Meeting: 1003, Atlanta, Georgia, SS 28A, AMS-SIAM Special Session on Reaction Diffusion Equations and Applications, I

1003-35-901 **Zhenbu Zhang*** (zbzhanguconn@yahoo.com), Department of Mathematics, Jackson State University, P.O.Box 17610, Jackson, MS 39217. *Coexistence and stability of solutions for a class of reaction-diffusion equations.*

In this paper, we consider the situation of two species of predator competing one prey, where the growth kinetics of both species are identical but their diffusion rates are different. To focus solely on the effect of the diffusion, we assume that both competing species have the same consumption rate of the prey. The model is

$$\frac{\partial u}{\partial t} = d_0 \triangle u - f(u)(v_1 + v_2), \quad \text{on } \Omega \times \mathbb{R}_+,$$

$$\frac{\partial v_1}{\partial t} = d_1 \triangle v_1 + v_1(f(u) - v_1 - v_2), \quad \text{on } \Omega \times \mathbb{R}_+,$$

$$\frac{\partial v_2}{\partial t} = d_2 \triangle v_2 + v_2(f(u) - v_1 - v_2), \quad \text{on } \Omega \times \mathbb{R}_+,$$

$$\frac{\partial u}{\partial \nu}(x,t) + r_0(x) u(x,t) = u^0(x), \quad x \in \partial\Omega,\ t > 0,$$

$$\frac{\partial v_i}{\partial \nu}(x,t) + r_i(x) v_i(x,t) = 0, \quad x \in \partial\Omega,\ t > 0,$$

where u is the population density of the prey, and v_1, v_2 are the population densities of two competing predator species. Under some assumptions, we prove the following results: (i) Global existence; (ii) Coexistence of steady states; (iii) Stability analysis. (Received September 30, 2004)