

CONTROL MODELS FOR THE MOSAIC VIRUS DISEASE IN *JATROPHA CURCAS* PLANTS

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The shrinkage of fossil fuel resources forces several countries to actively search for alternative energy sources. *Jatropha curcas* is a plant with a variety of potential ecological applications. It resists drought and from its seeds a sizeable amount of oil that can be used for producing high grade alternative biodiesel fuel is obtained. It can be easily cultivated in many tropical countries and even in arid landscapes.

Unfortunately, the plant is affected by the mosaic disease. The latter is caused by the mosaic virus (*Begomovirus*), spread by infected vectors, the white-flies (*Bemisia tabaci*). We present two models for combating this disease.

In one case, [1], we focus on the “backyard situation”, in which media campaigns are encouraged for raising awareness among people to control this disease, protecting this plant in small plots. The results indicate that to attain an effective reduction of the infection or even its eradication, the awareness campaigns should be implemented at sufficiently short time intervals.

In the second case we look at extensive plantations and the use of insecticide spraying. The infection transmission rate from vectors to plants and the vector mortality are found to be crucial parameters. The optimal spraying policy requires insecticide application only after the first ten days of the epidemic outbreak, but then spraying must be continued for the following three months to achieve disease eradication, [2].

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References

- [1] Priti Kumar Roy, Fahad Al Basir, Ezio Venturino. (2017). *Effects of Awareness Program for Controlling Mosaic Disease in Jatropha curcas Plantations*, to appear in MMAS.
- [2] Ezio Venturino, Priti Kumar Roy, Fahad Al Basir, Abhirup Datta. (2016). *A model for the control of the Mosaic Virus disease in Jatropha Curcas plantations*, to appear in Energy, Ecology and Environment, doi:10.1007/s40974-016-0033-8.