

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

H. W. Manter Laboratory Library Materials

---

1966

Translation of Muratov, E. A. 1966. Kroveparazit roda *Nuttallia* Franca ot domovoi myshi (*Mus musculus* Lin.) [= A blood parasite of the genus *Nuttallia* from the house mouse, *Mus musculus*]. *Dokl. Tadzhik SSR* 9(5): 34-47

E. A. Muratov  
*Academy of Sciences, Tadzhik SSR*

Frederick K. Plous Jr.  
*University of Illinois*

Follow this and additional works at: <https://digitalcommons.unl.edu/manterlibrary>



Part of the [Parasitology Commons](#)

---

Muratov, E. A. and Plous, Frederick K. Jr., "Translation of Muratov, E. A. 1966. Kroveparazit roda *Nuttallia* Franca ot domovoi myshi (*Mus musculus* Lin.) [= A blood parasite of the genus *Nuttallia* from the house mouse, *Mus musculus*]. *Dokl. Tadzhik SSR* 9(5): 34-47" (1966). *H. W. Manter Laboratory Library Materials*. 72.

<https://digitalcommons.unl.edu/manterlibrary/72>

This Article is brought to you for free and open access by DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in H. W. Manter Laboratory Library Materials by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

COLLEGE OF VETERINARY MEDICINE  
UNIVERSITY OF ILLINOIS  
URBANA, ILLINOIS

TRANSLATION NO. 27

Translated from Russian by Frederick K. Plous, Jr.  
Edited by Norman D. Levine

Muratov, E. A. 1966. Kroveparazit roda Nuttallia Franca ot domovoi myshi (Mus musculus Lin.). [A blood parasite of the genus Nuttallia from the house mouse.] Dokl. Tadzhik. SSR 9(5):34-47.

On the 12th of March, 1964, near a cattle farm situated on territory belonging to the Tiger's Ravine preserve (zapovednik Tigrovaya balka), 4 house mice (Mus musculus Lin.) were caught and their blood smears fixed in alcohol and stained with Romanovsky-Giemse solution. Microscopic examination of the smears from one of the mice revealed round or ovoid endoglobular parasites 1.2 x 1.2 and 1.2 x 2.4  $\mu$  with one chromatin mass. The parasite cytoplasm was pale blue, the nucleus ruby red. From 13-29 April another 17 mice were caught in another area of the preserve 30 km. from the first, located in a tugay forest. We found parasites, highly varied in size and shape (Fig. 1), in 7 of them.

The parasites were round, ovoid, piriform or ameboid. Each type could be small or large. Thus, the large piriform ones reached 4, 5, or 6  $\mu$  but were found seldom and only in certain periods of parasite development. The ovoid and round forms also reached large sizes. Along with these, tiny parasites were also encountered; up to 4, 6 or even more were present in a single erythrocyte. The maximum number that we saw was 11 in one erythrocyte. They were either the same or different sizes. The tiny ones often formed the figure of a cross, dividing the parasite into 4 parts. When this happened the piriform parasites most often had their broad ends toward the periphery. At a certain stage of parasite development the erythrocytes collapsed and the parasites entered the blood plasma, where they might lie singly or collect into agglomerations of several individuals. Free, isolated parasites were found in smears all the time. Some were cross-shaped. Most had a single chromatin mass. In the piriform parasites, it was near the rounded end, while in the ameboid forms there might be 2, 3 or more chromatin masses lying on the periphery. Parasites were seen both in the center and on the periphery of the host erythrocyte. The tiny piriform ones were more often encountered singly and sometimes in pairs. They lay parallel and unconnected at the narrow ends. The large piriform parasites might reach a size equal to the diameter of the erythrocyte and lay singly or in parallel pairs. As is apparent from this description, the parasite is characterized by a strong polymorphism, as a result of which its differential diagnostic is made more complicated. As a parasite of mammals it belongs to the family Piroplasmatae. Determination of the genus, however, is awkward. On the basis of the large, piriform parasites occupying the whole erythrocyte, the parasite could be a member of the genus Smithia Franca, 1910, and the species Smithia microti, found in the blood of Microtus incertus, but the cross-shaped forms were most often piriform and were attached by their broad ends. Nor could the multiple

forms be compared. Large piriform parasites and cross-shaped piriform ones lying round-end-to-periphery are found in Achromaticus vesperuginis Dionisi, 1898 (4), but this parasite has hitherto been found only in bats. In 1963 and 1964 we did catch bats of the species Vespertilio pipistrellus in the area where we caught the house mice, but no blood parasites were found in them. Nor is it known whether house mice are susceptible to blood parasites of the genus Achromaticus. In most of its structural features the parasite of the house mouse can be assigned to the genus Nuttallia Franca, 1910, which has round, oval, large and small pear-shaped forms, as well as a cross form. Nuttallia is also known to occur in the mouse-like rodents. Thus, in 1963 M. V. Krylov and Z. L. Zhanina (1) observed a blood parasite described as a new species Smithia tadzhikistanica in blood smears from a red-tailed gerbil found in the same preserve, Tiger's Ravine. In 1964, while conducting a revision of the genera Smithia and Nuttallia, Krylov (2) came to the conclusion that the genera Smithia Franca, 1910, and Nuttallia Franca, 1910, were identical and that one generic name, Nuttallia Franca, 1910, ought to be used for them.

The question arises whether the blood parasite we found in the house mouse shouldn't be assigned to the same species as described by Krylov and Zhanina as Smithia tadzhikistanica. The red-tailed gerbil (Meriones erythrorus Gray) and the house mouse (Mus musculus Lin.) live in the same territories; moreover, the mice often settle in burrows abandoned by the gerbils or along with the gerbils, which are known to carry ticks, the vectors of blood parasites. All evidence is on hand to support cross-transmission and adaptation of the blood parasites to both hosts. In 1962 E. A. Muratov and M. V. Krylov (3) conducted experimental work with a strain of Smithia tadzhikistana from a red-tailed gerbil. The strain was used to expose a series of experimental animals: calves, rabbits, guinea pigs and white mice. Two red-tailed gerbils were inoculated as controls. Only the gerbils fell ill, the other animals proving resistant to the strain. In 1964 a strain from a house mouse infected with Nuttallia musculi was used by us in experiments performed in cooperation with G. N. Shakhmatov. Calves, rabbits, red-tailed gerbils, a Turkestan rat, puppies, 2 susliks and 6 white mice were inoculated in the experiment. The controls were 2 white mice. The house mice, white mice and the susliks became infected with the strain. From these experiments it is apparent that Smithia tadzhikistanica and our parasite from the house mouse are different species. Only red-tailed gerbils are susceptible to the first and white mice are immune, while white mice, house mice and susliks are susceptible to the second, and red-tailed gerbils are immune. There are several structural differences between these 2 parasites which we give in the table.

Of the rodent parasites belonging to the genus Nuttallia Franca 1910 (4) we know of Nuttallia herpestidis Franca, 1910, found in the blood of the Pharaoh mouse (Herpestes ichneumon) in the environs of Lisbon. This parasite as described does not resemble ours from the house mouse in a number of features: the pear-shaped forms do not exceed 1.5-1.9  $\mu$ ; the round ones do not exceed 0.5-1.0  $\mu$ , while at the same time our pear-shaped forms reached a diameter equal to that of the erythrocyte itself--6  $\mu$ . Infection of another Pharaoh mouse could not be effected, while our house mouse were easily infected, as were white mice and susliks. According to mammologist, G. S. Davydov (6), the house mouse inhabiting the Tiger's Ravine is Mus musculus Lin. The

literature also speaks of Nuttallia muris Coles, 1910 and Nuttallia microti Coles, 1924 (5) in field mice. In view of our lack of a complete description of these parasites it is impossible to decide whether the parasite from the house mouse is identical to one of these or whether it is a new species. Therefore we are limiting ourselves to a description of the structure and several biological data on the parasite from the Tiger's Ravine house mouse, to which we assign the preliminary name Nuttallia musculi Muratov, n. sp., 1965, pending further detailed studies of the properties of this parasite.

Institute of Zoology and Parasitology  
Academy of Sciences of the Tadzhik SSR

Submitted 4/II. 1965

#### LITERATURE

1. M. V. Krylov and Z. L. Zanina. Tr. Instituta zoologiyi i parazitologiyi Akademiyi Nauk Tadzhikistanskoy SSR, Zoologiya i parazitologiya. 24 (1963), 169-170 [Proc. Inst. Zool. Parasit. Acad. Sci. Tadzhik SSR., Zool. Parasit. 24 (1963), 169-170].
2. M. V. Krylov. Acta Protozoologica. 2 (20) (1964), 202-206.
3. Ye. A. Muratov and M. V. Krylov. Doklady AN Tadzhik. SSR, 6 (1) (1963), 49-52 [Rep. Acad. Sci. Tadzhik SSR. 6 (1) (1963), 49-52].
4. C. Franca. Sur la classification des piroplasmes et description de deux formes de ces parasites. Arch. Real. Inst. Bacteriol. Camara Pestana 3, 1910, 11-18.
5. V. L. Yakimov. Bolezni domashnikh zivotnykh, vyzyvayemyye prosteishimi (Protozoa). [Diseases of domestic animals caused by Protozoa.] Moscow-Leningrad, 1931.
6. G. S. Davydov. Materialy po ekologiyi nekotorykh gryzunov polivnoy zony Yugo-Zapadnogo Tadzhikistana. Tr. AN Tadzh. SSR. 51. Dushanbe, 1933 [Materials on the ecology of some rodents of the irrigated zone of southwest Tadzhikistan]. Proc. Acad. Sci. Tadzhik SSR. 51. Dushanbe, 1933.

TABLE

---

Smithia tadjikistanica Krylov et  
Zanina, 1963 (from red-tailed gerbil)

---

Nuttallia musculi n. sp. (from house  
mouse)

---

Forms: oval (46.4%), ameboid (39.3%) and  
pear-shaped (14.8%).

Round, oval, pear-shaped, ameboid forms.

Number of parasites in erythrocyte 1 to 4.

Parasite extremely polymorphic. Number  
of parasites may be 1 to 11.

Pear-shaped forms situated on periphery  
of erythrocyte--oval and ameboid forms  
equally divided between periphery and  
center.

All forms situated both in center and on  
periphery.

Dimensions of parasites: 1.25 to 2.4  $\mu$   
wide and 2.4 to 3.5  $\mu$  long. Most parasites  
2.50 to 3.75  $\mu$ .

Dimensions of parasites fluctuate within  
wide range from 0.5 to 5 and 6  $\mu$  in the  
presence of an erythrocyte diameter of  
6  $\mu$ . Largest forms are pear-shaped and  
oval.

Nucleus consists of one compact chromatin  
mass in pear-shaped parasites, most often  
at large end.

Nucleus of one chromatin mass in pear-  
shaped forms. In the round and oval may  
be single or 2 chromatin masses, in latter  
case they may be situated polarly. In  
ameboid forms there may be something of a  
chromatin mass along periphery.

Division in 4 in form of cross with pear  
shapes having pointed ends toward periphery.

Division into 4, more often with large  
end of pear pointed toward periphery, less  
often with pointed end outward.

Free forms of parasite seldom found.

Free forms encountered all the time,  
especially during periods of mass rupture  
of erythrocytes, at height of invasion.

Erythrocyte infection rate by parasites  
is low.

Infection of erythrocytes by parasites  
reaches 50% or higher.

Can be passed to red-tailed gerbils success-  
fully with an incubation period of 10 to  
26 days.

Can be passed successfully to house mice  
with incubation period of from one to 21  
days. Young mice get infected faster than  
adults.

Susceptible to parasite are: red-tailed  
gerbils (Meriones erythrourus). Non-  
susceptible: calves, rabbits, guinea  
pigs and white mice.

Susceptible are: house mice (Mus musculus  
Lin.), white mice (Mus musculus var. alb.)  
and susliks (Spermophilopsis leptodactilus).

Unsusceptible: calves, puppies, rabbits,  
Turkestan rats and red-tailed gerbils.