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NEW ASPECTS IN THE ECOLOGY OF TICK VECTORS*)

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Abstract. The authors studied the population density of *Ixodes ricinus* and incidence of viruliferous ticks in an elementary focus of the Tribeč region.

Carbon dioxide is used as a bait for ticks (GARCIA 1962, 1965, BURGDORFER 1967, personal communication, NOSEK and KOŽUCH 1969).

The establishment of population density of a vector in certain biotopes is the first presumption of any ecological vector studies. The carbon dioxide method is one of the more advantageous methods for a rapid and very efficient collection of ticks from a limited area.

The use of carbon dioxide permits the collection of all stages of unengorged ticks, and new ecological findings may contribute to a better understanding of the ecosystem responsible for maintaining arboviruses in nature.

MATERIAL AND METHODS

The method used was described in the previous paper (NOSEK and KOŽUCH 1969). The trapping area amounted to 2.4 square meters. It was necessary to collect the ticks from both sides of the blanket at 10–15 minutes intervals, because the ticks in the cold environment in the vicinity of dry ice fell off. The ticks were attracted during 90 minutes.

This method is not suitable at low temperatures, when the forest litter is moist, after rain or in moist moss, etc. The average number of individuals for trapping area is calculated from 10 areas. The seasonal dynamics was confirmed by infestation of small rodents and insectivores and by collecting of ticks, from vegetation on a limited area (100 sq.m.). Density per one hectare was calculated: number of ticks from true area multiplied by coefficient 1660 or 1000, respectively.

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RESULTS

In this part we are presenting the results of our investigations on population density of ticks in an elementary focus in the locality Topoľčianky.

The population density of nymphs and adults is the highest in the spring, e.g., in Topoľčianky in mid-April (15. IV. 1969) the average population density per one hectare reached 46,000 nymphs and 50,000 adults, at the beginning of May it was 760,000 larvae, 16,000 nymphs and 3,300 adults only. This was in indirect correlation with the population density of hosts.

Table 1. Average number of ticks in trapping area 2.4 $m^2/_{90}$'

Topoľčianky	*Ixodes ricinus*			
	L	N	♂	♀
18. 6. 1968	0	22	1	1
14. 7. 1968	0	24	1	1
15. 4. 1969	0	28	10	20
5. 5. 1969	70	10	1	1
6. 5. 1969	468	8	1	1
15. 5. 1969	436	6	1	1
5. 6. 1969	10	6	1	1
1. 7. 1969	15	14	2	4
11. 11. 1969	0	12	5	5
16. 4. 1970	166	50	1	1

The higher population density in the localities examined was observed on the margin of the Little Carpathians (Pezinská Baba), in the southern part of the Tribeč Mountains (Járok) and in the forest-steppe region of southern Slovakia (Plášťovce).

The studies of microfoci, e.g., the results from Topoľčianky were as follows: In July 1968 (4. VII.), 1 strain of TBE virus was isolated from 24 nymphs (3 pools) collected in a trapping area of 2.4 m^2. In April (15. IV.), 1 strain of TBE virus was isolated from 30 adults (6 pools) collected by means of dry ice in the same place. This finding confirms the interstadial transmission and the persistence of microfoci as well.

DISCUSSION

It is necessary to add that the results on population density of ticks obtained by this method on the locality Topoľčianky are 4—5 times higher than those obtained by collecting ticks by usual methods.

By means of this method it is possible to collect the ticks with low, normal and increasing activities. The later incidence of overwintering larvae than that of nymphs and adults may be explained by their behaviour as was observed in our laboratory experiments (Sixl and Nosek in press).

The seasonal dynamics of larvae and nymphs established by carbon dioxide method agrees with the activity of ticks on vegetation and on small mammals as well.