

## SHORT COMMUNICATION/NOTA PRÉVIA

### Seroprevalence of antibodies against group A rotavirus in cattle from a pioneer frontier in Brazilian Amazon

### Soroprevalência de anticorpos anti-rotavírus do sorogrupo A em bovinos de uma fronteira pioneira na Amazônia brasileira

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#### SUMMARY

Rotavirus is a worldwide etiologic agent of diarrhea, responsible for large economic losses. We studied the seroprevalence of antibodies to group A rotavirus in cattle in 67 smallholder farms from Uruará municipality, using counterimmunoelectroosmophoresis with the NCDV strain as a standard antigen. Prevalence of positive smallholder farms was 95.6-100%. Significant differences were seen between age groups when the seropositivity rose from the youngest to the oldest groups and between females and males older than 1 year, when the seropositivity was higher in the first group.

**KEY-WORDS:** Seroepidemiologic studies. Antibodies. Rotavirus. Cattle. Amazonia.

Rotavirus is an etiologic agent of diarrhea in many species, causing large economic losses and playing an important role in human gastroenteritis. We studied the seroprevalence of smallholder farms positive to group A rotavirus antibodies in cattle in Uruará municipality, Eastern Amazon, Pará state and the association between sex, age and seropositivity. Sample size was calculated with EpiInfo (EpiInfo 6.04b 1997, CDC, Atlanta), using a N of 4200 smallholder farms, confidence level of 90%, desired absolute precision of 10 % and expected prevalence of 50%, resulting a n of 67 farms, randomly sampled with SPSS (SPSS for Windows 9.0.1, SPSS Inc., IL), whose mean herd size was 29.5 animals, ranging from 5 to 70. A total of 1955 serum samples were collected from male and female bovines (*Bos taurus* x *Bos indicus* bred dual-purpose cattle), classified in 4 age groups: 1 to 30 days, the most sensitive to infection and diarrhea <sup>6</sup>, 31 days to 6 months, when there is a fall in maternal antibodies <sup>6</sup>, > than 6 months to 1 year (reproductive maturity) and older > 1 year, when a higher seropositivity is expected <sup>2</sup>.

Counterimmunoelectroosmophoresis (CIEOP) was carried out with NCDV rotavirus strain grown in MA-104 cells

as a standard antigen, concentrated by ultracentrifugation (100,000g) in 45% saccharose cushion and re-suspended in Tris 10mM/CaCl<sub>2</sub> 1.5mM pH 7.3. Glass slides (5x7 cm) were covered with 1% agarose gel and runned with 12 mA/ slide/ 60', adding 10 mL of serum and 10 mL of standard antigen in the respective wells and a positive-control rabbit anti-NCDV hyperimmune serum. A serum was positive when it produced a precipitation line between serum and standard antigen wells, similar to that observed with positive control. Randomly selected positive sera (1/farm) and rabbit anti-NCDV hyperimmune sera were re-tested in CIEOP with NCDV-free MA-104 cells to evaluate nonspecific reactions. A farm with at least one positive serum in CIEOP was considered positive. Association between sex and positivity and age group and positivity was evaluated by one-sided chi-square test (critical values chi-square > 3.84 and p<0.05).

Farm-level seroprevalence was 100% (95.6-100%, 90% CI). Animal-level farm-specific positivity ranged from 30.8 to 100% (mean 71%, sd 16.3%). The 67 positive sera and the anti-NCDV hyperimmune sera tested against NCDV-free MA-104- antigen gave negative results. Seropositivity showed an increasing trend related to age groups (Tab. 1 and 2). Between

females and males, there was a significant difference between those older than 1 year (Tab. 3), with a higher seropositivity in the females' group. These findings can be explained by conditions to which animals are exposed, as high population density, lack of separation by age groups and lack of disinfection in corrals and other facilities, which can enhance the preservation of infectious viral particles<sup>4,9</sup>. In farms where swine, chickens and cattle share common areas, interespecies transmission is possible<sup>3,8</sup>. Dogs, cats and wild animals can contribute to rotavirus spreading among bovine populations<sup>10</sup>, as well as transmission between men and bovines<sup>5</sup>. In group 1 to 30 days, antibodies may be originated from colostrum

and milk. The fall in the seropositivity observed in the following age group (31 days-6 months) is in accordance with the fall in titers of antibodies of maternal origin in bovine<sup>6</sup>. Older animals, resistant to diarrhea but susceptible to infection, develop stronger humoral immunoresponse than do the newborns<sup>1,2,7</sup>. Significant gender difference was observed in cattle older than 1 year, what might be due to management practices: once reaching reproductive age, females are more handled than when they were younger and than males. Close relationship between females and their calves and a higher number of females than males may also contribute to such a result.

**Table 1**

Seropositivity to antibodies against group A rotavirus by CIEOP in bovine sera samples. São Paulo, 2000.

Age Group	Gender			
	Female		Male	
	Number tested	% positive	Number tested	% positive
1-30 days	30	66.7	25	72
31 days – 6 months	202	47.5	156	42.9
>6 months – 1 year	155	62.6	80	56.3
>1 year	1134	85.4	173	69.9

**Table 2**

Qui-square values, p-values and degrees of freedom (df) and comparisons between seropositivities of different age groups. São Paulo, 2000.

Compared groups	Chi-square	p	df
1 – 30 days and 31 days – 6 months	10.59	0.0011	1
31 days – 6 months and > 6 months – 1 year	12.6	0.0004	1
> 6 months – 1 year and > 1 year	65.44	0.0000	1

**Table 3**

Qui-square values, p-values and degrees of freedom (df) and comparisons between seropositivities of females and males. São Paulo, 2000.

Age groups (females and males)	Chi-square	p	df
1 – 30 days	0.18	0.6700	1
31 days – 6 months	0.74	0.3886	1
> 6 months – 1 year	0.88	0.3470	1
> 1 year	26.07	0.0000	1

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In conclusion, it could be found that rotavirus antibodies are highly prevalent in the surveyed area, where rotavirus can be a problem to the improvement of cattle breeding. Also, seroprevalence to anti-group A rotavirus antibody was found to rise in accordance with the animals'

age group, an information that can help the development of preventive measures, as choosing of the best vaccination age and the age-linked separation of animals in the surveyed area and other areas with similar weather and management conditions.

## RESUMO

O rotavírus é um agente etiológico de diarreias de distribuição mundial, responsável por grandes prejuízos econômicos. Pesquisou-se a soroprevalência de anticorpos anti-rotavírus do sorogrupo A em bovinos criados no município de Uruará, utilizando a técnica da contraímunoelutrosmofore com a amostra NCDV como antígeno padrão. A prevalência de propriedades positivas foi de 95.6-100%. Diferenças significativas foram observadas entre as sucessivas faixas etárias, quando a soropositividade aumentou dos grupos mais jovens para os mais velhos, bem como entre fêmeas e machos maiores de 1 ano, quando a soropositividade foi maior no primeiro grupo.

**PALAVRAS-CHAVE:** Estudos soropidemiológicos. Anticorpos. Rotavírus. Bovinos. Amazônia.

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