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TRANSLATION FROM RUSSIAN. BOGDANOV, L. L.* (1969). An experiment to determine the potential epidemiological valency of tickborne encephalitis and Omsk hemorrhagic fever natural foci in western Siberia. Med. Parazit., Moskva, 38(4):415-417.

In tickborne encephalitis (TE) and Omsk hemorrhagic fever (CHF) foci, the total numbers of infected Ixodes persulcatus P. Sch. and Dermacentor pictus Herm. ticks and the range of their fluctuation may serve as criteria of the existence conditions of the agent and the potential epidemiologic valence of a focus. Nikiforov and Beklemishev et al. (1963) stressed the need of quantitative evaluation of this indicator.

From data of tick numbers and ticks carrying virus in different biotopes, we (Metsky and Bogdanov, 1966) determined the minimum and maximum numbers of ticks infected with the virus per km of route collections on drags as well as the range of the area in which it is possible to find 1 infected tick per person. This indicator is suitable for evaluating TE and CHF morbidity and also for determining the potential epidemiologic valence of a natural foci.

Here we suggest a method for determining the total tick numbers (including those infected with virus) per unit area, which is more suitable for mapping and zooparasitological and landscape-epidemiological division into areas. For this purpose, the tick numbers per kilometer of route collection on drags (drags are more suitable than flags, because the entire flag surface does not come into contact with vegetation) are considered to be the number of ticks collected from 600 m^2 (1000 m of route collection multiplied by 0.6 m, the width of the drag). Consequently, the total number of active ticks during the season per hectare may be designated as

$$\frac{\Sigma a \cdot 100}{6}$$

where Σa represents the sum of 10-day average indices of tick abundance per km of route collection on drags.

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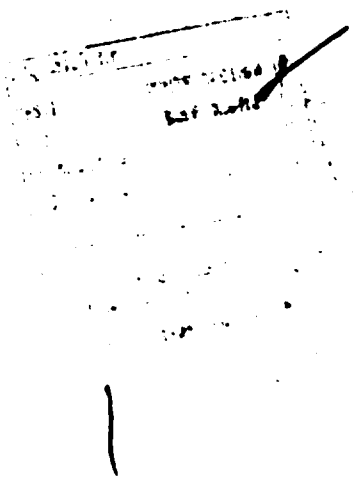
* Omsk Scientific Institute of Natural Focal Infections, Ministry of Health RSFSR (entered 15 November 1968).



However, active ticks do not determine the tick reserve (stock) in nature (Khizhinsky, 1963). Therefore, a correction "x" is introduced to the formula representing the percentage of active ticks (from their total reserve per hectare of the area), thus the formula becomes as follows:

$$A = \frac{\Sigma a \cdot 100}{6} \cdot \frac{100}{x} = \frac{1000 \cdot \Sigma a}{6x} \quad \ldots\ldots\ldots (1)$$

The formula (1) shows the approximate general reserve of ticks per hectare of the area for the season (A). For determination of virus-carrying ticks among them (A_B), it is sufficient to introduce into the formula the percentage of individual virus-carrying ticks - B2:

$$A_B = \frac{10000 \cdot \Sigma a}{6x} \cdot \frac{B}{100} = \frac{10\Sigma a \cdot B}{6x} \quad \ldots\ldots\ldots (2)$$

From the formula (1) and (2) it is possible to determine the tick numbers in any defined area if it is homogenous and has a similar character of distribution of tick populations, in heterogenous areas, the calculation should be carried out per "joint hectare" (Rall', 1947).

Comparison of numbers calculated for different areas (or for the same area during different years) allows us to find the degree of epidemic potentiality and the range of its fluctuation, which may be of practical importance.

SUMMARY (Original in English)

It is suggested that potential epidemiologic valence of foci of tickborne encephalitis and Omsk hemorrhagic fever be evaluated by the number of virus-carrying ticks per 1 hectare. The latter is determined by the formula $\frac{1000}{6x} \cdot \Sigma a$ (summary for season) and $\frac{10\Sigma a \cdot B}{6x}$

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(1) For both species the author used by calculation the correction x = 40%.

In our work (Gordanov, 1968) we used x = 40%, based on the data of Khizhinsky (1963) for I. persulcatus in Krasnoyarsk region. The formula was $\frac{1000A}{24}$, the correction was applied for I. persulcatus and also (conditionally) for D. pictus, but similar data for this species have not yet been recorded.

(2) Virus infection in ticks was determined in suspensions (10 unfed ticks in each suspension) with a subsequent calculation based on Beklemishev's (1963) table and at the same time individually in tissue culture by virologists of Omsk Scientific Institute of Natural Focal Infections, L. A. Lelent'yeva, L. N. Tarasevich, and T. N. Fedorova.

(in the period of peak), where A is the sum of 10-day average indices of tick abundance per 1 km of the route with blanket dragging (or the density of ticks per 1 km during the period of peak in the 2nd formula) and B is the percentage of virus-infected ticks among the latter.

LITERATURE

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Table. Probable number of ticks per hectare (total and virus-carrying) in TE foci in Toguchinsky region, Novosibirsk Oblast and in CHF foci in Tyukalinsky region, Omsk Oblast (1959-1965)

Infection	CHF			TE		
Main vector	D. pictus			I. persulcatus		
Habitat	Timber clearings	Glades	Areas along floodplanes	Timber Clearings	Pine forest belt	Taiga
Number of ticks per km collected during the season of drags	6.9-62.1	3.9-30.2	3.5-26.2	1.7-21.4	38.4-63.5	24.7-80.1
Per hectare (A)	290-2580	166-1500	150-1090	805-990	1600-2650	1030-3340
Virus-carrying ticks (%)	0.39-0.5		0.6-3.4	4.0-5.5	4.3-11.3	4.3-10.0
Number of virus-carrying ticks per hectare (A)	3-23	1-13	8-14	16-85	104-296	66-275