1135-65-1796 **Vrushali A Bokil*** (bokilv@math.oregonstate.edu), **Linda J. S. Allen**, **Michael Jeger** and **Suzanne Lenhart**. *Optimal Control of Vector Transmitted Viral Disease of Crops with Different Replanting Strategies.* Preliminary report.

Vector-transmitted diseases of plants have had devastating effects on agricultural production worldwide, resulting in drastic reductions in yield for crops such as cotton, soybean, tomato and cassava. In this investigation, we formulate a new plant-vector-virus model with continuous replanting from density-dependent replanting of healthy and some infected plants. The new model is an extension of a model formulated by Holt et al., An epidemiological model incorporating vector population dynamics applied to African cassava mosaic virus disease, Journal of Applied Ecology, pages 793-806, 1997. Both models are analyzed and thresholds for disease elimination are defined in terms of the model parameters. Parameter values for cassava, whiteflies, and the virus, in African cassava mosaic virus serve as a case study. A numerical investigation illustrates how the equilibrium densities of healthy and infected plants for both models vary with changes in parameter values. Applications of insecticide and roguing to reduce plant disease and to increase the number of plants harvested are studied using optimal control theory. (Received September 24, 2017)