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**Disease regulation of age-structured host populations.** (English) Zbl 0688.92009

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Summary: A lethal, contagious disease can generate a density-dependent regulation of its host, provided the hosts' contact rate grows with population size. The condition for disease-induced population control is that the expected number of offspring of an infected new-born be less than one. In vertebrates that acquire immunity if they survive infection, the disease changes the age structure of its host population.

The steady-state age structure of a disease-regulated host with age-dependent fecundity is computed. Local stability analysis indicates that the equilibrium age structure is always stable. However, when the usual exponentially distributed duration of the disease is replaced by a constant duration, the population can exhibit oscillations with a long period.

**MSC:**

92D25 Population dynamics (general)

34C99 Qualitative theory for ordinary differential equations

35Q99 Partial differential equations of mathematical physics and other areas of application

Cited in **12** Documents

**Keywords:**

lethal, contagious disease; density-dependent regulation; contact rate; disease-induced population control; expected number of offspring; steady-state age structure; disease-regulated host; age-dependent fecundity; Local stability analysis; equilibrium age structure; exponentially distributed duration; constant duration; oscillations

**Full Text:** [DOI](#)

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