

CONTROLLING AND DETECTION OF PLANT VIRAL DISEASES WITH HOST AND VECTOR FACTOR

One indicator of SDG's Program is food security, where the main focuses is the fulfilled main food, like rice for each individual. Rice (*Oryza sativa*) is a very important food crop in the world, in Asia especially in Indonesia. One of the serious diseases in rice agriculture, tungro, could reduce rice quality and production extremely. Tungro virus transmitted by green leafhoppers which is the most efficient vector for spread. Tungro disease, it needs insect to spread. In this paper we developed a mathematical model of the vector-borne rice Tungro disease, with the aim is to investigate the effects of insect vector in the spread of the disease. We also analyze the effect of insecticide for infected plant, and discuss briefly the dynamics of the model including the existence and stability of the equilibrium points. Finally we present the optimal control via the Pontryagin Maximum Principle.