In this paper we describe the development of individual-based simulation model on zoophilic mosquito's behavior that encounters odor plumes from two groups of alternative hosts. Within the framework of the model it is assumed that (i) the hosts are represented by two points located at varying distance from each other and that their odor plumes ("zones of influence") are represented by fractional–linear functions that depend on the number of individuals in each host group and their relative attractiveness to the mosquito; (ii) a mosquito comes under the attractive influence of the plumes only within a fixed domain with rectangular distribution; (iii) outside the odor zones, the probability of a mosquito locating points that represent human or animal hosts is zero; and (iv) the interval between mosquito's contact with one or the other plume is a stochastic variable with exponential distribution. 10^5 computer experiments were carried out to elucidate the relationship between the number of individual mosquitoes that arrived at the 'human point' and its distance from the 'animal point'. This relationship was found to have a non-linear character with maximum diversion to the alternative hosts occurring at a certain optimum distance. As expected, at any given distance between the host points, the number of mosquitoes that arrived at the 'human point' varied with the relative numbers of 'human and animal individuals'. The implications of the results are discussed.