

AVERMECTIN RESISTANCE DEVELOPMENT IN THE HOUSE FLY (DIPTERA: MUSCIDAE)

MIKHAIL ALEKSEEV

Scientific Research Disinfectology Institute of Federal Service for Surveillance on
Consumer Rights Protection and Human Well-being,
Nauchnyi proyezd 18, Moscow 117246, Russia
e-mail: aversect@mail.ru

Abstract The house fly, *Musca domestica* L., is one of the most common synanthropic insects in the world. It is known as mechanical carrier of various organisms that cause diseases of man. In many countries, house fly populations can quickly develop resistance to insecticides using to control them. At present, in natural conditions, house flies become resistant to many insecticides from different chemical groups (organochlorines, organophosphates, carbamates, and pyrethroids).

Avermectins are relatively new group of compounds derived from the soil actinomycete, *Streptomyces avermitilis*. They act in nerve-muscular synapses of arthropods causing paralysis and death as a result of irreversible blocking of nerve impulse conduction. However, various arthropod populations in the world during past two decades have developed resistance to avermectins. As for the house fly, it can develop resistance to abamectin by selection in laboratory conditions.

The purpose of our study was evaluation of speed of avermectin resistance development in the house fly in laboratory. Selection of adult flies of Cooper strain with three compounds (chromatographically pure avermectins A1 and A2 and 20% EC of aversectin C, the natural avermectin complex consisted of eight individual avermectins) was conducted. Two selection methods were used: the topical application and the dipping technique. After 12 selections with avermectin A1 during 18 generations and after 16 selections with avermectin A2 during 47 generations susceptibility to these avermectins in corresponding experimental strains didn't changed. Selection with aversectin C was conducted 12 times during 27 generations. In F27 of this strain resistance ratio to aversectin C at topical application (LD₅₀ level) was 7.5. Moreover, this strain shows the cross-resistance to avermectins B1 and B2 and abamectin. Flies selected with avermectins A1 and A2 were susceptible to other avermectins. All three house fly strains did not show any cross-resistance to insecticides from different chemical classes (organophosphates, carbamates, pyrethroids, phenylpyrazoles, spinosyns, and neonicotinoids). Influence of selection with aversectin C on rate of emerging adult house flies was registered.

Thus, speed of resistance development to three avermectins in house fly at selection in laboratory is relatively slow.