EFFECT OF ANTIBIOTIC ON THE NATURAL ENEMY, 
NEOCHRYSOCHARIS FORMOSA

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Many natural enemies are commercially used worldwide. The use of these natural enemies has many advantages. Fecundity is one of the important ecological characteristics of a natural enemy. Recently, many types of intracellular symbionts that affect fecundity of the host parasitoid, such as Wolbachia (Anaplasmataceae) and Rickettsia (Rickettsiaceae), have been reported in insects. Wolbachia and other intracellular symbionts induce many kinds of reproductive alterations in host insects, such as cytoplasmic incompatibility, feminization of genetic males, male killing, and parthenogenesis induction. When the symbiont induces parthenogenesis against host parasitoids, the infected females produce only uninfected males by antibiotic treatment. These males are not effective as natural enemies of pest insects. By using antibiotics, insect intracellular symbionts can easily be removed. Antibiotics are naturally used to treat plant diseases. We tested the effect of an antibiotic against the leaf-miner parasitoid, Neochrysocharis formosa (Westwood) (Hymenoptera: Eulophidae) that was infected with Rickettsia. Rickettsia induced parthenogenetic (thelytokous) reproduction of the host N. formosa. We treated the primary leaves of a kidney bean containing third instar larvae of Liriomyza trifolii (Burgess) (Diptera: Liriomyzidae) with oxytetracycline. The results revealed that N. formosa produced only male offspring. Neochrysocharis formosa ingests the antibiotic not only by feeding on an antibiotic containing host L. trifolii, but also through mouthpart contact to the surface of treated leaves. These results indicate that antibiotics may decrease the effect of natural enemies and the sustainable utilization of the natural enemy.

CO-ADAPTATION OF AN ENTOMOPATHOGEN WITH THE POMEGRANATE APHID, APHIS PUNICAE PASSERINI

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Pomegranate, Punica granatum Linn. (Punicaceae) is an important source of antioxidants. The aphid, Aphis punicae Passerini (Hemipera: Aphidae) is a pest on pomegranate. An entomopathogenic fungus (EPF), Entomophthora aphidis Hoffman (Zygomycetes: Entomophthorales) causes high mortality of the aphid. Therefore, it was felt that understanding the relationships among the weather, crop phenology, aphid and EPF would be useful in aphid management. From 2002-2004, a study was conducted in a pesticide-free orchard in Bangalore, (12°58’N, 77°35’E) India. Weekly samplings were done on 20 random trees (out of 80) on 80 random shoots per tree. Thus, 1600 shoots/week were sampled for aphids and graded for pathogen infection. These data were subjected to correlation matrix analysis with the weather and crop phenology factors. It was found that the infection of the pathogen on the