

PROPHYLACTIC AND THERAPEUTIC USE OF A VACCINE AGAINST TRICHOPHYTOSIS IN A LARGE HERD OF SILVER FOXES AND ARCTIC FOXES

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Received June 28, 1990

Abstract

Rybníkář A., J. Chumela, V. Vrzal, F. Krys, Hana Janoušková: *Prophylactic and Therapeutic Use of a Vaccine Against Trichophytosis in a Large Herd of Silver Foxes and Arctic Foxes*. Acta vet. Brno, 60, 1991: 285–288.

The report describes the incidence of trichophytosis in a large herd of silver foxes and arctic foxes in Czechoslovakia. Out of 4 800 animals in the herd 25 silver foxes and 25 arctic foxes were clinically affected. The causative agent was identified as *Trichophyton mentagrophytes*. Prophylactic and therapeutic use of an experimental vaccine, prepared from a live *T. mentagrophytes* culture, was successful: trichophytosis was brought under control within 2 months of revaccination.

Trichophyton mentagrophytes, vaccination, fur animals

Data on the incidence of dermal mycoses in silver foxes (*Vulpes fulva*) and arctic foxes (*Alopex lagopus*) kept abroad have been described (Nikiforov et al. 1972; Nikiforov 1976; Woloszyn et al. 1983). In our country no major spread of this disease in herds of animals of these two species has occurred to date.

The appearance of dermatophytosis in a large herd of silver foxes and arctic foxes in Czechoslovakia described in the present study occurred at the end of 1988. Clinical skin lesions were first observed in two arctic foxes purchased from another herd. Although the clinically affected foxes were isolated, the infection spread to other animals. Skin lesions were found in 25 silver foxes and 25 arctic foxes, 4 weeks to 18 months of age, out of a total number of 4 800 animals. The lesions, 1 to 15 cm in size, were observed on various parts of the body: on the head (around the eyes and the nose and at the edges of the auricles), back, limbs and on the tail (see Plates XI, X and XI, Fig. 1 to 6). Circular mycotic foci with the hairs shed or broken were covered with grey-white scales and crusts. Isolation attempts from these lesions yielded the dermatophyte *Trichophyton mentagrophytes*.

Local treatment with Mycodekan for several months was of no avail. The trichophytic lesions were slow to recede and new ones continued to appear. Therefore it was decided to test a newly developed experimental vaccine against trichophytosis of furred animals.

Materials and Methods

The vaccine containing living *T. mentagrophytes* conidia as active ingredient was tested in 33 silver foxes aged 3 to 4 months. The animals were divided into two groups.

Group 1 consisted of 14 clinically healthy silver foxes that were kept in an environment where trichophytosis occurred. They were vaccinated with prophylactic doses of the vaccine: two i. m. 0.5 cm³ doses injected into the hind leg muscle 11 days apart. The animals were then examined for local and systemic postvaccination reactions and for possible appearance of clinical trichophytic lesions twice a week during a six-month period.

Group 2 consisted of 14 silver foxes with clinical trichophytosis of various extent (Fig. 1 to 6). These animals were injected with therapeutic doses of the vaccine: two i. m. 1 cm³ doses injected 11 days apart. They were then observed for possible postvaccination reactions and for the character of clinical mycotic lesions, compared with 5 non-vaccinated and non-treated silver foxes showing trichophytic lesions of originally the same extent as was seen in the vaccinated animals. These observations were conducted for 6 months.

Results

Group 1 animals injected with the prophylactic doses of the vaccine showed no undesirable systemic or local postvaccination reactions and did not develop trichophytosis during the 6-month observation period although they were kept in the infected environment.

In Group 2 there out of the 14 silver foxes injected with the therapeutic doses of the vaccine showed circumscribed postvaccination crusts of 0.5 to 1 cm in diameter. These foci disappeared spontaneously after about 3 weeks. The therapeutic effect of the vaccine was good. From the 2nd week after revaccination the crusts shown by the 14 therapeutically vaccinated animals were drying up and coming off. By the end of the 4th week new hair appeared at healed sites and the lesions persisted only at the edges of the auricles and on the limbs. Practically all vaccinated animals were without clinical signs of trichophytosis 8 weeks after revaccination.

The non-treated non-vaccinated controls developed further mycotic lesions and generalized disease during the experiment. They were sacrificed after 4 months in view of human health hazards. Their skins were unfit for further industrial processing: they were mostly without hair and were covered with scales and crusts.

Discussion

Mycotic diseases of fur animals have a serious economic impact not only because of the debasement of skin quality; they also impair the breeding programs and cause losses resulting from prohibition of the sale of such animals. Moreover, they constitute human health hazards. All these considerations made them the subject of several studies.

The causative agents of dermatophytosis of fur animals were studied by Sarkisov and Nikiforov (1981). Having examined 514 samples of relevant pathological material these investigators isolated the following cultures: *Trichophyton mentagrophytes*, *T. verrucosum* and *Microsporum canis* in 85.5 %, 7.5 % and 6.9 % of the cases, respectively. They found trichophytosis in animals of all age categories, beginning with those aged 18 to 20 days.

In our study clinical mycotic changes were likewise found in animals ranging from 4 weeks to 18 months of age. Since according to the afore-mentioned investigators the incubation period of this dermatophytosis is 14 to 30 days, it seems probable that the infection may occur as early as in the first days after birth.

Sarkisov and Nikiforov (1981) studied the development of immunity to trichophytosis in experiments with silver foxes and arctic foxes. They found that animals that had experienced trichophytosis did not develop disease after inoculation with a virulent *T. mentagrophytes* culture. In the light of this observation they developed a specific vaccine, Mentavak, containing a living *T. mentagrophytes*

culture in the lyophilized state. This vaccine has been produced commercially since 1984. Animals treated with Mentavak became immune by the 21st day after immunization and were protected against trichophytosis for at least 3 years. At the site of injection a scab of 2 to 6 mm in diameter developed 10 to 15 days after vaccination and came off spontaneously in 15 to 20 days. The same changes were observed by us in 3 out of the 14 silver foxes vaccinated therapeutically with our experimental vaccine. The circumscribed crusts disappeared in all these animals without further treatment. No post-vaccination crusts were found in any of the 14 silver foxes injected with prophylactic doses of our vaccine.

The prophylactic efficiency of the Soviet vaccine in the field amounted to 99.8 % according to Nikiforov (1981). The number of furred animals vaccinated with this vaccine was reported to exceed 5.5 million animals (Sarkisov and Nikiforov 1988).

The incidence of trichophytosis and the possibilities of its specific prophylaxis among silver foxes were also studied by Woloszyn et al. (1983) on 8 farms. They found *T. mentagrophytes*-produced dermatophytosis in 12 % to 76 % of animals in summer but in not more than 5.5 % in winter. As in our findings, mycotic foci were observed on the head, limbs, tail and, in some animals, all over the body. After administration of a living avirulent or a phenol-inactivated vaccine the number of diseased silver foxes was considerably reduced.

From the experience with antimycotic vaccines abroad it appears that specific immunoprophylaxis and immunotherapy of trichophytosis is an effective tool also in herds of fur animals. The results obtained with our experimental vaccine in a large herd of silver foxes and arctic foxes also promise well. At present, potency and safety tests of our vaccine in 1 800 fur animals are under way. The aim is a commercial vaccine that would confer reliable protection against dermatophytosis to silver foxes and arctic foxes.

Profylaktické a léčebné použití vakcíny proti trichofytóze ve velkochovu lišek stříbrných a pesců modrých

Je popsán případ výskytu trichofytózy ve velkochovu lišek stříbrných a pesců modrých v Československu. Z celkového stavu 4 800 kusů bylo klinicky postiženo 25 lišek a 25 pesců. Jako původce onemocnění byl zjištěn dermatofyt *Trichophyton mentagrophytes*. Profylaktické a léčebné použití pokusné vakcíny, připravené ze živé kultury *T. mentagrophytes*, bylo úspěšné. Trichofytóza byla touto metodou do dvou měsíců od revakcinace utlumená.

Профилактическое и лечебное применение вакцины против трихофитоза в промышленном содержании черно-бурых лисиц и голубых песцов

Приводится описание наличия трихофитоза в промышленном содержании черно-бурых лисиц и голубых песцов в Чехословакии. Из общей численности 4 800 животных клинически заболевали 25 лисиц и 25 песцов. Бозбудителем заболевания был установлен дерматофит *Trichophyton mentagrophytes*. Профилактическое и терапевтическое при-

менение подготовленной на живой культуре *T. mentagrophytes* пробной вакцины проходило успешно. Трихофитоз благодаря данному методу до двух месяцев со дня ревакцинации дошел до стадии затухания.

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Fig. 1. Trichophytic lesions on the head of a silver fox.

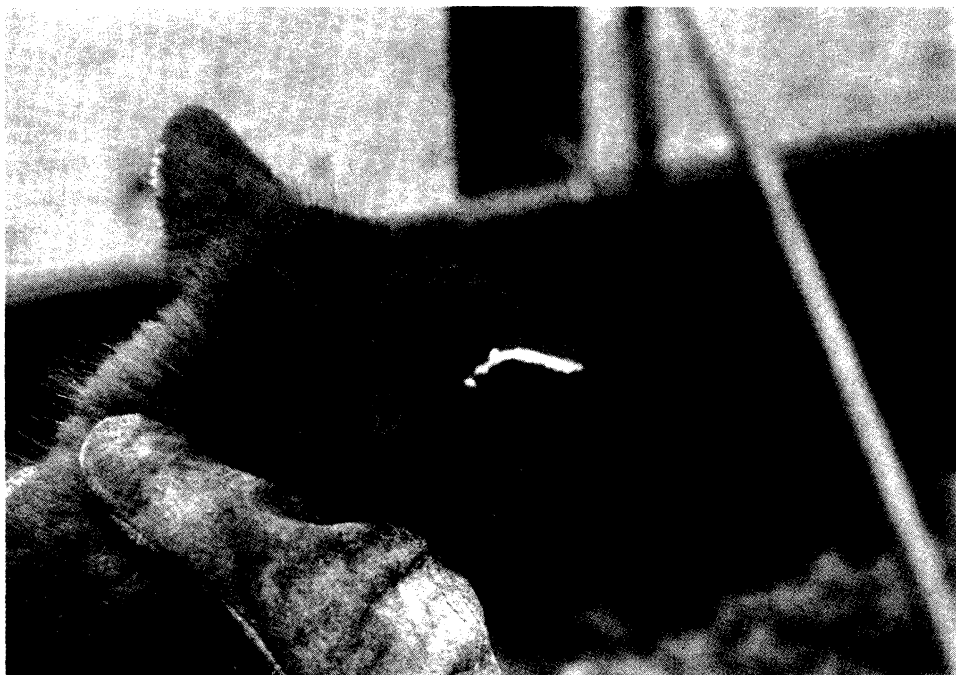


Fig. 2. Trichophytic lesions at the edges of the auricles.



Fig. 5. A trichophytic focus on the tail and on the auricle of a silver fox.



Fig. 6. A silver fox with trichophytic foci on the head and limbs.