

INSECTICIDE RESISTANCE OF HOMELESS PEOPLE BODY LICE FROM MOSCOW, RUSSIA

¹YU.V. LOPATINA, AND ²O.YU. EREMINA

¹Moscow State University, Russia

²Scientific Research Institute of biocides and nanobiotechnologies, Moscow, Russia

Homelessness is an increasing public health problem. Because of poor living conditions and limited access to healthcare systems, homeless persons are exposed to many communicable infections. The pattern of life and the crowded shelters provide ideal conditions for the spread of lice. Body lice have long been recognized as human parasites, it is now increasingly encountered in developed countries especially in homeless people or inner city economically deprived population. The threat posed by the ectoparasite in homeless is not the ectoparasite themselves but the associated infectious diseases that they may transmit to humans. Except for scabies all these ectoparasites are potential vectors for infectious agents. Three louse-borne diseases are known at this time. Trench fever caused by *Bartonella quintana*, epidemic typhus caused by *Rickettsia prowazekii*, and relapsing fever caused by the spirochete *Borrelia recurrentis*. Last years pyrethroids were the main group of insecticides to control body lice. Widespread use of pyrethroids led to significant lice resistance reported from various countries. Although treatment failures are observed in Russia, the resistance frequency to pyrethroid pediculicide of human lice has not been determined. The first report on inefficiency of pyrethroids against homeless people lice in Russia has appeared in 2008. In 2009-2010 we studied insecticide resistance of the body lice, collected from homeless people in Moscow, by WHO method modified by Zeihner. Clothes of 455 persons were examined, and the body lice were detected in 136 cases (29,9%). The number of lice, collected from a person, varied from 1-2 up to 6000 and more. Among 97 observed lice populations in 92 have been found permethrin resistant insects. Their part varied from 8,7 to 100%, composing 52,4% at the average. In five populations all lice were susceptible to permethrin, in seven populations — 100% insects were resistant. Permethrin-resistant lice were cross-resistant to d-phenothrin and organochlorine insecticide DDT. All examined populations were susceptible to organophosphorus insecticide fenthion. Resistance to malathion was found only in 5 cases from 44 (6,1-12,7% insects in the experiments). Lethal concentrations (LC50, LC95) were determined for twelve lice populations by dipping insects in a permethrin solution (EC) for 15 minutes. Permethrin LC50 and LC95 values were 0,025 to 0,36% a.i. and 0,18 to more than 1,0% a.i., respectively. The data on lice resistance to permethrin using standard method (dipping in the insecticide solution) correlated with data received by WHO modified method. DDT resistance values demonstrated that there is a DDT cross-resistance phenomenon in pyrethroid-resistant body louse populations and suggested that an alteration in the receptor of the nervous system (kdr gen) is a key factor of the resistance phenomena in these populations.

Key Words Resistance, control, ectoparasites