae were found in 1. Trichinae have not been demonstrated in bearded seal, bladder-nose, Greenland seal, ringed seal, Weddell-, Ross- or Leopard seal. Specimens from finback, sperm whale, white whale and Greenland shark were also negative.

As Dr. phil. *Roth* has demonstrated trichinosis in bearded seal and ringed seal around Greenland, the authors had expected to find trichinosis in seals from the Northern and Eastern Ice where trichinosis is very prevalent among polar bears and to a certain extent among walruses. Trichinosis in seals was not demonstrated and any confirmation of the seal

being a frequent carrier of trichinae has so far not been established. The authors are of opinion that the stock of seals in the Western Ice and on Newfoundland is to be regarded as free from trichinae, whereas there is a possibility of infection as regards bearded seals and ringed seals which are living round Spitsbergen and in eastern waters.

The authors mention the factors contributing to the stock of polar bears in the Northern and Eastern Ice being affected by trichinosis to such a degree and emphasise the part possibly played by the walrus as an intermediary trichinae-carrying link.

The importance of preventive measures is referred to, and also to the desirability and necessity of establishing an effective control in order to extend our knowledge of the prevalence of trichinosis and its fluctuations in Arctic waters, and the importance of continued investigations on a broad basis.

Zusammenfassung.

Untersuchungen über die Verbreitung der Trichinose bei Tieren in arktischen und antarktischen Gewässern.

In einer kurzen Uebersicht wird über die von der amerikanischen und kanadischen Gruppe ausgeführten Untersuchungen der Ortsbevölkerung in arktischen Teilen von Alaska und Kanada berichtet, wo 27—46 % der untersuchten Individuen für Trichinose positiv reagierten.

Während der Periode 1949—53 untersuchten die Autoren das Vorkommen von Trichinose bei einigen Tierarten des nördlichen, östlichen und westlichen Eismeer, Neufundlands, der Dänemark-Strasse und einer begrenzten Area ringsum Maudheim in der Antarktis. Das Untersuchungsverfahren bestand in der Zerkleinerung besonderer Muskeln, Kompression der Muskelproben und Trichinoskopie derselben. Bei negativen Proben von Eisbären wurden bis zu 300—400 Muskelproben durchgeprüft. Die Digestionsmethode wurde zur Kontrolle und in zweifelhaften Fällen angewandt. Mit Ausnahme von 4 Proben aus dem westlichen Eismeer, die negativ ausfielen, stammten sämtliche Proben von Eisbären des nördlichen und östlichen Eismeer. Von 278 Proben von Eisbären enthielten 58.63 % Trichinen und in Bezug auf das nördliche und östliche Eismeer für sich 59,5 %. Eine genaue Feststellung des Alters geschah bei 41 Tieren. Junge, 1—2 Jahre alte Tiere waren nach einer durchschnittlichen Berechnung bis zu 16,67 % infiziert, ältere Tiere bis zu 79,31 %. Von Hopen wurden 18 Proben untersucht, von denen 17 Trichinen aufwiesen.

Der grösste Teil untersuchter Eisbären muss als mittelgradig trichinenbehaftet bezeichnet werden. 73 aus dem nördlichen und östlichen Eismeer stammende Walrosse wurden untersucht, von welchen 9,6 % Trichinen aufwiesen. Von 4 Proben von Hunden wurden in 1 Probe Trichinen ermittelt. Bei der Bartrobbe, der Kappenrobbe, der Sattelrobbe, dem geringelten Seehund, dem Weddell-, Ross- oder Leoparden-Seehund wurden Trichinen nicht festgestellt. Proben vom Finnwal, Pottwal, Weissfisch und Eishai waren ebenfalls negativ.

Nachdem Dr. phil. *Roth* Trichinose bei Bartrobber und geringelten Seehunden ringsum Grönland nachgewiesen hatte, erwarteten die Autoren Trichinose bei Seehunden aus dem nördlichen und östlichen Eismeer zu finden, wo Trichinose unter Eisbären sehr und in einem gewissen Umfange auch unter Walrossen stark verbreitet ist. Bei Seehunden wurde Trichinose nicht ermittelt, und eine Bestätigung, dass der Seehund ein gewöhnlicher Trichinenträger sei, ist deshalb nicht erbracht. Die Autoren vertreten die Auffassung, dass der Bestand der Seehunde im westlichen Eismeer und um Neufundland herum als trichinenfrei zu betrachten sei, während die Möglichkeit einer Infektion bei Bartrobber und geringelten Seehunden vorliege, welche ringsum Spitsbergen und in den östlichen Gewässern leben.

Die Autoren besprechen die Faktoren, die zum Trichinenbefall des Eisbärenstammens im nördlichen und östlichen Eismeer in solchem Grade beigetragen haben, und betonen die Rolle, welche möglicherweise das Walross als Zwischenglied in der Reihe der Trichinenträger gespielt hat.

Auf die Bedeutung von Vorbeugemassnahmen wird hingewiesen. Ferner werden der Wunsch und die Notwendigkeit effektiver Massregeln zwecks Erweiterung unserer Kenntnis über die Verbreitung der Trichinose und ihrer Schwankungen in arktischen Gewässern sowie die Wichtigkeit auf breiter Basis fortgesetzter Studien hervorgehoben.

Resymé.

Undersøkelser over utbredelsen av trikinose hos dyr i arktiske og antarktiske havområder.

I en kort historikk omtales de amerikanske og kanadiske gruppeundersøkelser på den stedlige befolkning i den arktiske del av Alaska og Kanada hvor 27—46 % av undersøkte individer ga positivt utslag for trikinose.

Forfatterne foretok i 1949—53 undersøkelser over trikinosens forekomst og utbredelse hos endel dyrearter fra Nord-, Øst- og Vesterisen, Newfoundland, Danmarkstredet og et begrenset område omkring Maudheim i Antarktis. Fremgangsmåten var muskelklipp fra de enkelte prøver, kompressorium og trikinoskop. Ved negative isbjørnprøver er det undersøkt opptil 300—400 klipp. Digereringsmetoden er brukt i kontrolløyemed og ved tvilstilfeller. Isbjørnprøvene er — med undtagelse av 4 fra Vesterisen som forøvrig var negative — fra Nord- og Østisen. Av 278 isbjørnprøver var 58.63 % trikinøse og for Nord- og Østisen alene 59.5 %. For 41 dyrs vedkommende forelå det aldersoppgave. Unge dyr — 1 og 2 år — viste en gjennomsnittsinfeksjon på 16.67 %; mens eldre dyr viste 79.31 %. Fra Hopen ble undersøkt 18 prøver hvorav 17 var trikinøse. Storparten av undersøkte isbjørn må betegnes som middels sterkt angrepne. Fra Nord- og Østisen er undersøkt 73 hvalross hvorav 9.6 % var trikinøse. Av 4 hundep prøver var 1 trikinøs. Det er ikke påvist trikiner i storkobbe, klappmyss, grønlandssel, snadd, Weddell-, Ross- eller Leopardssel. Finn- hval, spermhval, kvitfisk og håkjerring var også negative.

Da dr. phil. *Roth* har påvist trikinose i storkobbe og ringsel omkring Grønland hadde forfatterne ventet å finne trikinose i sel fra Nord- og Østisen hvor trikinose er sterkt utbredt hos isbjørn og delvis hos hvalross. Trikinose hos sel ble ikke påvist og noen bekreftelse på at selen skulle være en hyppig trikinførende faktor foreligger ikke ennå. Forfatterne mener at selstammene i Vesterisen og på Newfoundland bør ansees trikinfrie, mens storkobbe og ringsel som holder til omkring Svalbard og i østlige farvann muligens kan smittes. Forfatterne omtaler de faktorer som medvirker til at isbjørnbestanden i Nord- og Østisen er så sterkt trikinøs og framhever den mulige betydning hvalrossen kan spille som trikinførende mellomledd. Betydningen av profylaktiske tiltak omtales. Likeledes ønskeligheten og nødvendigheten av å etablere en effektiv kontroll for å utvide vårt kjennskap til trikinosens utbredelse og svingninger i arktiske farvann samt betydningen av fortsatte undersøkelser på bred basis.

(Modtaget af redaktionen: 7. november 1955).

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