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**Xiang-Sheng Wang\*** (xswang@semo.edu), Department of Mathematics, Southeast Missouri State University, Cape Girardeau, MO 63701, and **Jianhong Wu**. *Periodic systems of delay differential equations and the dynamics of avian influenza.*

Modelling the spread of avian influenza by migratory birds between the winter refuge ground and the summer breeding site gives rise to a periodic system of delay differential equations exhibiting both the cooperative dynamics (transition between patches) and predator-prey interaction (disease transmission within a patch). Such a system has two important basic reproductive ratios, each of which being the spectral radius of a monodromy operator associated with the linearized sub-system (at a certain trivial equilibrium): the (ecological) reproduction ratio for the birds to survive in the competition of birth and natural death, and the (epidemiological) reproduction ratio for the disease to be persistent. We calculate these two ratios by our recently developed finite dimensional reduction and asymptotic techniques, and we show how these two ratios characterize the nonlinear dynamics of the full system. (Received September 15, 2014)