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☐ **Brief Communication** ☐

Setaria marshalli infection in neonatal calves

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Abstract: A total of 50 filariid worms of *Setaria* spp. was recovered from the peritoneal cavity of three neonatal calves infected with the Akabane virus. The parasites were identified as *S. marshalli* by their morphological characteristics. Males were 41-52 mm long and females 68-98 mm. Most of them were fully matured, indicating that the calves were infected prenatally. This is the first report of prenatal infection in calves by *S. marshalli* in Korea.

Key words: *Setaria marshalli*, calf, Akabane virus, prenatal infection, Korea

Filarid worms of the genus *Setaria* are commonly found in the peritoneal cavity of ungulates. They are several centimeters long, milkish color and tapering posteriorly (Soulsby, 1982). One of them, *S. digitata*, is normally found as an adult in the peritoneal cavity of cattle and buffaloes in Asia, including Japan and Korea (Jubb *et al.*, 1985). However, migration of immature forms of the parasite in abnormal hosts such as sheep and goats, causes epizootic cerebrospinal nematodiasis (also called lumbar paralysis), when it invades the brain and spinal cord (Jones and Hunt, 1983; Radostits *et al.*, 1994).

The prevalence of *Setaria* spp. in Korean native cattle has been reported. Kim *et al.* (1968) examined the abdominal cavities of adult cattle at slaughter houses in Cheju and reported the infection rate of 5% with *S. digitata*. In a later work carried out at the Chonju abattoir it was found that about 57% of cattle were infected with *S. digitata* (Paick *et al.*, 1976). In a recent, extensive work carried out again at the Chonju abattoir, Rhee *et al.* (1994) found that 34.2% of cattle were infected with *Setaria* spp; by both light and scanning electron microscopy they identified *S. digitata* and *S. marshalli*. In the present study we report three neonatal Holstein calves found to be infected with *S. marshalli*.

The first case, male Holstein calf one-day-old was admitted to the Pathology Division, National Veterinary Research Institute (NVRI) on January 26, 1993. The calf had symptoms of arthrogryposis (deformities of the limbs and vertebral column, caused by fixation of joints) suggestive of Akabane virus infection of its dam during pregnancy. It was the third calf of the dam.

The second case, female stillborn Holstein calf was admitted to the Pathology Division, NVRI on November 18, 1994. It was the first calf of the dam and showed signs of arthrogryposis. The third case, male, stillborn Holstein calf was admitted to the Pathology Division, NVRI on December 23, 1994. It was the fourth calf of the dam, which had a history of having a stillborn calf with Akabane virus infection. The calf showed signs of arthrogryposis. Antibodies to Akabane virus were detected in the abdominal, and thoracic fluid or cerebrospinal fluid of the three calves.

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Table 1. The number and sizes of *Setaria marshalli* recovered from the peritoneal cavity of three neonatal calves

	case 1	case 2	case 3	Length (mm)	
				Range	Mean ± S.D.
Male	5	8	3	41-52	47.75 ± 11.58
Female	14	12	8	68-98	84.00 ± 7.23
Total	19	20	11		

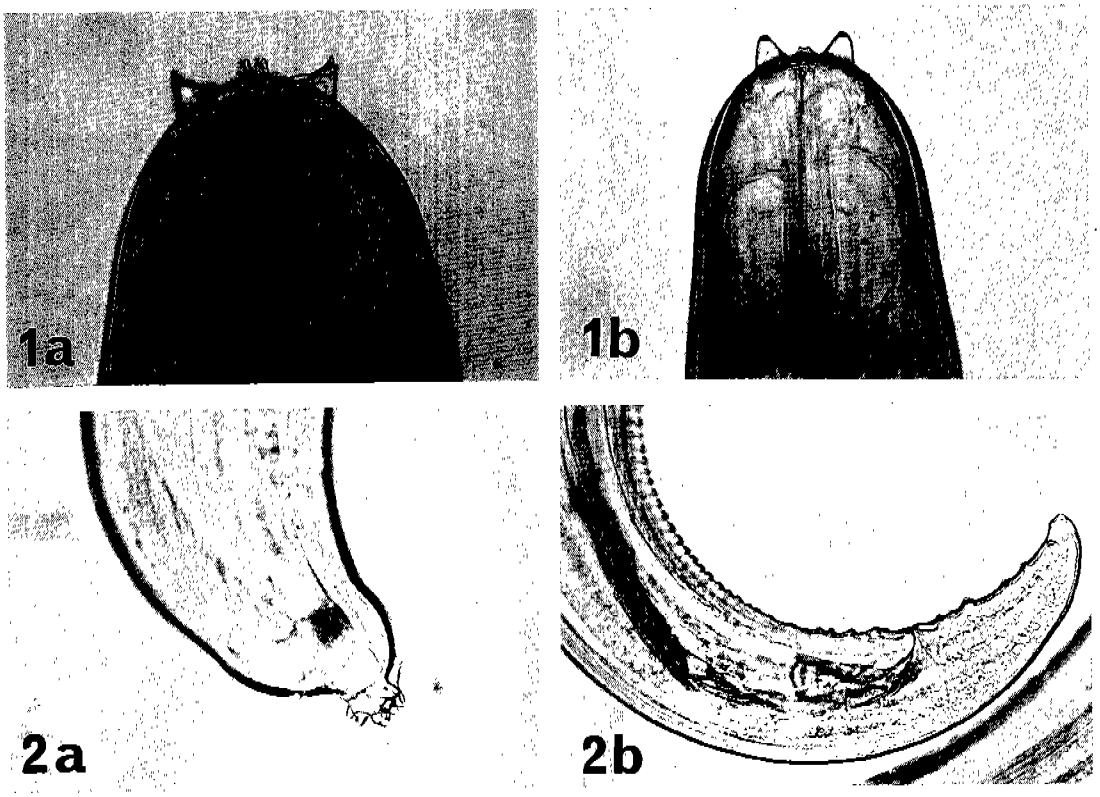

Fig. 1. Light micrograph of the anterior part of *Setaria marshalli*. **a**, female; **b**, male. **Fig. 2.** Light micrograph of the posterior part of *Setaria marshalli*. **a**, female; **b**, male.

The number and sizes of worms recovered from the peritoneal cavities of the three neonatal calves are shown in Table 1. The parasites were identified as *S. marshalli* by their morphology (Rhee *et al.*, 1994). Of the 50 worms recovered, 16 were males and the rest females. Males were 41-52 mm long and females 68-98 mm. In both males and females, in anterior part, the peribuccal crown bore dorsal and ventral projections, and the lateral lips were adjacent to the buccal aperture. Females had bifid lateral lips (Fig. 1a) and males non-bifid lateral lips (Fig. 1b). The tail of the female bears a blunt terminal end which was roughly furcated (Fig. 2a), and males had clear lateral appendages on the slightly bent posterior end (Fig. 2b) in the posterior part.

Infection of cows during early pregnancy with the Akabane virus results in the production of calves with congenital arthrogryposis or hydranencephaly. Abortion and stillbirth are other variable manifestations of the infection. The dam is not affected. The virus, which is transmitted by mosquitoes, has

been isolated from naturally occurring cases in calves (Radostits *et al.*, 1994). In the present cases, however, the Akabane virus infection was verified by the detection of antibodies to the virus in the calves. The disease has been recorded as a series of epizootics in cattle in Korea.

Microfilariae of *Setaria* spp. are taken up from the peripheral blood of the infected animal by bloodsucking mosquitoes which transmit the disease to others. Infective larvae have been shown to develop in the thoracic muscles of mosquitoes such as *Aedes*, *Culex*, and *Anopheles* spp. (Soulsby, 1982). In cattle, *Setaria* spp. migrates only to the abdominal cavity where it reaches maturity in 8-10 months. The calves in the present report were infected with *S. marshalli* and the parasites were fully matured when they were recovered, suggesting that the calves were infected prenatally. Prenatal infection has been recorded with a number of *Setaria* spp. (Soulsby, 1982; Radostits *et al.*, 1994; Fuji *et al.*, 1995). Fuji *et al.* (1995) reported that *S. marshalli* has not been detected in cattle older than 2 years. They suggested that prenatal infection with *S. marshalli* is the common type, while postnatal infection is rather uncommon.

S. digitata was the only species known to infect Korean cattle (Kim *et al.*, 1968; Paick *et al.*, 1976). In a recent work it has been shown that *S. marshalli* is also present in cattle in Korea, although *S. digitata* is the dominant species (Rhee *et al.*, 1994). The results in the present report support the latter work and suggest that more attention be given to the pathogenicity of *S. marshalli*.

REFERENCES

Fujii T, Hayashi T, Ishimoto A, Takahashi S, Asano H, Koto T (1995) Prenatal infection with *Setaria marshalli* (Boulenger 1921) in cattle. *Vet Parasitol* **56:** 303-309.

Jones TC, Hunt RD (1983) Veterinary Pathology. 5th ed. p809-813, Lea & Febiger, Philadelphia.

Jubb KVF, Kennedy PC, Palmer N (1985) Pathology of domestic animals. Volume 2. 3rd ed. p338-339, Academic Press, Orlando.

Kim SH, Kim CS, Lee BJ (1968) Survey of the internal parasites of Cheju cattle. *Korean J Vet Res* **8:** 92-97.

Paick YK, Rhee JK, Baek BK, Lee SB (1976) Studies on epizootic cerebrospinal setariasis. I. Infection rate of *Setaria digitata*. *J Korean Vet Med Assoc* **12:** 81-87.

Radostits OM, Blood DC, Gay CC (1994) Veterinary Medicine. 8th ed. p1274-1275, Bailliere Tindall, London.

Rhee JK, Choi EY, Park BK, Jang BG (1994) Application of scanning electron microscopy in assessing the prevalence of some *Setaria* species in Korean cattle. *Korean J Parasitol* **32:** 1-6.

Soulsby EJL (1982) Helminths, arthropods and protozoa of domesticated animals. 7th ed. p316-319, Bailliere Tindall, London.

=초록=

신생송아지의 마샬사상충 감염

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아케바네병에 이환되어 관절만곡증을 보이는 1일령의 송아지 1두와 사산된 송아지 2두의 복강내에서 총 50마리의 *Setaria*를 수집하였다. 송아지는 모두 Holstein종이었으며, 기생충은 형태학적 특징에 의해 마샬사상충으로 동정되었다. 충의 길이는 수컷 41-52 mm, 암컷 68-98 mm로 대부분 성충의 크기에 속했다. 이러한 사실은 마샬사상충이 어미의 태반을 통해 송아지에 감염되었음을 의미한다. 이 종례는 마샬사상충이 어미소의 태반을 통하여 송아지로 감염된 국내 최초의 보고이다.

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