1161-35-38 **Gampola Waduge Nalin Fonseka*** (fonsekan@carolinau.edu), 1825 Sherwood St, Apt C, Greensboro, NC NC 27403, **Ratnasingham Shivaji** (jgoddard@aum.edu), Montgomery, AL 36117, and **Jerome Goddard** and **Byungjae Son**. *A diffusive weak Allee effect model with U-shaped emigration and matrix hostility.*

We study positive solutions to steady-state reaction-diffusion equations of the form:

$$-\Delta u = \lambda f(u);\ \Omega$$
$$\alpha(u)\frac{\partial u}{\partial \eta} + \gamma\sqrt{\lambda}[1-\alpha(u)]u = 0;\ \partial\Omega$$

where u is the population density, $f(u) = \frac{1}{a}u(u+a)(1-u)$ represents a weak Allee effect type growth of the population with $a \in (0,1)$, $\alpha(u)$ is the probability of the population staying in the habitat Ω when it reaches the boundary, and positive parameters λ and γ represent the domain scaling and effective exterior matrix hostility, respectively. In particular, we analyze the case when $\alpha(s) = \frac{1}{[1+(A-s)^2+\epsilon]}$ for all $s \in [0,1]$, where $A \in (0,1)$ and $\epsilon \geq 0$. In this case $1-\alpha(s)$ represents a U-shaped relationship between density and emigration. Existence, nonexistence, and multiplicity results for this model are established via the method of sub-super solutions. (Received August 02, 2020)