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J. Goddard II and **Quinn Morris*** (qamorris@uncg.edu), 116 Petty Building, PO Box 26170, Greensboro, NC 27402, and **C. Payne, J. Price** and **R. Shivaji**. *Analysis of steady states for classes of reaction-diffusion equations with U-shaped density dependent dispersal on the boundary.*

We consider positive solutions to equations of the form:

$$\begin{cases} -\Delta u = \lambda u(1 - u); & \Omega \\ \frac{\partial u}{\partial \eta} + \gamma \sqrt{\lambda}(u - A)^2 u = 0; & \partial\Omega \end{cases} .$$

where $\lambda > 0, \gamma > 0, A \in (0, 1)$ are parameters, Ω is a bounded domain in \mathbb{R}^n ; $n \geq 1$ with smooth boundary $\partial\Omega$ and $\frac{\partial u}{\partial \eta}$ is the outward normal derivative. Such models arise in the study of population dynamics in a habitat Ω when the population exhibits U-shaped density dependent dispersal on the boundary. We analyze the persistence of the population (existence, non-existence, uniqueness and multiplicity of positive solutions) as the patch size (λ) and the hostility of the outside matrix (γ) vary. Building upon the results obtained when $\Omega = (0, 1)$ via a quadrature method, we obtain solutions for any bounded domain Ω in \mathbb{R}^n ; $n > 1$ by the method of sub-super solutions. (Received September 10, 2016)