Binomial Population of Biological Objects

Alymov N*

South Kazakhstan University, Republic of Kazakhstan

*Corresponding author: N Alymov, South Kazakhstan University, Shymkent, Republic of Kazakhstan

Opinion

Let the system consist of n of the same type and independent biological individuals with the same indicator p survival at a given interval [0,T] time [1]. Let us assume that a population is subject to an epidemic that leads to the death of some of the individuals. For this population, it has been established that it saves itself from extinction if the condition of survivability is met $r \leq d$ where r and d - the number of individuals, dying on [0,T], and the maximum allowable (critical) value of the quantity r. In another notation, this condition has the form $\hat{q} \leq q_0$, where $\hat{q} = r/n$ and $q_0 = r_0/n$ - the proportion of individuals, dying on [0,T] and its critical value [2].

Under the conditions of the example under consideration, the survivability criterion is used in the form [2]

$$G = \sum_{k=0}^{d} \binom{n}{k} p^{n-k} q^{k} \quad (1)$$

Where G - the probability of survival of this species of individuals for [0,T]. For calculations, it is convenient to use the exact lower estimate established in the paper [3,4]:

$$G \geq G_* \quad (2)$$

Where,

$$G_* = p^n \left(1 + \frac{q}{q_0 p} \right)^d \quad (3)$$

- a guaranteed indicator of the survivability of the population.

References

1. Bazykin AD (2003) Theories of nonlinear dynamics of interacting biological populations. Moscow-Izhevsk: IKI, Russia, p. 368.

2. Alymov N (2006) Investigation of the properties of the guaranteed criterion of survivability of the binomial structure. Scientific Journal of Technique and Technical Sciences 5: 107-111.

3. Alymov N (2006) A method for assessing the survivability of the composition of binomial structures. Scientific Journal of Natural and Technical Sciences 4: 198-202.

4. Alymov N (2006) Generalization of Bonferoni and Widder's inequality. Scientific Journal of Natural and Technical Sciences 4: 14-20.