

The **FASTest® BOR in TICK** were tested in two rounds.

The first round 10 ticks were tested with the **FASTest® BOR in TICK** and with a PCR from the University of Hannover on the 19<sup>th</sup> of Feb 2014.

In the second round 22 ticks, provided by a Dutch health institute, by 31.03.2014 were also tested with the **FASTest® BOR in TICK** and with a PCR from the University of Hannover.

The first 10 ticks were middle size to engorged ticks, collected from different animals. The results of the first round are shown below in table 1. Only one tick was detected as positive by the PCR. The **FASTest® BOR in TICK** also showed a positive test result for tick 10 and a very slight positive for tick 9.

Material: Tick

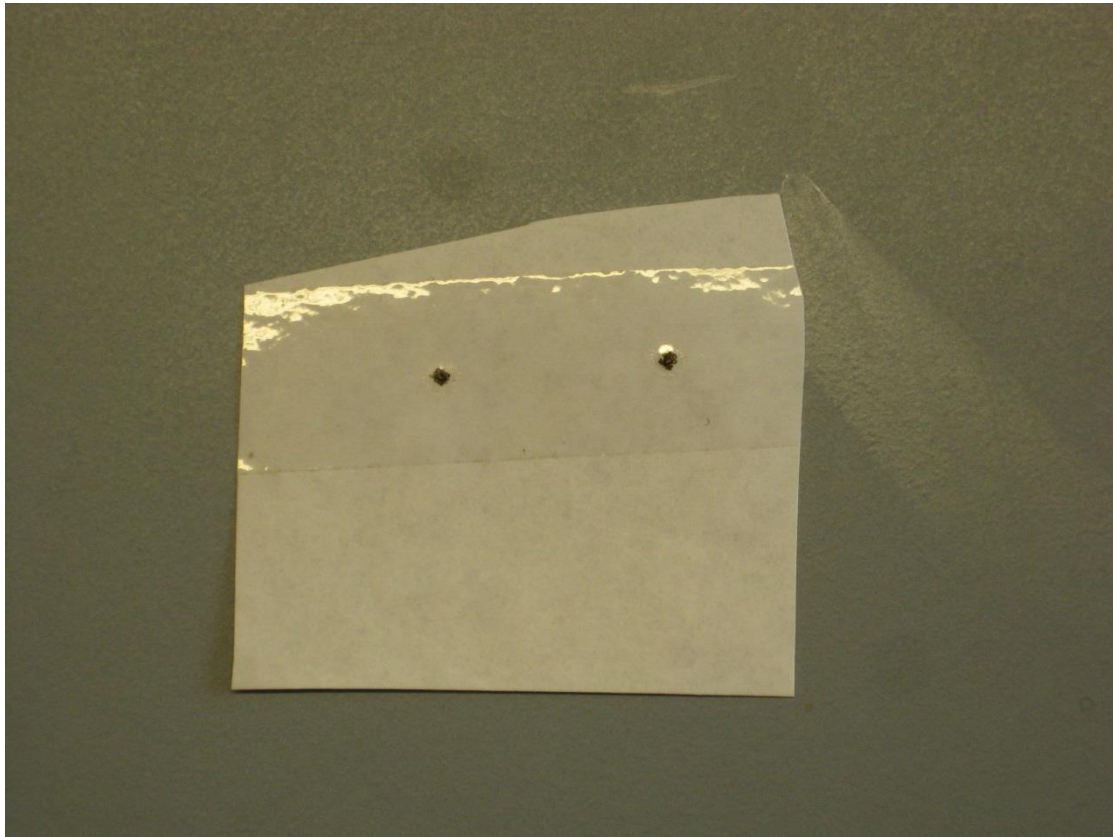
Target: **FASTest® BOR in TICK** for the detection of borrelia antigens

Untersuchungsnummer	Tieridentifikation	Ergebnis	
14/744-1	1	Negativ	Übereinstimmung (1)
14/744-2	2	Negativ	Übereinstimmung (1)
14/744-3	3	Negativ	Übereinstimmung (1)
14/744-4	4	Negativ	Übereinstimmung (1)
14/744-5	5	Negativ	Übereinstimmung (1)
14/744-6	6	Negativ	Übereinstimmung (1)
14/744-7	7	Negativ	Übereinstimmung (1)
14/744-8	8	Negativ	Übereinstimmung (1)
14/744-9	9	Negativ	Übereinstimmung (1,5)
14/744-10	10	Positiv	Übereinstimmung (2)

Table 1

In the second 22 ticks were small to middle size ticks from the Dutch health institute. In total, we received 50 ticks, problem with the received ticks were that a majority of the ticks were very small, already fully dried and glued on a small piece of paper (like shown on picture 1). These ticks could not be crushed properly and the state of the ticks made a testing highly problematic. Nevertheless 6 of these kind of ticks were tested with the numbers (x-G), the other ticks were middle sized ticks and ticks provided in a sample tube. The test results are shown in table 2.

Some PCR results showed unclear test results in PCR, the tests will be repeated.



Picture 1

Sample number	Identification	PCR result	Tick test result
31032014-01	1-G	Negative (1)	Negative (1)
31032014-02	2-G	Unclear result	Negative (1)
31032014-03	3-G	Negative (1)	Negative (1)
31032014-04	4-G	Negative (1)	Negative (1)
31032014-05	5-G	Negative (1)	Negative (1)
31032014-06	6-G	Unclear result	Negative (1)
31032014-07	1	Unclear result	Negative (1)
31032014-08	2	Positive (2)	Positive (2)
31032014-09	3	Unclear result	Positive (2)
31032014-10	4	Positive (2)	Positive (2)
31032014-11	5	Negative (1)	Negative (1)
31032014-12	6	Negative (1)	Negative (1)
31032014-13	7	Negative (1)	Negative (1)
31032014-14	8	Positive (2)	Weak Positive (1/2)
31032014-15	9	Negative (1)	Negative (1)
31032014-16	10	Negative (1)	Negative (1)
31032014-17	11	Negative (1)	Negative (1)
31032014-18	12	Negative (1)	Very Weak Positive (1)
31032014-19	13	Negative (1)	Negative (1)
31032014-20	14	Negative (1)	Negative (1)
31032014-21	15	Negative (1)	Negative (1)
31032014-22	16	Negative (1)	Negative (1)

Table 2

- (1) No *Borrelia burgdorferi* antigens were detected
- (2) *Borrelia burgdorferi* antigens were detected

**Dried, on paper glued ticks:**

All 6 ticks were tested negative.

Overall it was nearly not possible to test the ticks with the tick test. Testing of dried, very small ticks (especially glued on a paper) is not recommended.

Rapid test:                6 Negative  
 PCR test:                4 Negative  
 PCR test:                2 Unclear results

➔ Very small, not engorged ticks, like shown on picture 1, should not be tested.

**Engorged ticks:**

Ticks are in best state for testing. The bowel of the ticks can thoroughly be crushed which provides best sample fluid.

Rapid test:                1 Negative        and        3 Positive  
 PCR test:                0 Negative        and        2 Positive  
 PCR test:                2 Unclear results

➔ Generally best tick sizes for testing.

**Small ticks**

The majority of ticks were small ticks that had the approximate size of a pinhead. These ticks could be thoroughly crushed and used for testing.

Rapid test:        10 Negative        and        2 Weak Positive  
 PCR test:        11 Negative        and        1 Positive

In summary, it must be noted that the testing of fully dried ticks with the rapid test does not work properly. Only testing of fresh ticks that have already sucked is only recommended.

First test round:  
 Correct Negative: 8  
 False Positive: 1                                Weak Positive  
 Correct Positive: 1  
 False Negative: 0

Sensitivity:  $1/1+0= 100\%$   
 Specificity:  $8/9=88,88\%$

Second test round:  
 Correct Negative: 14  
 False Positive: 1                                very Weak Positive  
 Correct Positive: 3                                (one Weak Positive)  
 False Negative: 0

4 results were unclear results in PCR and will be retested.  
 The 4 ticks are not part of the following calculation.

Sensitivity:  $3/3+0 = 100\%$   
Specificity:  $14/15 = 93,33\%$

Summary of the current results:

Correct Negative:  $8+14=22$   
False Positive:  $1+1=2$   
Correct Positive:  $1+3=4$   
False Negative:  $0+0=0$

Sensitivity:  $4/4= 100\%$   
Specificity:  $22/24=91,67\%$

Accuracy:  $26/28 = 92,9\%$

The above sensitivities and specificities depend on the user, if the test is read properly with the recommendations of using proper lightning and knowledge of the test.  
Especially weak positive signals may be hard to read for the untrained user.