

PARAMYXOVIRUS IN BOA CONSTRICTOR CONSTRICTOR

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SUMMARY

This virus is transmitted through the air by small droplets that are exhaled from the lungs. Through infected water bowls in which the virus can survive for a long time and spread. Transmission through faeces is also possible.

There is no cure for this virus and once infected a snake will carry the virus for the rest of its life, even though no symptoms are visible. Because the virus can

strike when stress occurs, it is important to create optimal conditions for the animals. The correct temperature, a good hiding place to limit stress, good hygiene etc. will limit the chances of the symptoms caused by the virus reoccurring.

INTRODUCTION

In 1998 I encountered the paramyxovirus in two *Boa constrictor constrictor* that I had kept for years. In this article, I will describe in what families the virus has been found, where it occurs, what the symptoms can be and how the virus is transmitted. I will then describe my experiences with my two boa's. I will go into their housing, feeding, growth and general health during and before their illness. I feel this is important since



♀ feb 98

Boa constrictor constrictor, female with blisters on her body



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snakes can be carriers for the virus for a long time, without becoming ill. For instance my boa's have not been in direct contact with other boa's since 1994. To me this suggests that they already must have carried the virus since 1994. They were housed in a room together with other snakes but none of these have become ill. In addition, I will describe virus symptoms and the development and treatment of the disease.

SOMETHING ABOUT THE PARAMYXOVIRUS

The paramyxovirus occurs both in juvenile and adult snakes. Infections have been recorded in the following families:- *Viperidae* (vipers), *Colubridae* (to which Ratsnakes *Elaphe* species belong), *Boidae* (boa's and pythons) and *Elapidae* (cobra's). The virus is spread world wide and occurs in the United States, Mexico, Argentina and Europe.

To me the symptoms are rather vague, this is because the virus weakens the animals natural resistance, which often gives other diseases a chance. Clinical symptoms can be as subtle as refusing to eat for two weeks. Other symptoms can be:- abnormal breathing sounds, secretions in the back of the throat, pneumonia, abnormal activity (moving around with the mouth wide open) and loss of balance.

In some outbreaks of the virus little or no symptoms are noted and snakes are found dead in the morning. Most snakes appear to be in good health, are of normal weight and behave normally until just before their death. Organs that can be affected are the lungs, the pancreas, the liver, kidneys and the brain. The lungs especially, appear to be affected.

Snakes can carry this infection without being ill. The virus multiplies at a temperature between 23 and



♂ feb 97

Boa constrictor constrictor, male

32°C. This means that the virus can become active when snakes are held at (too) cool temperatures like during cold periods in the winter or during hibernation. The paramyxovirus is contagious. Transmission occurs through the air by the tiny droplets that are exhaled from the lungs. Also the virus can remain in water bowls for a long time and can spread from there. Transmission through faeces is also possible.

It is difficult to diagnose the virus in infected snakes. Often, because symptoms are not very specific, diagnosis can only be made definite by isolating the virus and growing it in cell culture. Then the virus can be made visible by the electron microscope. In the United States a test has been developed to show the presence of specific antibodies against the virus in blood. Unfortunately this test is not yet available in Europe. There is no specific treatment against this virus, nor is there a vaccine available to vaccinate and protect snakes.

MY EXPERIENCES WITH TWO BOA CONSTRICTOR CONSTRICTOR

In 1992 I traded a *Python regius* for a juvenile *Boa constrictor constrictor*. It was a lovely male, born in April 1992. The female I bought in 1994, from a private snake keeper. She was born in 1992 and she was behind in growth because of too little food. Apart from that she looked healthy.

HOUSING

In 1994, after a 3 month quarantine period, the animals were housed together, in a terrarium that measured 120 x 50 x 180 cm. It contained four lamps, two in the middle right above a basking spot and two in the top.

During summer the temperatures reached a minimum of 20 degrees Celsius (night) and a maximum of 34 °C (day). During the winter the temperature reached a maximum of 28°C during the day. During the night it dropped to room temperature but never below 18°C.

Three resting spots were available at heights of 60, 90 and 120 cms. On the bottom, a large wooden box could be used as a dark and quiet hiding place. In addition there was a large water bowl and old newspapers were used as floor covering.

In 1997 I changed the interior of the terrarium. It was divided in two and I housed the animals separately. The floor was covered with newspapers and a layer of wood shavings. The water bowl and hiding box had become rather small (and the snakes rather big) and I changed them for some bigger ones. I also installed some heating mats instead of the lights thereby creating a more even daytime temperature (25-35°C). During the night the heating mats were left on so the snakes always had a warm spot.



The *Boa constrictor constrictor* terrarium





CARE

I hardly sprayed the terrarium and therefore the relative humidity was an average of 60%. I did bath the snakes from time to time in water of about 30°C. The water bowl was cleaned every week unless faeces polluted it earlier. The cage itself was checked for faeces nearly every day and inspected thoroughly every week and cleaned completely once every three weeks. During the winter this was done less often because the snakes did not produce that much faeces, were less active and needed more rest.

FEEDING AND GROWTH

Both animals fed well from the beginning. The first two years mice and rats were on the menu. After that, the snakes ate freshly killed adult rats without any problems. The tables below show the intake of food and the growth of the two snakes. Unfortunately I did

not start recording this data until 1996. Still these tables provide a good overview of the years before their illness. Both in behaviour, feeding and growth these snakes do not differ from other Boa constrictors.

HEALTH AND DISEASES

During the winter of 1995 the male contracted a mild cold. I treated that by raising the temperature slightly. September the 1st 1996 I noticed a small wound on the tip of the nose of the female. The wound did not heal well and gave problems with sloughing and a small dry crust appeared. In November the vet removed this crust and covered the wound with some "second skin". This second skin is a skin replacing and protective preparation that protects underlying tissue. Unfortunately the female was troubled by it and rubbed her nose until she had removed this second skin. I then decided to treat the wound with 'Betadine' ointment twice a week. The wound healed very slowly.

Boa constrictor constrictor male:

Year	Weight in month	Food intake since last weight	Weight gain
1994	March 3000 g	unknown	unknown
1995	October 4500 g	unknown	1500 g
1996	October 5000 g	4000 g	500 g
1997	October 5500 g	3795 g	500 g
1998	February 5500 g	0 g	
	March 4500 g		

Boa constrictor constrictor female:

Year	Weight in month	Food intake since last weight	Weight gain
1996	October 6500 g	7320 g	unknown
1997	November 11000 g	10640 g	4500 g
1998	February 12000 g	1490 g	1000 g
	November 10500 g	5580 g	-1500 g

In December 1996 the faeces of the female turned out to contain a lot of flagellates. I therefore treated both the female and the male with metronidazol. In the middle of December the male started to "sigh" several times at each occurrence. This lasted until the middle of January. During a physical examination at the Department of Veterinary Medicine of the University of Utrecht, it was concluded that most likely a small piece of sloughed skin was in the way. This was nothing to worry about. However the vet did find small red spots on the ventral side of the snake and his active behaviour was something to keep an eye on. It could point to some sort of inflammation. I myself ascribed his active behaviour to the mating season. As usual he refused to eat during this time and was actively roaming his terrarium. The small red spots had been there for as long as I could remember and were part of his markings. In the course of the next few months the spots did not get worse and as of March he started to eat again and returned to his normal behaviour.

At the end of September 1997 a small bump appeared on his nose. This grew to a real lump, which turned out to be an infection. In October the male sloughed including the skin on his nose. This left a small wound. Now and again I treated this wound with "Betadine". I also changed the wood shaving on the floor for newspapers to minimise the chances of dust getting into the wound.

At the end of November he sloughed again and the small wound was still there. There was hardly any blood only white bone. Again I treated the wound with "Betadine". In December the snake became very active as usual and he regularly rubbed his nose against the walls of his terrarium. This caused the wound to open up again. Regularly treating the wound with "Betadine" it healed very slowly. When the wound was closed completely, I changed the newspapers for wood shavings again.



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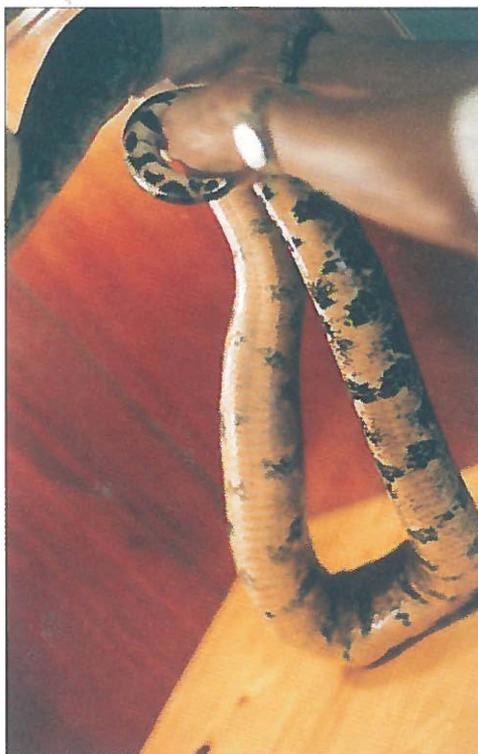


In January 1998 the male caught a cold again. Also the infection on his nose had become worse and now looked like a dry graze. I again removed the wood shavings. At the beginning of February the male started to breath with his mouth open and I could hear a rattling sound. A closer investigation by Marja Kik (the vet) showed that his mucosa were clean. She took a swab from his wind pipe and cultured it. This revealed an early pneumonia. This was treated with 10 mgr of TMPMS (Trimehthoprimsulphatemetoxazol, Bartrimel) per kilogram of body weight for a period of ten days, from February 4 until February 14.

The animal was treated by injection and it proved quite a task to treat the snake every day. But after a few days I got the hang of it and the snake was not so stressed anymore. If the snake really had to gasp for breath, I was advised to give him some Bisolvon (for kids). I did not do this because the snake became very tense when I came near and his breathing was not that bad.

The wound on his nose I treated with a soft disinfecting ointment. I used Calendula cream (VSM) which is a homeopathic ointment for the treatment of small injuries. On February the 10th the result of the bacteria culture became know. Some pseudomonas bacteria had been cultured that play a role in pneumonia and that are susceptible to TMPMS. The female had a cold too and was also treated with TMPMS. She responded well to the treatment.

On February 23 the female suddenly suffered from "blisters" on her body. They resembled the pox-like symptoms that garter snakes show when kept under too moist conditions. The terrarium was not too moist, not dirty and there was no possibility for the snake to burn itself on a lamp. So it was a mystery as to what caused the blisters. The next day the female suffered from several different sized blisters under her skin. The blisters were filled with a clear fluid. This fluid was cultured and in the meantime I treated the blisters with Neotriam (active ingredient Neomycine 2.5 mg/ml triamcinolonacetonide). This slowed down the infec-



♂ Male with pink/red dots on belly

tion. I opened up the blisters, dabbed the fluid and cleaned the wounds with 3% hydrogen peroxide. Finally I treated the wounds with Betadine ointment.

In the meantime the male also began to suffer from blisters. Fluid was also cultured from his blisters, as well as from swabs taken from his wind pipe. The results from these cultures came on March 2nd. No pathogens could be cultured from the fluid but many polymorph nucleated leukocytes were present. They are responsible for fighting off and killing bacteria and the formation of puss.

The culture of the wind pipe swab showed haemolytic streptococcus. Since this is susceptible to Ampicillin,

it was decided to treat both snake with this antibiotic for a period of ten days. This treatment was also by injection.

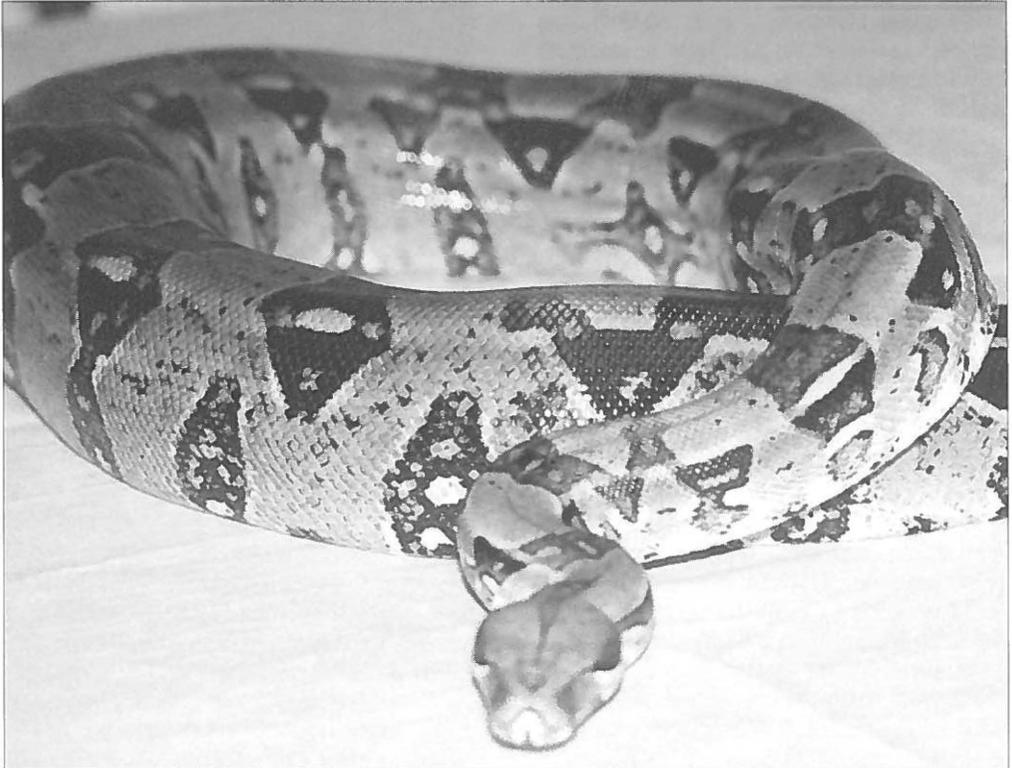
During the treatment I bathed the snakes daily in a warm bath (30°C) of Betadine shampoo. On March 11th the Ampicilline treatment stopped and from then on, the snakes were bathed four more times every other day. Until April 15 I treated the wounds with Calendula ointment two to three times a week.

The bathing and the Calendula treatment had a positive effect on the infection on the nose of the female. On March 26 the female sloughed (in pieces) while bathing voluntarily. This caused the wounds to open up a bit so I treated them after the bath with Betadine ointment.

From March 29 the wounds and scars of the female were dry and were healing well. On March 30 she ate 40 grams of chick and 509 grams of rat. From that time on she ate well (see Table 2). She sloughed on April 23, May 29 and August 7. She looked and behaved healthy again.

THE MALE WAS NOT SO LUCKY

The skin of the male had become very dull and he had not eaten since October. At the beginning of April his eyes looked cloudy. A physical examination by Roswitha van de Sandt (veterinary ophthalmologist) showed a cloudy spot underneath the eye cap. It also revealed little dimples in the eye cap of the left eye. It was decided to wait, to see if he would slough. If not,



♀ The wound on her nose can be seen vaguely





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he could get a dose of Vitamine A to speed up the sloughing.

On April 21 he was doing really badly. His body no longer felt supple and his muscles seemed to stiffen. He was gasping for breath. He could no longer turn himself around when put on his back and he was shaking his head. We decided to put him to sleep and send him for an autopsy, at the Veterinary Department of the University of Utrecht.

IN CONCLUSION

The autopsy revealed that the male suffered from encephalitis, inflammation of the pancreas and kidney. The latter also showed inclusion bodies characteristic of a viral infection. Because of this and his syndrome the previous year (pneumonia and abscesses) it is most likely that he was suffering from a paramyxovirus infection. Using an electron microscope paramyxovirus particles were found in his kidney and pancreas.

The most likely conclusion is that the female is also a carrier of this paramyxovirus. For the moment she is

healthy. There is no treatment for the virus and she will always carry the virus with her. Because the virus can become active when her resistance is low, it is important to keep her under optimal conditions:- the right temperature, a good hiding place to minimise stress and strict hygiene should lower the risk of her becoming ill again.

In October the female moved and she is now under the care of an employee of the Veterinary department of the university.

ACKNOWLEDGEMENTS

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LITERATURE

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