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Global analysis for an epidemical model of vector-borne plant viruses with disease resistance and nonlinear incidence. (English) [Zbl 07331980](#)

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Summary: Vector-borne disease models play an important role in understanding the mechanism of plant disease transmission. In this paper, we study a vector-borne model with plant disease resistance, disease exposed period and nonlinear incidence. We compute the basic reproduction number, determine the implicit locations of equilibria and then investigate their global stability by generalizing a classic geometric approach to higher dimensional systems. Higher dimensions cause greater difficulties such as the construction of the transformation matrix and the estimate of the *Lozinskiĭ* measure in this geometric approach. For a complete control of vector-borne diseases, a quantitative way is provided by the given expression of the basic reproduction number, from which we need not only increasing plant disease resistance but also decreasing the contact rate between infected plants and susceptible vectors instead of a single one of them.

MSC:

- 92D30 Epidemiology
- 34C60 Qualitative investigation and simulation of ordinary differential equation models
- 34D05 Asymptotic properties of solutions to ordinary differential equations
- 34D20 Stability of solutions to ordinary differential equations

Keywords:

[nonlinear incidence](#); [plant disease resistance](#); [vector-borne model](#); [global stability](#)

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