

## **Are riparian forest reserves sources of invertebrate biodiversity spillover and associated ecosystem functions in oil palm landscapes?**

### **Abstract**

The world's forested landscapes are increasingly fragmented. The effects of fragmentation on community composition have received more attention than the effects on ecological processes, particularly in the tropics. The extent to which populations from forest fragments move (spillover) into surrounding agricultural areas is of particular interest. This process can retain connectivity between populations and alter the rate of beneficial or detrimental ecological functions. We tested whether riparian forest fragments (riparian reserves), are sources of two functionally important invertebrate groups (dung beetles and scavenging ants) within oil palm plantations in Malaysia. We also assessed whether forest fragments enhance rates of associated ecosystem functions (dung and bait removal). We found that oil palm sites with and without adjacent riparian reserves had similar overall beetle and ant communities and functional rates. However, dung beetle species richness, abundance and diversity declined with distance from a riparian reserve, providing evidence for a weak spillover effect. In addition, dung beetle community metrics within a riparian reserve predicted corresponding values in adjacent oil palm areas. These relationships did not hold for dung removal, ant community metrics or bait removal. Taken together, our results indicate that although riparian reserves are an important habitat in their own right, under the conditions in which we sampled they have a limited role as sources of functionally important invertebrates. Crucially, our results suggest that contiguous habitat corridors are important for maintaining connectivity of invertebrate populations, as forest dependent species may not easily be able to disperse through the agricultural matrix.