

0192 SSAR SIEBERT CONSERVATION AWARD, Session I, Minneapolis

Ballroom F, Thursday 7 July 2011

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Managing Amphibians in Agricultural Wetlands in South China: Effects of Fertilizers on Tadpole Performance

Agricultural practices have altered natural wetland habitats, and this is particularly true in lowland areas of Southeast Asia. Recently, decreasing area of arable land and increased use of chemicals may limit the persistence of lowland amphibian populations. We investigated how the management of the wet agricultural farms helps to promote amphibian biodiversity. As one part of this study, we examined fertilizer use in traditional and organic farmlands, and in field mesocosm experiments, compared the effects of a chemical fertilizer (granular urea) and an organic fertilizer (peanut cake) on the survival and growth of hatchlings of the brown tree frog (*Polypedates megacephalus*) and marbled pygmy frog (*Microhyla pulchra*). Experiments assessed fertilizers at low, manufacturer-recommended, and high levels, and after 21 days we measured survival, snout-vent-length, and the weight. Survival of *P. megacephalus* and *M. pulchra* was extremely low (0%) in the chemical fertilizer at the recommended level. Conversely, survival was 98% for *P. megacephalus* and 55% for *M. pulchra* at the recommended level for the organic fertilizer. All tadpoles showed significantly increased growth in elevated concentrations of organic fertilizer. In fact, *P. megacephalus* were three times larger in mass in low concentration and seven times larger in high concentration. Similarly, increased growth in *M. pulchra* in all organic treatments resulted in abbreviated time to metamorphosis. For South China, our study suggests that where conservation of amphibians is a priority, chemical fertilizers should be avoided, and land managers should encourage the use of the organic fertilizer on long-term water crops.