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http/urn:lsid:zoobank.org:pub:7582919E-6169-4561-8EA8-3ADEC57990C6

E. A. Litvinova[1,*)], M. N. Litvinov[2)], T. O. Markova[1)], N. V. Bykovskaya[1)], M. V. Maslov[2)]. SEASONAL DYNAMICS OF ABUNDANCE OF THE FLEA *NEOPSYLLA BIDENTATIFORMIS* (SIPHONAPTERA: HYSTRICHOPSYLLIDAE) PARASITIZING ON THE GREAT LONG-TAILED HAMSTER IN PRIMORSKII KRAI. – Far Eastern Entomologist. 2017. N 330: 29-32.

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Summary. The data on the seasonal dynamics of abundance of *Neopsylla bidentatiformis* (Wagner, 1893) (Siphonaptera: Hystrichopsyllidae) parasitizing on the great long-tailed hamster *Tscherskia triton* (de Winton, 1899) (Rodentia: Cricetidae) in Primorskii krai are given.

Key words: Siphonaptera, Hystrichopsyllidae, Neopsyllinae, fleas, parasites, biology, ecology, Russia.

Е. А. Литвинова, М. Н. Литвинов, Т. О. Маркова, Н. В. Быковская, М. В. Маслов. Сезонная динамика численности блохи *Neopsylla bidentatiformis* (Siphonaptera: Hystrichopsyllidae) при паразитировании на крысовидном хомячке в Приморском крае // Дальневосточный энтомолог. 2017. N 330. С. 29-32.

Резюме. Приводятся оригинальные данные по сезонной динамике численности блохи *Neopsylla bidentatiformis* (Wagner, 1893) (Siphonaptera: Hystrichopsyllidae) при паразитировании на крысовидном хомячке *Tscherskia triton* (de Winton, 1899) (Rodentia: Cricetidae) и в его гнёздах в Приморском крае.

Ecology of the flea *Neopsylla bidentatiformis* (Wagner, 1893) are studied sufficiently in different parts of the area (Goncharov, 1963; Zhovtii, 1968; Letov & Letova, 1970). The data on the abundance, life cycle and seasonal dynamics of this flea when parasitizing on a striped field-mouse (*Apodemus agrarius* Pallas, 1771), reed vole (*Microtus fortis* Büchner, 1889) and dahurian hamster (*Cricetulus barabensis* Pallas, 1773) in Primorskii krai have been published (Litvinov & Litvinova, 2003, 2015, 2016). In this report the data on seasonal dynamics, female physiological age and the number of generations of *N. bidentatiformis* parasitizing on a great long-tailed hamster (*Tscherskia triton*) in Primorskii krai are analyzed.

MATERIAL AND METHODS

Materials were obtained by authors during the field recearches in Ussuriyskii, Mikhailovskii, Oktyabrskii, Pogranichnii, Khankaiskii districts of Primorskii krai from 1989 to 2014. The rodents were caught with the help of “Gerro” mashers and alive catchers. The excavating of rodent burrows was done by second author. In total, 146 rodents were caught and combed out, 34 burrows were excavated, 2874 specimens of *N. bidentatiformis* were collected.

The determination of female physiological age follows to Urgenson (1982). The following indexes are used: AI – abundance index, the mean number of flea specimens per one host

individual (rodent AI) or one burrow (housing AI); LI – loyalty index (%), the percentage of the flea specimens collected on the hosts (rodent LI) or in the burrows (housing LI) to the total collected specimens.

RESULTS AND DISCUSSION

During the winter (from the beginning of November to the middle of March) a hamster is in its housing and does not go out onto the surface that is why fleas can be met only in housings. The flea abundance in the housing before animal's hibernation is usually high (housing AI = 54,2). At the end of winter and in early spring the abundance of fleas is minimal in both hamster and burrow (Fig. 1).

In spring the host activity is raising and, as a result, flea abundance index on rodents increases too. In April the abundance of fleas on hamsters is maximal (rodent AI = 8), while in burrow remain low. In May, when females of hamsters are nursing their posterity, they leave their housings very seldom and flea abundance in housings increases (Fig. 1) but it reduces on rodents.

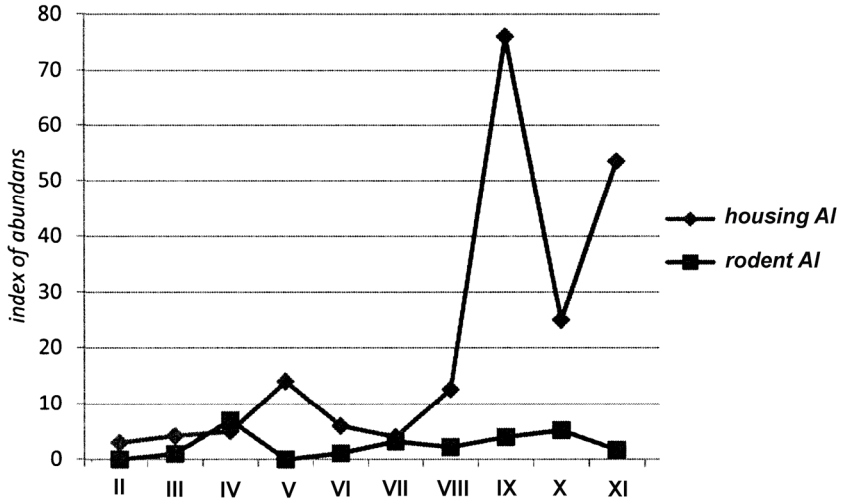

Fig 1. Seasonal dynamics of abundance of *Neopsylla bidentatiformis*. II–XI – month (from February to November); rodent AI – the mean number of flea specimens per one individual of the great long-tailed hamster (sum of 1990–2015); housing AI – the same per one burrow.

In June when young animals start settling on an area adjacent to the housings flea abundance on rodents and in their housings reduces (Fig. 1). The reduction of parasite abundance depends on the flea redistribution on a larger number of hosts and of extinction of older fleas. In July the number of fleas in the burrows and on the hamsters equilibrate and rodent AI is equal to housing AI; the rodents spend little time in their housings but hatching of the flea second generation begins and housing loyalty index reduces to 56% (Fig. 2). Side by side with the increasing of rodent activity we associate such reduction of housing LI with the continued resettlement of the young hamsters.

In September *N. bidentatiformis* reaches its peak of abundance and the flea bulk is in the housing (Fig. 1). In October the number of housing fleas decline as a result of dying of old fleas (housing AI = 25).

Dynamics of abundance of and their distribution between an animal and its housing are inseparably linked with the reproduction. In November up to 94% of females which are in the housing becomes of the III physiological age and is ready to lay eggs. A part of them lays eggs but their development is delayed until spring as evidenced by the absence of larvae in winter housings which were excavated in February. The other part of females is in the state of physiological dormancy until the middle of March.

If nourishment is stopped there is ovule resorption in a flea at any development phase (Shatas, 1965) and in winter a part of adult females has ovules of the II physiological age, the other part – V physiological age. In February we can find only young females of *N. bidentatiformis* (II physiological age) in housings and old ones (V physiological age).

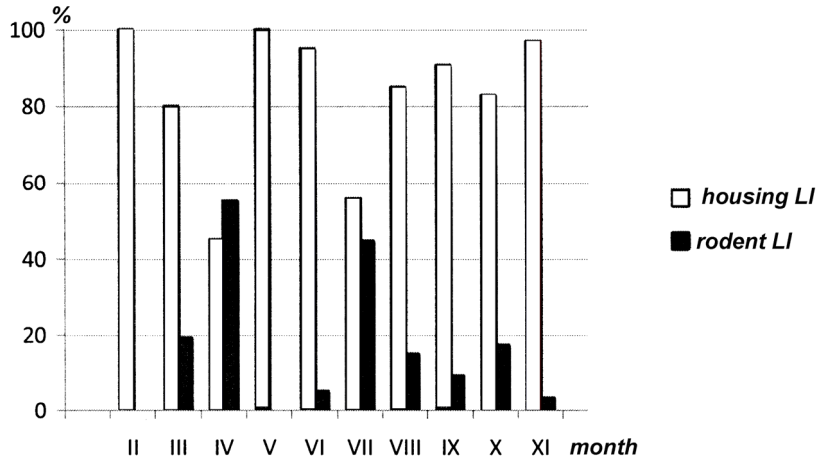

Fig. 2. Seasonal changes of the loyalty index (LI) of *Neopsylla bidentatiformis* (sum 1989–2014). II–XI – month; rodent LI – the percentage of the flea specimens collected on the hosts to the total collected specimens; housing LI – the same in the burrows.

In March the air temperature in housings raises due to animal activity increasing. In the second decade of March larvae (AI = 12,0) and imagines (AI = 4,2) were found in housings. From the third decade of March to the first decade of April the permanent high air temperature (+13-18^{o}C) is set in housings under which wintered imagines are actively feeding on and a half of females are ready to lay eggs (III physiological age) as the amount of young and old females is reducing.

Young imagines of the first generation appear from the end of April to the beginning of May. At the same period the first maximum of laying-egg females was noted (56%). High physiological activity leads to the quick aging. In June old individuals prevail (73,6%), young fleas are absent. In July the second hatching of flea generation is observed. In the rest of summer months the part of adult females is from 56,4% to 71,1%. The second peak of the rut activity is in September (females of the IV physiological age make up 76,6%). From October to November the flea females of I, II and III physiological age could be met in rodents' housings. The hatching peak of the third generation of flea is from the end of October to the beginning of November.

Thus, the flea *Neopsylla bidentatiformis* reproduction on a large long-tailed hamster in Primorskii krai depends on the host activity. The spring peak of abundance depends on the finish of the flea metamorphosis and usually observed in April–May coinciding with the period of hamster reproduction activity. In June–July the flea abundance strongly decreases

because the old females died and only young unfertile females appeared. New generation of the flea is hatched in August and the autumn peak of flea abundance is observed in September. The decrease of flea abundance occurs in October. In November hamsters lie into hibernation and the flea reproduction activity is suspended. From December to February the abundance of flea considerably decrease due to dying off old individuals.

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© **Far Eastern entomologist (Far East. entomol.)** Journal published since October 1994.

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