CLINICAL RESEARCH NOTE

THE PREVALENCE OF NEUTRALIZING ANTIBODIES TO INFECTIOUS BOVINE RHINOTRACHEITIS (IBR) IN CATTLE IN ALBERTA

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The virus of infectious bovine rhinotracheitis (IBR) contributes to bovine respiratory disease in Alberta and in recent years has caused many abortions in certain herds (2).

In a survey made in 1962 before IBR became recognized as a clinical problem in Alberta (5) nearly 40% of adult cows were found to carry antibodies to IBR. It was considered worthwhile to determine whether the greater incidence of clinical IBR now being experienced was reflected in more serologically positive cattle. Vaccination which was not being practiced in Alberta in 1962 is now widely used and should influence the percentage of cattle with neutralizing antibodies.

Sera for this survey were obtained from two sources, the entries in the 1972 Calgary Spring Bull Sale and every tenth sample coming to our laboratory under the Brucellosis Control Area (BCA) scheme during the period November 1971 to February 1972, inclusive. Herds with less than ten samples under the BCA scheme were excluded.

In all, 457 samples were obtained from bulls (mainly from Calgary, Lethbridge and Edmonton districts) and 627 samples (five from bulls) were obtained from a wide selection of herds under the BCA scheme. The BCA samples were from all areas of Alberta except the extreme south. Sera were kept frozen at −15° until tested.

In each case an attempt was made to determine the age and IBR vaccination status of the animals and the census area of Alberta (1) in which it was raised. Vaccination status was determined in 574 of the 627 BCA animals and in all but two of the bulls. All bulls were born in 1970 but the BCA animals varied in age (Table III).

For determining the virus neutralizing titer in tissue culture we have used the microtechnique described by McKercher (3, 4) modified in two ways, 25 $TCID_{50}$ instead of 100 $TCID_{50}$ were added to each well of the Micro-Test[1] plates and dilutors and droppers delivering 0.05 ml instead of 0.025 ml were used. The same medium (10% fetal calf serum in Eagles MEM) was employed. This was supplemented by antibiotics, penicillin 400 I.U./ml, streptomycin 400 μgm/m and Fungizone[3] 2.5 μgm/ml. Virus neutralizing titer of serum is here defined as the reciprocal of the dilution of serum producing inhibition of 25–50% $TCID_{50}$ in bovine fetal kidney monolayers. As serum is further diluted with an equal volume of virus suspended in culture medium, this is taken into account in calculating the serum dilutions in each tissue culture well. In this study cattle having virus neutralizing titers of four have been regarded as negative as suggested by the frequency distribution of titers in the cattle population. Those with titers over four are regarded as positive.

The percentage of serologically positive cattle approached 100 among the vaccinated cattle in both groups and high titers were more frequent in the vaccinated than unvaccinated cattle (Tables I and II). Of 339 non-vaccinated bulls 102 (31%) were positive Table I). Among BCA samples, of 394 non-vaccinated, 229 (58%) were positive (Table I).

The frequency of positive titers by age group in BCA cattle is presented in Table III. The proportion of samples positive for IBR in the non-vaccinated cattle rises from 48% in those born in 1966–1970 to 60–70% in those born earlier. The lower proportion of positive titers in non-vaccinated bulls (31%) than in non-vaccinated BCA cattle (58%) may be due to the BCA cattle being older. The possibility of sex influencing the titers cannot of course be dismissed but as shown on Table III the titers in the younger BCA females (those born 1966–1970) correspond more closely (48% positive) to the percentage in the bulls.

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[1]Falcon tissue culture multi-welled plates, Becton, Dickinson & Co., Canada Ltd., Clarkson, Ontario.

[2]Cooke Engineering Co., Alexandria, Va. 22314.

[3]Grand Island Biological Co., New York 14072.

TABLE I

PERCENTAGE OF SERA POSITIVE FOR IBR NEUTRALIZING ANTIBODY IN VACCINATED AND NON-VACCINATED CATTLE

Source of Sera	No. of Samples	% Positive
Calgary Bull Sale		
Vaccinated	116	97
Non-vaccinated	339	31
Total	455	47
BCA Cattle		
Vaccinated	180	91
Non-vaccinated	394	58
Total	574	68

TABLE II

PERCENTAGE DISTRIBUTION OF TITERS IN 180 KNOWN VACCINATED AND 394 KNOWN NON-VACCINATED BCA CATTLE[a]

Titer[b]	Vaccinated	Non-vaccinated
NEG	9	42
8	8	7
16	15	9
32	16	11
64	22	16
128	18	8
256	7	4
512	5	3

[a]Titrations were not carried beyond 1/32 in the bull sera.
[b]Reciprocal of serum dilution.

TABLE III

DISTRIBUTION OF POSITIVE SERA ACCORDING TO AGE GROUP IN 229 NON-VACCINATED BCA CATTLE

Year of Birth	No. of Cattle	Percent Positive
1956-60	20	62
1961-65	114	70
1966-70	95	48

In general, the proportion of positive animals was comparable among the different census areas of Alberta with the exception of the Peace River Area. On further examination it was found that a large herd in this area had contributed 25 samples, all positive but one, to the total of 44 samples tested from this area.

The different sampling technique used in the present study compared with that used earlier (5) had little influence on the result. When the percent positive was calculated from the reaction of the first two samples of a herd, as in 1962, the value was 52.6% instead of 58%.

Positive reactions to IBR are therefore slightly more frequent today in BCA samples than in our survey ten years ago, but as the micro-technique now in use may be more sensitive than the test employed earlier, it is likely that the distribution of the virus has not seriously changed since the 1960's. Thus although the virus of IBR has been the cause of a large number of abortions in recent years (2) this new role does not appear to be due to a wide general increase in the frequency of infected animals.

While this note was in preparation the results of a similar survey (6) done in Saskatchewan became available. While there are differences in technique and interpretation the results resemble those we obtained on the comparable BCA samples.

Summary

Sera from cattle in Alberta of known vaccination status with respect to Infectious Bovine Rhinotracheitis have been surveyed for neutralizing antibodies to this virus. Samples from two groups of cattle, the Calgary Bull Sale and the Brucella Control Area (BCA) scheme, were available. The percentage of positive cattle approached 100 in vaccinates of both groups. Of the non vaccinated cattle, 31% of the bulls and 58% of the BCA cattle were positive. Distribution of neutralizing antibody titers according to age suggested that the difference between the two groups was most likely due to the differences in ages. Compared with a survey of ten years ago, there does not seem to have been any great increase in percentage of positive cattle.

Résumé

L'auteur a procédé à la recherche d'anticorps neutralisant le virus de la rhino-trachéite infectieuse, dans le sérum de bovins de l'Alberta dont il connaissait le statut relatif à la vaccination contre cette maladie. Il disposait d'échantillons provenant de deux groupes distincts: des taureaux offerts en vente à Calgary et des bovins impliqués dans le programme d'éradication de la brucellose. Le nombre de sujets positifs atteignit près de 100%, chez les vaccinés des deux groupes. Quant aux non-vaccinés, 31% des taureaux et 58% des sujets impliqués dans le programme d'éradication de la brucellose s'avérèrent positifs. La répartition des titres d'anticorps neutralisants, en fonction de l'âge, indiquait que les variations entre les deux groupes étaient vraisemblablement reliées aux différences d'âge. D'après une étude effectuée dix ans auparavant, il ne semble pas s'être produit une augmentation appréciable du pourcentage de sujets positifs.

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ANALYSE DE VOLUME

Précis d'incubation, d'élevage et de pathologie du dindon. J. Nicolas. Éditeur Maloine S.A., 27 rue de l'École de Médecine 75006, Paris. 1972. 237 pages.

Cette monographie sur l'élevage industriel du dindon représente une contribution importante de l'auteur aux éleveurs qui choisissent ce genre d'élevage afin de concurrencer les autres producteurs de viandes. La conversion alimentaire du dindon permet de réaliser cette ambition si des normes d'élevage, d'alimentation et de contrôle des maladies sont mises en application.

Dans la première partie, traitant de l'incubation, l'auteur insiste sur l'hygiène et la propreté de l'œuf, des incubateurs et éclosoirs ainsi que des locaux d'entreposage et de manutention. De nombreux détails sont utiles pour l'obtention de dindonneaux sains et vigoureux.

La partie sur l'élevage demande une certaine adaptation au lecteur canadien. Le climat, les races de dindons et les conditions du marché nous obligent à construire des bâtiments bien isolés, chauffés et pourvus d'un bon système de ventilation. Cet ouvrage ne contient que quelques illustrations de poulaillers sans aucun détail de construction et de ventilation.

Les chapitres sur l'alimentation sont précis et contiennent plusieurs tableaux faciles à consulter. Il n'y est pas question de réglementation sur les additifs mais comme celle-ci varie d'un pays à l'autre, il aurait fallu trop élaborer pour traiter ce sujet.

La pathologie du dindon est étudiée dans la quatrième partie de cet ouvrage. Ici, l'auteur nous fait bénéficier de son expérience pratique, ce qui est très valable. Par contre, on peut se demander pourquoi dans une étude comme celle-ci, on fait mention de produits commerciaux. Pour le pathologiste, plusieurs assertions de l'auteur lui sembleront discutables; l'évolution rapide en ce domaine et l'apparition de nouvelles conditions pathologiques permettent d'élaborer des hypothèses que des travaux de recherches pourront confirmer ou infirmer.

Bref, cet ouvrage mérite d'être consulté pour les nombreux renseignements sur l'élevage du dindon; il a été écrit pour les éleveurs européens mais il peut aussi être recommandé à nos vétérinaires, techniciens et éleveurs. *R. Filion.*