Plates were examined for characteristic colonies of C. renale. Pure colonies were obtained by subculturing on BA plates. Smears from the growths were stained by the Gram technique for identification of cellular morphologies. C. renale was identified as described elsewhere (4, 5).

Results and discussion
Out of the 40 urinary bladder urine samples examined C. renale was isolated from 5 (12.5 %) of the samples. Of the 24 samples from the males, 4 (16.7 %) were positive and among the 16 female samples, 1 (6.3 %) was positive. The difference in the infection between the male and female cattle was statistically significant (P < 0.001).

Corynebacterium renale has been isolated from both apparently healthy cows and from cows showing signs of pyelonephritis in other parts of the world. The isolation of C. renale from an infected kidney and some urine samples in cattle (1) and from urinary bladder samples of cattle in this study shows that the organism is not restricted to temperate zones. Although C. renale infection is more common in female cattle than in males (3), this study has shown that males can also be infected to some extent.

Acknowledgements
The authors wish to thank Mr. Ugo CHUKWU for the technical assistance.


Forty urinary bladders were collected from apparently healthy cattle slaughtered at the Zaria abattoir. Twenty-four (60 %) were from male animals and 16 (40 %) from females. Urine samples were obtained and cultured for Corynebacterium renale. Four (16.7 %) of the samples from males and 1 (6.3 %) from females were positive. The difference in infection between the sexes was statistically significant (P < 0.001). Key words : Slaughtered cattle - Urine sample - Corynebacterium renale - Nigeria.

References

Association of Klebsiella organisms with pulmonary lesions in sheep

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Introduction
Klebsiella organisms can be found as saprophytes in soil and water and in the genital, respiratory and digestive tract of healthy animals (2, 4, 10). It has been stated as a cause of contagious metritis, abortion and sterility in equines (6, 9, 16, 17) and mastitis in cattle (14, 18, 19). It has also been isolated from cases of diarrohea and suppurative lesions in foals (7, 12), pneumonia in goats (8), gangrenous mastitis in ewes (11), diarrohea and urinary tract infections in dogs (5, 13, 15) and metritis and mastitis in pigs (2).

The present communication describes pulmonary lesions caused by Klebsiella organisms in sheep slaughtered at the Al-Ahsa abattoir, Saudi Arabia.

Materials and Methods
Small nodules were occasionally seen on the chest wall and in the lungs of sheep slaughtered at the Al-Ahsa abattoir, Saudi Arabia. These were associated with pleural adhesions, adhesions between lungs and diaphragm and enlargement of regional lymph nodes. The lesions were examined and samples from lungs and mediastinal lymph nodes were fixed in 10 % formalin for histopathology. Representative samples were taken for bacteriology. The present study was based on six cases.

Pathological methods
Tissue samples were processed in paraffin and sections stained with haematoyxlin and eosin (HE), Ziehl-Neelsen (ZN) stain and periodic acid schiff method (PAS).

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Reçu le 15.10.90, accepté le 6.11.1990.
Bacteriological methods

Smears were prepared from lung nodules and mediastinal lymph nodes, heat fixed and stained with Gram's and ZN stains. The nodules were incised with a sterile blade and the cut surface inoculated in 10% sheep blood agar. Conventional bacteriological procedures were applied. Identification of isolates was made according to COWAN (3) and KREIG and HOLT (12).

Results

The nodules on the chest wall and in the lungs were glintening white in colour, firm with smooth appearance and measured about 2-5 mm in diameter (photo 1). They projected from the lung surface under the thickened raised pleura. Surrounding lung tissue was rather consolidated and difficult to cut. The nodules contained yellowish inspissated cheesy material with granular appearance. The mediastinal lymph nodes were markedly enlarged and rough surfaced. The cut surface had a yellowish granular appearance.

Histopathological examination of lung sections showed well encapsulated caseous nodules with distinct layers; a central rather loose zone of necrosis followed by a more compact necrotic layer, then a narrow zone of infiltrating neutrophils followed by a cellular connective tissue layer containing mononuclear cells and outermost by a relatively less cellular connective tissue capsule. Surrounding lung tissue was atelectatic (photos 2, 3). Hypertrophy of alveolar cells, hyperplasia of bron-
chial epithelium and presence of suppurative exudate in bronchi were also seen. Pleura was thickened with fibrosis.

Similar caseated nodules were seen in lymph node sections, some coalescing to form diffuse irregular areas of necrosis replacing normal lymphoid tissue (photo 4). Sections stained with ZN or PAS were negative for acid fast organisms or fungi.

**Bacteriological findings**

One type of bacteria was isolated in the pure form; the biochemical results are presented in table 1. The organism was diagnosed as Klebsiella pneumoniae subspecies ozaenae (12).

**TABLE I  Biochemical results with K. pneumoniae subspecies ozaenae isolated from lung.**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth on MC</td>
<td>(+)</td>
</tr>
<tr>
<td>Catalase</td>
<td>+</td>
</tr>
<tr>
<td>Oxidase</td>
<td>-</td>
</tr>
<tr>
<td>Urease</td>
<td>(+)</td>
</tr>
<tr>
<td>Arabinose</td>
<td>-</td>
</tr>
<tr>
<td>Lactose</td>
<td>(+)</td>
</tr>
<tr>
<td>Dulcitol</td>
<td>+ Trace of gas</td>
</tr>
<tr>
<td>Maltose</td>
<td>+ Trace of gas</td>
</tr>
<tr>
<td>Mannitol</td>
<td>+ Trace of gas</td>
</tr>
<tr>
<td>Rhamnose</td>
<td>+</td>
</tr>
<tr>
<td>Xylose</td>
<td>+</td>
</tr>
<tr>
<td>Sucrose</td>
<td>(+)</td>
</tr>
<tr>
<td>Sorbitol</td>
<td>-</td>
</tr>
<tr>
<td>Salicin</td>
<td>-</td>
</tr>
<tr>
<td>Malonate</td>
<td>-</td>
</tr>
<tr>
<td>Lysine</td>
<td>-</td>
</tr>
</tbody>
</table>

(+ = positive after 7 days incubation.

**Discussion**

Klebsiella pneumoniae subspecies ozaenae was the only organism isolated from the lung nodules in the pure form. K. ozaenae, previously described as a separate species, now considered as a metabolically inactive biogroup (subspecies) of K. pneumoniae (12). The organism may not be easily classified due to the great variability in biochemical characters (1). Thus the present strain was only able to ferment lactose and sucrose, hydrolyse urea and utilize citrate as sole source for carbon after continuous incubation for seven days at 37 °C. Moreover, in the absence of serology it is difficult to distinguish a metabolically active strain of K. pneumoniae subspecies ozaenae from a strain of K. pneumoniae (12).

K. pneumoniae has been evidenced as a cause of contagious mertis, abortion and sterility in equines (10, 16, 17) and mastitis in cattle (14, 18, 19). It has also been isolated from cases of diarrhoea in foals (6), pneumonia in goats (8) and gangrenous mastitis in ewes (11). In dogs the organism has been associated with diarrhoea and urinary tract infections (5, 13).

Information on the association of Klebsiella organism with pathological conditions in sheep appears to be scanty and the present report suggests that such infections could be prevalent.

**References**