The contribution of the cocoa agroforest matrix to biodiversity conservation depends on its structure, floristic composition and landscape quality. This study intended to analyze the interactions between host trees/epiphytes/ants in the several agroforest systems associated with the cocoa tree, with the aim of verifying how these interactions may favor biodiversity conservation. We investigated if (i) the ant diversity associated with epiphytic bromeliads depends on the phorophyte architecture; (ii) the architectural heterogeneity (volume) and location (distance from the canopy epicenter) of epiphyte bromeliads determine the ant diversity and abundance of associated organisms. The study was carried out in five cocoa agroforests and one remnant of mature forest in the cocoa region of southern Bahia, Brazil.

Data collection of the explanatory variables about the architecture of the phorophytes (CAP, stem, tree height, crown size and canopy shading area) and epiphytic bromeliads (bromeliads size = volume and distribution of bromeliads in the canopy), as well as of the dependent variables (ants and fauna in general), was conducted on 30 trees and 180 epiphytic bromeliads (six bromeliads per tree), occurring in the tree canopy. A total of 103 ant species and 5,808 invertebrates and vertebrates of the fauna associated with epiphyte bromeliads were collected. The architectural variable size of host tree canopy is positively correlated to the ant richness found associated to the bromeliads present in the canopy (p<0.03), while the remaining variables were not significant in explaining the diversity of ants (p>0.05). No relationship between bromeliad volume and richness of ants (p=0.6) was observed. However, we observed a positive and significant relationship between bromeliad size (volume) and the abundance of fauna associated (p=0.0005). Ant species richness and abundance of associated fauna was positively correlated with distance variable of epiphyte bromeliads in the tree crowns (p<0.04, p=0.0003; respectively). The tree canopy may contribute to maintaining determined spatial and physical conditions in the structure of the branches and leaves, which confers different microclimatic and microhabitat conditions. These will favor, in turn, the diversity and abundance of animals living in the canopy, as well as the occurrence and distribution of the epiphytes. The architectural information of the host trees is sometimes considered a determinant factor for the arboreal fauna. The function of this environment in regions where there are mosaics of forest remnants appears to be more a compromise than a solution. Agroforest initiatives can contribute to the planning of ecological corridors that contribute to the genic flow of a range of species and reducing the diversity loss in the tropical forest regions. Moreover, our results show the importance of shade tree canopies in agroforests for maintaining the native fauna associated with epiphytes. (CNPq, PRONEX SECTI-FAPESB/CNPq, projeto PNX 0011/2009, PPG-Zoologia UESC/BA)