

## Anaplasmosis in imported deer - The need for stringent regulatory guidelines -

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### 수입 사슴에서의 anaplasmosis

-관리 대책 마련을 위한 제언-

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초 록 : 최근 우리나라는 anaplasmosis 유행 지역으로부터 사슴을 비롯한 반추수를 수입하고 있다. 이처럼 리켓치 아성 질환을 비롯한 원충성 질병의 국내 유입 기회가 높아지고 있다. 그러나 사슴에서의 anaplasmosis 에 대한 연구 보고 예는 접할 수 없었다. 1993년 전라북도의 한 사슴 목장에서는 호주 등지로부터 수입한 250 여두의 사슴에서 빈혈을 수반한 심한 쇠약증세를 나타내는 20마리 사슴의 혈액도말 표본을 Giemsa stain 과 acridine orange stain 방법으로 진단하였던 바, 이 중 8 마리에서 *Anaplasma* spp가 관찰되었기에 anaplasmosis 에 의한 경제적 손실을 최소화하는데 일익을 도모하고자 사슴에서의 anaplasmosis 발병을 보고하는 바이다.

Key words : deer, anaplasmosis, anemia

In this short communication, the authors try to highlight the potential dangers of unregulated importation of deer into Korea. Eight deer out of 20 red deer imported from Australia in 1993 tested positive for anaplasmosis. This paper further highlights the fact that deer are also susceptible to other diseases such as blue tongue, bovine respiratory syncytial virus, epizootic hemorrhage disease and tuberculosis. Many

of these disease are zoonotic.

Anaplasmosis is an infectious hemoparasitic disease of ruminants. The disease is characterized by anemia, weight loss, abortion and death.<sup>1,2</sup> Survivors are lifelong carriers of the infection and enjoy lifelong immunity.<sup>3</sup> The causative agent in cattle, goat and deer is the rickettsial organism *Anaplasma*. The disease is transmitted both biologically by ticks and

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mechanically by biting flies and contaminated fomites such as needles.

In recent years, Korea has experienced an influx of imported deer from countries such as Australia and New Zealand. However, it is a well known fact that many areas of USA, Canada and Australia are enzootic to anaplasmosis. The presence of large numbers of carrier deer is one of the factors responsible for the maintenance of a high prevalence of *Anaplasma* infection among cattle kept in the same environment.

Anaplasmosis in deer was first reported in the Columbian black-tailed deer and in the Virginia white-tailed deer by Christensen *et al.*<sup>4</sup> The organism was reported as *Anaplasma marginale*. Kreier *et al.*<sup>5,6</sup> and Smith *et al.*<sup>7</sup> reported the possible role of the deer as a reservoir of *A. ovis* and *A. marginale* respectively. Another way to ascertain which species of *Anaplasma* infects deer is that described by several authors.<sup>8</sup> Infected blood from the deer was subinoculated into a splenectomized calf and sheep in order to confirm the agent. There were no hematologic or serologic changes observed in the calf 3 months post-infection. On the other hand, the sheep developed clinical anaplasmosis. Information on wildlife disease in Korean game animals is rather scarce. However, Back *et al.*<sup>9</sup> reported death of 250 goats among 800 goats imported from Australia in 1993. The causative organism was *Anaplasma ovis*. The present diagnosis of 20 sick deer was reached upon examination of blood films stained with Giemsa (Fig 1) and acridine orange. The acridine orange-stained intraerythrocytic



bodies were very clear under ultraviolet light. This is the first report of deer anaplasmosis in Korea. It is difficult to differentiate the different *Anaplasma* species.<sup>10</sup> Diagnostic serology lacks specificity due to cross reactivity among the different *Anaplasma* species. Most of the published observations have been based on the complement-fixation test (CFT) data and the rapid card agglutination test (RCA), both of which lack adequate sensitivity.<sup>11</sup> However, the RCA test has been reported to be specific when used on non-bovine test samples such as elk<sup>12</sup> or Columbian black-tailed deer.<sup>13</sup> However, Jeon *et al.*<sup>14</sup> reported the successful use of the indirect fluorescent antibody test to detect bovine anaplasmosis in Korean bovine blood samples.

One method of detection of infectious agents that is increasingly being used as an alternative to serologic tests (CFT and RCA) is nucleic acid hybridization. A DNA probe is about 400 times more sensitive than methods based on microdetection of stained erythrocytes.<sup>15</sup> A probe with a detection limit of 0.0035% parasitemia due to *A. ovis* in goats has been constructed.<sup>16</sup>

According to the Ministry of Agriculture and Fisheries Annual Report, about 2,871 deer were imported into the country during 1993. One of the reasons given for this sudden increase is the emerging demand for newly budding horns and blood from deer by the Korean for use as an oriental drug for good health. A form of control should be instituted to screen deer on arrival into Korea and before their ultimate destination. This is necessary not only because of epizootic diseases such as anaplasmosis,<sup>12,13,17</sup> blue tongue, bovine respiratory syncytial virus, epizootic hemorrhage disease,<sup>18</sup> theileriosis<sup>19</sup> and tuberculosis.<sup>20</sup> The occurrence of anaplasmosis and other hemotropic diseases in imported and indigenous deer in Korea has received little attention so far with the implementation of the UR Agreement. There is potential danger of importing into Korea epizootic disease of domesticated and wild animals from foreign countries unless stringent regulatory measures are instituted. The availability of highly sensitive and specific diagnostic technology would facilitate the realization of these regulatory efforts.

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