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**Jemal S Mohammed-Awel\*** (jmohammedawel@valdosta.edu), P.O.Box 5743, Valdosta, GA 31603, and **John Bantle, Aaron Festinger, Ryan Klafehn, Hee-Joon Jo and John Ringland.** *Boundaries of Sustainability in Simple and Elaborate Models of Agricultural Pest Control with a Pesticide and a Nontoxic Refuge.*

In two models of pest control using a pesticidal crop along with a non-pesticidal refuge to prevent the development of resistance, we numerically compute the bifurcations that bound the region in parameter-space where control is sustainable indefinitely. An exact formula for one of the bifurcation surfaces in one of the models is also found. One model is conceptual and as simple as possible. The other is realistic and very detailed. Despite the great differences in the models, we find the same distinctive bifurcation structure. We focus on the parameters that determine: (i) the restriction of pest exchange between the crop and the refuge, which we call screening the refuge, and (ii) the recessiveness of the resistance trait. The screened refuge technique is seen to work in the models up to quite high values of the fitness of resistant heterozygotes, i.e., even when resistance is not strongly recessive. (Received August 19, 2010)