

# FVX-SPRAYER

Easy application for vaccines in livestock

## Introduction

By Mr. Andre Steentjes, DVM.

Although the fogging devices Atomist and the Turbofogger have proven their worth in the past (especially during the outbreak of Newcastle Disease (ND) in the early 1990s in The Netherlands) in the vaccination against ND, there is quite a bit of aversion on the farms to the inconvenience and lugging of extension cords. The practical value of the use of the Atomist and the Turbofogger lies mainly in the fact that both devices produce a fine mist ("aerosol"), with which good protection against ND can be built up from an early age; this can be explained because the fine mist reaches deep into the respiratory tract of the chicks. In order to prevent a too strong immune response after the first vaccination with aerosol, the first ND vaccination is usually vaccinated with a "coarse drop". Another option is to carry out the first vaccination with an atomist or Turbofogger, but then with a "mild" vaccine (which causes no or less adverse vaccination reaction but also a lower immune response: for example with Nobilis ND C2 or Poulvac NDW).

## Vaccination test with a Newcastle Disease vaccine on a rearing farm for broiler breeders

At the rearing farm where the FVX-sprayer has been tested, the chicks have been vaccinated for protection against ND virus with the vaccines Nobilis ND C2 and Nobilis ND Clone 30 from MSD Animal health. Consultation between stake holders has taken place before the application took place to discuss all possible scenarios.

On the rearing farm for broiler breeders, there are three houses with Ross and Rustic Gold birds. The table below shows the schedule of the vaccination and dosage, with the used amount of water. **The used amount of water differs from the traditional fogging devices or spraying equipment.** This is an important step. Because it means people have to change the existing water dosage that is used in their current spray or fogging device. The walking speed and routing through the house determines the time that is required to vaccinate all birds. **A test walk with water only in the FVX-sprayer through the house in advance will give you feeling of the total amount of water that is used in the house.** The width of the poultry houses in the test was 12 meter. The FVX-sprayer has a reach over 3 meter. So with spraying from left to right gives a reach of more than 6 meters. The 12 meter wide house can be done in 1 walk to the back and returning to the front on the other side of the house. Walking time in house 1, 2 and 3 was respectively 10, 15 and 15 minutes. The number of water used can be found in the table.

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Broiler breeder rearing farm in the Netherlands	ND vaccine	Veterinarian: Veterinair Centrum Someren.		
Chicks born: 21/7/2021		Age		
		Vaccine before day 17	6 weeks later (week 8)	6 weeks later (week 14)
	Number of birds:	Nobilis ND C2 (1/1 dose)	Nobilis ND Clone 30 (1/1 dose)	Nobilis ND Clone 30 (1/1 dose)
House 1	6.960 Rustic Gold hen chicks	700 ml water	700 ml* water	700 ml water
House 2	12,060 Ross hen chicks	1050 ml water	1050 ml water	1050 ml water
House 3	19,350 chicks (12330 Ross Hen + 7200 Ross Rooster)	1050 ml water	1050 ml water	1050 ml water

**Tips for usage:** The FVX-sprayer has been rinsed with lukewarm water to remove dust and to prevent cross contamination.

**3 weeks after every vaccination, in every house from 30 birds blood samples were taken.**

The blood is sent to the laboratory of Royal GD in Deventer, The Netherlands. The results can be found in below table. The reports (in Dutch) from Royal GD can be found by clicking on the table.

## Results:

Results:

			HI (Haemagglutination Inibition test) ND-titer							
			1	2	3	4	5	6	7	average
Age (Days)	Interval after 1st NCD vaccination (Days)									
43	26	H1: Rustic Gold	22	4	2	1	1			1,5
42	26	H2: Ross 308-hens	19	6	3	2				1,6
42	26	H3: Ross 308-roosters	16	2	5	4		1		2
78	20	H1: Rustic Gold *		1				1	28	6,8
77	20	H2: Ross 308-hens							30	7
77	20	H3: Ross 308-roosters						1	29	7
99	41	H1: Rustic Gold	1				4	6	19	6,3
98	41	H2: Ross 308-hens					1	7	22	6,7
98	41	H3: Ross 308-roosters						5	25	6,8

\* Ventilation has (accidently) not been turned off during application.

**Mr. Andre Steentjes, DVM:** *As far as I'm concerned, an astonishingly good result!!*

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## Test TRT vaccination with Nobilis Rhino CV

At the same rearing farm for broiler breeders a vaccination trial has been carried out to give protection against TRT, also known as Swollen head syndrome. Consultation between all stake holders has taken place before the application took place to discuss all possible scenarios. Mr. Luc Snoeijen, DVM: As far as I am concerned, this is an appropriate result for this 'vaccination trial', which shows that the FVX-sprayer device with the vaccine Nobilis Rhino CV vaccine can be used for a successful TRT vaccination.

## TRT-titers

**January 27, 2022** : 3 houses with rearing broiler breeders of 31 days old (born 27/12/21) intended for 2 broiler breeder farms. In all 3 houses, 10 blood samples were first taken for measuring the titer (O-measurement) (ELISA TRT). Subsequently, two X-sprayers were used for TRT vaccination with Nobilis Rhino CV from MSD Animal Health.

**February 17, 2022** : Exactly 21 days after vaccination with Nobilis Rhino CV, per house 10 blood samples were collected for the vaccination to be determined again.

Conclusion of veterinarian Mr. Luc Snoeijen, DVM: **February 25, 2022.** We are now a month further and the results have been received from the trial with the TRT vaccine Nobilis Rhino CV in combination with the FVX-Sprayer device at the Kemperman Poultry Farm. Prior to the vaccination, on January 27, blood samples were taken in all three houses for a baseline measurement of the serological TRT titres. This includes the following GD results and average TRT titres:

IP2022-01865: House 1: avg. 6.9

IP2022-01866: House 2: avg. 4.2

IP2022-01867: House 3: avg. 2.2

Exactly 7 days after vaccination, on February 3, 10 trachea swabs were taken from one barn (house 1), which were individually tested for the presence of TRT virus, with the aim of detecting the virus in the upper respiratory tract. Unfortunately, TRT virus has not been discovered. Although this negative result was a surprise, it turns out not to be very unusual. The TRT virus is difficult to find back, which could explain the negative trachea swabs. There was therefore no reason to believe that the vaccination was not successful and no negative conclusions could be drawn yet. For this, one had to wait patiently for the serological titer determinations 21 days after vaccination. And they finally arrived. Exactly 21 days after vaccination, on February 17, blood samples were again collected in all three stables for serological testing. These average titers then show an titer increase in all three houses:

IP2022-03227: House 1: avg. 8.1

IP2022-03228: House 2: avg. 7.4

IP2022-03229: House 3: avg. 6.9

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House	27 January (Titer before vaccination)			17 februari (Titer 21 days after vaccination)			Volume of water in FVX-sprayer
	Average	Standard Deviation	Spread	Average	Standard Deviation	Spread	
1	6,9	2,96	<1 - 10	8,1	1,72	6 - 12	1L
2	4,2	3,74	<1 - 9	7,4	1,51	5 - 9	1L
3	2,2	2,74	<1 - 9	6,9	2,64	<1 - 9	1L

"As far as I am concerned, this is an appropriate result for this 'vaccination trial', which shows that the FVX-sprayer device in combination with the Nobilis Rhino CV vaccine can be used for a successful TRT vaccination combination." Mr. Luc Snoeijen, DVM.

## Who can use the FVX-Sprayer?

The FVX-Sprayer is now tested to replace aerosol treatments in rearing farms for broiler breeders.

We believe it can be used in vaccinations where already similar droplet sizes are used with fogging and fine spray applications. This can be done for applications at rearing farms, breeding farms, and at farms with day old chicks. Please check with your veterinarian and supplier the possibilities of the vaccine and consult us. We might already have more experience with new applications, after publication of this paper. We are always curious to learn about new applications, with other vaccines, different type of farms, and different type of animals.

## Droplet size FVX-sprayer

Droplet size in micrometer / $\mu$ m	X10	X50	X90	capacity [ ml/min]	Nozzle / setting
Turbofogger ULV	13,7	41,2	76	150	1.0 nozzle
Ulvavac	52,5	67,4	93,6	58	Orange nozzle
FVX-sprayer	31,5	68,8	114,0	70	0.5 mm nozzle
Maruyama MSB15liDX battery backpack sprayer	49,7	126,3	210,7	722	Birchmeier nozzle duro+tol 1.3 high pressure

\* Changes reserved. Version November 2022.