1086-37-2669 **Xiang-Sheng Wang*** (xswang@mun.ca), Dept of Math & Stat, Memorial University of Newfoundland, St. John's, NL A1C 5S7, Canada. *Dynamic threshold of patch disease model for migratory birds.* Preliminary report.

We study spread of avian influenza in migratory birds by a patch disease model which is a periodic delay system combining a cooperative sub-system and a predator-prey (SIR) sub-system. There are two kinds of basic reproductive ratio: one (R_0^c) for the birds to survive in the competition of birth and natural death; the other (R_0^p) for the disease to transmit from infected birds to susceptible birds. It can be shown that if the ecological R_0^c is less than one, then the bird population will decrease to zero; if the ecological R_0^c is greater than one and the epidemiological R_0^p is less than one, then the birds will survive and the disease will be cleared. However, if both ecological R_0^c and epidemiological R_0^p are greater than one, the birds and the disease will seek for a balance to reach an endemic periodic equilibrium or vanish eventually. It is thus suggesting that there exists a third R_0^e to determine the stability of trivial equilibrium for the coupled system. Here we derive an asymptotic formula for this third R_0^e by the method of finite dimensional reduction and asymptotic techniques. (Received September 25, 2012)