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Epidemic spread in coupled populations with seasonally varying migration rates ADAM MUZYCZYN, LEAH B. SHAW — The H5N1 strain of avian influenza has spread worldwide, and this spread may be due to seasonal migration of birds and mixing of birds from different regions in the wintering grounds. We studied a multipatch model for avian influenza with seasonally varying migration rates. The bird population was divided into two spatially distinct patches, or subpopulations. Within each patch, the disease followed the SIR (susceptible-infected-recovered) model for epidemic spread. Migration rates were varied periodically, with a net flux toward the breeding grounds during the spring and towards the wintering grounds during the fall. The case of two symmetric patches reduced to single-patch SIR dynamics. However, asymmetry in the birth and contact rates in the breeding grounds and wintering grounds led to bifurcations to longer period orbits and chaotic dynamics. We studied the bifurcation structure of the model and the phase relationships between outbreaks in the two patches.

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