

adding an acaricidal preparation was weaker. Complete protection was observed in *D. marginatus* tested with diethyltoluamide, terpenol, diphenyloxide, 51-P-325 (American repellent), and a mixture of hexamide and polychloroprene in these concentrations. No tick could crawl through the repellent zone and all CREs were 100%. Tests with P-228 (toluylparadiamide), ASDF-3 (Dorokhov's preparation of fraction 3), and P-320 showed an almost 90% CRE (P-320 = 83.3%) for *D. marginatus*.

It should be mentioned that different CRE results were frequently obtained in tests even with dimethylphthalate. The CRE was 13–50% for *H. plumbeum* and 37–87.5% for *D. marginatus*.

When tested ticks were about or more than 4 months old the CRE was low after using dimethylphthalate. Consequently, older ticks were less subject to repellents. However in 2 cases with ticks of this age, but with a laboratory temperature above 22°C, the CRE was more than 50% for *H. plumbeum* tested with P-162 and 2% polychloroprene. On the contrary, the highest CRE was observed in younger ticks, as recorded for *D. marginatus* in the repudin and kyuzol tests. Ticks 20 days old were used in these tests at 20–21°C.

From analyzing these data, it may be assumed that the repellent effect depends on the material properties and temperature, and possibly also on tick age.

We also made a few experiments to clarify the duration of repellent effect of DETA-hexamide and an American repellent. After 5–7 hrs, no substantial differences were observed in both tick species as compared with tests in which repellent properties of these materials were determined. However, the almost complete absence of repellent properties on *H. plumbeum* and the sharply decreased effect on *D. marginatus* were observed after 25, 29, and 32 hrs.

CONCLUSIONS

1. Laboratory tests on repellent properties of 19 materials, or their different concentrations, showed a better effect on *Hyalomma plumbeum* by 50% hexamide mixed with 2% alcohol solution of polychloroprene (CRE = 83.3%), P-320 (CRE = 80.9%) diethyltoluamide-DETA (CRE = 66.0%), and terpenol (CRE = 63.7%).

2. Dimethylphthalate can be considered to be the standard material against *H. plumbeum* when testing repellents at a constant temperature no lower than 22°C.

3. A 100% CRE on *Dermacentor marginatus* was obtained by testing diethyltoluamide, terpenol, diphenyloxide, 51-P-325, and a mixture of 50% hexamide with a 2% alcohol solution of polychloroprene.

4. A CRE of over 80% on *D. marginatus* was obtained in tests by using P-2, P-228 (toluylpiperdiamide), P-320, and ASDF-3 (Dorokhov's preparation of fraction 3).

5. Repellents showing better effect on *H. plumbeum* should be recommended for tests in the laboratory and field and in CHF foci field conditions.

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APPENDIX 1.

TRANSLATION FROM BULGARIAN: Donchev, D., G. Kebedzhiev, and M. Rusakiev. 1967. Hemorrhagic fever in Bulgaria. Bulgarian Academy of Science Microbiology Institute. First Congress of Microbiology (1955), p. 777–784

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Hemorrhagic fevers are comparatively new discoveries in the world and in our country (see literature). They are natural focal ailments with a febrile hemorrhagic syndrome and in some varieties a renal syndrome. The topic of our communication is hemorrhagic fever without renal syndrome, its distribution in Bulgaria, its chief characteristics and epidemiology, and attempts at etiological elucidation.

In our country the first hemorrhagic fever case, which Chumakov (1952, 1955, Chumakov et al. 1965) considers "almost" or "fully" identical with Crimean

fever, was diagnosed in 1951 in Starozagorsk (Mitov and Neklyudov 1952). Retrospectively, Mironov (1953) defined it more accurately when he observed hemorrhagic fever in Bugras in 10 patients treated in 1946, 1947, 1951, and 1952 who came from Karnobatsk, Grudovsk, and Pomoriysk. Since 1953, hemorrhagic fever detection started in many districts of the country when febrile diseases admitted to several hospitals in 1953–1954 were particularly alarming.

Table 75 shows the movement of persons who became sick and/or died of hemorrhagic fever, as well