Occurrence of Equine Dermatophytosis in Hokkaido

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Abstract. A clinical and mycological investigation on equine dermatophytosis was performed in Hokkaido during a one-year period in 1978. The animals investigated were raising light horses on 7 farms and heavy draft horses in 3 race courses. The infection rates were 21.9~100% and 8.6~18.8% in the light and the draft horses, respectively. The seasonal occurrence of equine dermatophytosis was especially high in the light horses from July to September in the pasture feeding stage and in the draft horses between July and October in the racing season. Lesions were usually found all over the body surface in the light horses. On the other hand, main lesions were observed at the chest in the draft horses. Trichophyton equinum was isolated as a causative agent of equine dermatophytosis, from all the horses and Microsporum canis from the hair and scale in some infected horses.

Dermatophytoses in Japan are commonly observed in cattle [6, 15] and increasingly in dogs and cats [7]. The occurrence of dermatophytosis among military horses was reported by Onizuka [10] and by Tsuji and Kuchii [14]. From 1945 to 1971, however, no cases had been reported on equine dermatophytosis, except one [8]. In 1972, the mass occurrence of dermatophytosis in race horses was reported by Hasegawa et al. [8] and Ichijo et al. [9]. It was considered that the infection might have been transmitted by race horses imported.

An investigation on the occurrence of equine dermatophytosis was conducted to examine whether it was actually prevailing in Japan or not.

Materials and Methods

Investigation was conducted on 520 raising light horses 1 to 4 years old and 507 heavy draft horses 3 to 4 years old on randomly selected 7 farms in the Hidaka and Tokachi districts and in 3 race courses in Asahigawa, Kitami and Obihiro cities in Hokkaido during a one-year period in 1978. The incidental frequency of equine dermatophytosis and the clinical findings of the horses infected were investigated.

Specimens of hair and scale were collected from skin lesions and inoculated directly on BBL Mycosel agar (MS). These agar plates were incubated at 30°C for 3 weeks. Growing fungi were isolated and identified by the morphological and nutritional characteristics. In addition, the pathogenicity was also studied by the experimental infection of guinea pigs.

Results

1. Incidental frequency
Table 1. Occurrence of dermatophytosis among raising light horses

<table>
<thead>
<tr>
<th>District</th>
<th>Form</th>
<th>Infection in 1978</th>
<th>Incidental frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of horses examined</td>
<td>No. of horses infected</td>
<td></td>
</tr>
<tr>
<td>Hidaka</td>
<td>A</td>
<td>200</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>82</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>55</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>Tokachi</td>
<td>G</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 2. Occurrence of dermatophytosis among heavy draft horses in each race course

<table>
<thead>
<tr>
<th>Race course</th>
<th>Infection in 1978</th>
<th>Incidental frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of horses examined</td>
<td>No. of horses infected</td>
</tr>
<tr>
<td>Obihiro</td>
<td>170</td>
<td>32</td>
</tr>
<tr>
<td>Kitami</td>
<td>175</td>
<td>25</td>
</tr>
<tr>
<td>Ashigawa</td>
<td>162</td>
<td>14</td>
</tr>
</tbody>
</table>

(1) Occurrence in raising light horses on 7 farms

Seven farms designated A to G, respectively, were investigated for the occurrence of dermatophytosis among raising light horses (Table 1). All of them, except farm G, were located in the Hidaka district. Farm G was in the Tokachi district. The incidental frequency was the highest, or 100% (25/25), on farm G and the lowest, or 21.9% (18/82), on farm D.

The seasonal incidence of dermatophytosis in the raising light horses on farm A is shown in Fig. 1. A total of 200 horses have been raised on this farm since February, 1978. This farm had 10 stables of 20 horses each. In March, 5 horses were infected with dermatophytosis for the first time. Although they were generally recovered within 3 to 4 months, the number of horses infected increased gradually up to July, when 61 were infected. The occurrence of the disease continued from March to October, the total incidental percentage being 80.5% (161/200). The incidental number of horses involved in each stable is indicated in Fig. 2. All the 20 horses were infected in every stable, except two stables, Nos. 2 and 7. The horses of the two stables were grazing on a pasture different from the pasture for the horses of the other stables in the daytime.

(2) Occurrence in heavy draft horses at race courses

Table 2 shows the occurrence of dermatophytosis in the heavy draft horses in the 3 race courses. The incidental frequency of the disease was 18.8, 14.2, and 8.6% in the Obihiro, Kitami, and Ashigawa race courses, respectively.

2. Clinical and mycological findings
In the raising light horses, skin lesions were initially found in areas of the head and the neck. They extended gradually over the whole body. As the initial signs of skin lesions, erection and floating of the hair were seen massively (Fig. 3). Then the hair fell out. The hairless lesions were covered with grayish scales, round in shape, and about 1 cm in diameter (Fig. 4). The horses were sensitive to the palpation of lesions in a few of them, erosion or hemorrhage was caused in lesions by scrubbing on the stable wall.

In the heavy draft horses, skin lesions appeared first at the chest and extending to the shoulder, abdomen, back and haunch. There were, however, few lesions on the neck (Fig. 5). These horses were sensitive to the touch on the skin lesion like the raising light horses.

Several fungi were isolated from hair and scale, as shown in Table 3. Of them, T. equinum (Fig. 6) was regarded as a causative agent, since it was isolated at the highest frequency, or 79.6%. Microsporum canis was also detected in 6 specimens from skin lesions.

Micromorphological examination on the isolate of T. equinum revealed that no macroconidia were produced, but that numerous microconidia were produced. The microconidia were oval or pyriform and 2.0–2.5×3.0–5.5 μm in size (Fig. 7). Nutritional examination revealed that T. equinum required nicotinic acid for development.

The pathogenicity of this fungus for guinea pigs was confirmed by the observation of hair invaded with fungal elements composed of arthrospores (Fig. 8).

**Discussion**

In 1972 to 1973, equine dermatophytosis may have been transmitted to Japan by horses imported [8, 9]. Since that time its occurrence has not been investigated especially in Hokkaido. It was clarified by the present investigation that the disease had been prevailing with a high incidence in some districts, particularly in Hokkaido, which is a main horse breeding area in Japan. In most horses infected skin lesions
are spread all over the body. So that infection is easily transmitted to healthy horses with contaminated saddles and hair brushes and by contact mostly on pasture. In the case of heavy draft horses wearing the number plate in the race, primary lesions may be observed mainly on both sides of the chest.

There are some differences in the seasonal occurrence of the infection between raising light horses and heavy draft horses. The infection was seen in the former during the feeding period on pasture, and in the latter especially in the racing season from July to October. This fact indicated that equine dermatophytosis was easily transmitted by contact with infected horses or contaminated saddles, robes and other equipments. The infection may occur by contact with walls and soil in the stable and hair brush [12].

Such prevalent fungi as *Aspergillus* and *Mucor* were also isolated from hair on the affected and healthy skin in the same manner [13]. In addition, *M. canis* was detected from 6 specimens, from two of which *T. equinum* was also detected. Carter et al. [1], Fischman et al. [4] and Hasegawa et al. [8] reported similarly that *M. canis* had been isolated from equine dermatophytosis. No human cases were found to have been caused by *T. equinum* in this investigation. There are a few reports on human cases due to this fungus [2, 3, 5, 11].

The horses investigated recovered from the disease in a few months after the onset, as was reported previously [12]. Since equine dermatophytosis is transmitted commonly to healthy horses during the latent period, an appropriate countermeasure is to be considered for the prevention of the disease.

References

要約
北海道における馬の皮膚真菌症の発生状況について、高島治介（食品薬品安全センター・栗野研究所）、茂・小西辰雄（帯広畜産大学・家畜内科）、田中一郎（エーサイ株式会社・製薬部）——本邦における馬の皮膚真菌症の最近の発生状況については十分検討されていない。そこでわれわれは、1978年に本邦でも馬の生産地として知られる北海道での発生状況について、臨床的ならびに真菌学的検索を行なった。対象地域は北海道内上川、日高、十勝および北見の4支庁管内で、軽種馬養成牧場と競走用競馬を管理している競馬場であった。7軽種馬養成牧場での発病率は、21.9～100%であり、対象牧場すべてに馬の皮膚真菌症の発生を認めた。また、3競馬場での発病率をみたところ、8.6～18.8%であり、いずれの競馬場でも本症の発生を認めた。発病の時期をみると、軽種馬では7～9月の放牧期に多く、競馬では7～10月の競馬開始時に多く、いずれも感染源や原因菌で汚染された馬具との接觸が発病に関係深いものと考えられた。皮膚病巣の発生部位は、育成馬では全身各所にわたることが多く、競馬ではジンケンの著然部位である胸部から病巣が始まる例が多くかった。すべての発病馬の病巣から共通してTrichophyton equinumが分離され、本菌が発病の主な原因と考えられた。また一部の発病馬からは、Microsporum canisが分離された。「M. canis」の本症発生における原因菌としての役割については、今後の検討すべき問題と思われた。以上の成績から、北海道における馬の皮膚真菌症は定着した疾患となっている。また本病が全国的に認められるものと考えられた。したがって、今後本病に対する適切な予防と治療対策が重要な衛生上の課題であると思われた。

Explanation of Figures

Fig. 3. Initial skin lesions of horse infected. Massive lesions have come up on the back (the raising light horse).

Fig. 4. Skin lesions of infected horses with loss of hair and gray-colored scales (the raising light horse).

Fig. 5. Skin lesions observed in places of back, chest, abdomen, and haunch (the heavy draft horse).

Fig. 6. T. equinum isolated from infected hair and scale and growing on MS medium.

Fig. 7. Microconidia of acladium type on the typical hyphal element in culture.

Fig. 8. Guinea pig hair invaded with T. equinum. Fungae sheath is composed of arthrospores.