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TRANSLATION 153 (T153)
DEPARTMENT OF MEDICAL ZOOLOGY
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NAVAL MEDICAL RESEARCH UNIT No. 3
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TRANSLATION FROM RUSSIAN. SOTNIKOVA, A. N. and SOLDATOV, G. M. (1964).
Participation of birds of the Family Emberizidae in the circulation
of tick-borne encephalitis virus. (Abstracts of papers of the 11th
Scientific Conference of the Institute of Poliomyelitis and Encephalitis).
In: Tick-borne encephalitis, Kemerovo tick-borne fever, Hemorrhagic
fevers, and other arbovirus infections. Moscow, pp. 214-216.

In the Maritime area, we find 16 species of Buntings* nesting
and in passage. In taiga biotopes of the SW part of Sikhote-Alin
Mountains, in the area of an active focus of tick-borne encephalitis
under study, we found six species of buntings in nests; these are
Tristram's Bunting (Emberiza tristrami Swinh.), Yellow-throated Bunting
(Emberiza elegans Temm.), Masked Bunting (Emberiza spodocephala Pall.),
Siberian Grey-headed Bunting (Emberiza fucata Pall.), Chestnut Bunting
(Emberiza tutila Pall.), and Yellow-breasted Bunting (Emberiza aureola
Pall.).

From 1959 to 1962, we examined 233 buntings and collected from them
110 larvae and 59 nymphs of ixodid ticks, 5 fleas, and 2 gamasoid mites.
Tristram's Bunting (Emberiza tristrami Swinh.), in the territory of the
focus, inhabits fir forests and dense bushes in the taiga. The Yellow-
throated Bunting (Emberiza elegans Temm.) is found in cutover broadleaf,
and in mixed broadleaf-cedar forests in river and stream valleys.

The Masked Bunting (Emberiza spodocephala Pall.), inhabits dense
bushes along the river banks and edges of the forest and burned areas
of the forest. Examination of 194 birds of the above species yielded
106 larvae and 59 nymphs of Ixodes persulcatus and Haemaphysalis japonica
douglasi. The incidence of ticks on buntings in different periods was
from 20.0 to 51.6%. The index of prevalence was from 0.2 to 5.42.
Ixodid ticks feed on buntings from May till August.

Three species Siberian Grey-headed Bunting (Emberiza fucata Pall.),
Chestnut Bunting (Emberiza tutila Pall.), and Yellow-breasted Bunting
(Emberiza aureola Pall.), in the territory of the focus, inhabit open
landscapes with small bushes. 39 birds yielded 5 larvae and 4 nymphs
of Ixodes persulcatus. The incidence of ticks did not exceed 10%, the
index of prevalence 0.5. Thus all the above bunting species are hosts
of larvae and nymphs of ixodid ticks. Most significant in this feeding

* Note: The scientific names of these birds do not appear in this
publication; they were added at N.MRU-3.

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are the dominant species, Tristram's Bunting, Yellow-throated Bunting, and Masked Bunting. Biotores of these birds coincide with typical habitats of ixodid ticks. The other bunting species inhabit landscapes where prevalence of ixodid ticks is low.

During the study in this focus, 214 buntings belonging to 5 species were examined virologically. Of them, 177 were adults and 37 were nestlings. Five virus strains were isolated from the brains of adult Yellow-throated Bunting, Masked Bunting, and Tristram's Bunting. No virus could be isolated from their blood. All virus strains were obtained during the period when ticks parasitize birds - June, July, August. Strains were isolated in the first and second passages. Inoculated white mice developed typical picture of experimental encephalitis. The virus titre in subcutaneously inoculated mice was 10^{-6} , 10^{-7} , in intracerebrally inoculated mice 10^{-8} .

In neutralization tests in white mice, no antigenic relationship with Japanese encephalitis, Lymphocytic choriomeningitis, and Taylor's virus could be found.

Positive results were obtained only with immune sera of standard reference "Sophyia" strain and hyperimmune sera against tick-borne encephalitis. The neurovirus isolated from buntings was found to be identical with tick-borne encephalitis.

Immunological examination of buntings was done in order to obtain better insight into the frequency of exposures of the birds to infection in nature. The specimens were tested by the CF test, neutralization test, and HI test. A total of 159 buntings of 6 species was tested, 79 in the CF test (of them 35 in parallel neutralization test) and 80 in the HI test.

The specific antibodies were found in all bunting species inhabiting the focus, but only in adults. The highest neutralization indices were found in those bunting species from which the virus was isolated. Thus, in the Masked Buntings - up to 5.777 and in Tristram's Buntings - 1.000.

In 8 buntings giving positive HI test, antibody titres were 1:10-1:160. In contrast to previous tests, this test was performed with specimens of one year collected in spring. Ticks were found on only five birds.

Of the 59 buntings tested by the CF and HI tests, antibodies were found in 14 (25.7%). Immunological and virological evidence indicate considerable frequency of exposure of buntings to the virus in nature. The above evidence testifies to the significance of Maritime buntings as hosts of the ixodid ticks and carriers of tick-borne encephalitis virus.