1163-35-1316   **J. T. Cronin** (`jcronin@lsu.edu`), Department of Biological Sciences, Louisiana State University, Baton Rouge, LA 70803, **J Goddard II** (`jgoddard@aum.edu`), Department of Math. & Stat., C. Comp., Auburn University Montgomery, Montgomery, AL 6124-023, **A Muthunayake*** (`akmuthun@uncg.edu`), Department of Mathematics and Statistics, University of North Carolina at Greensboro, 206 Petty Building, 317 College Ave, Greensboro, NC 27412, and **R Shivaji** (`r_shivaj@uncg.edu`), Department of Mathematics and Statistics, University of North Carolina at Greensboro, Greensboro, NC 27412. *Modeling the effects of trait-mediated dispersal on coexistence of mutualists.*

We analyse positive solutions (u, v) to the steady state reaction diffusion system:

$$\begin{cases} -\Delta u = \lambda u(1-u); \ \Omega \\ -\Delta v = \lambda r v(1-v); \ \Omega \\ \frac{\partial u}{\partial \eta} + \sqrt{\lambda} g(v) u = 0; \ \partial\Omega \\ \frac{\partial v}{\partial \eta} + \sqrt{\lambda} h(u) v = 0; \ \partial\Omega \end{cases}$$

where $\lambda > 0$, $r > 0$ are parameters and $g, h \in C^1([0, \infty), (0, \infty))$ are decreasing functions. This system models the steady states of two species living in a habitat where the interaction is limited to the boundary. Here, λ is directly proportional to the size of the habitat and we will study the ranges of λ where coexistence and nonexistence occurs. Namely, we will consider three cases: (a) $E_1(1, g(0)) = E_1(r, h(0))$, (b) $E_1(1, g(0)) > E_1(r, h(0))$, (c) $E_1(1, g(0)) < E_1(r, h(0))$. Here $E_1(r, K)$ denotes the principal eigenvalue of: $-\Delta z = r E z; \ \Omega, \ \frac{\partial z}{\partial \eta} + K\sqrt{E} z = 0; \ \partial\Omega$. (Received September 15, 2020)