Biodiversity as a focus for conservation efforts has received increased attention in the last decades (Wilson, 1988; Pearson, 1994). Searching for patterns in biodiversity, researchers have suggested various units of study including ecological communities (Hunter et al., 1988), cladistic classifications (Vane-Wright et al., 1991), hierarchical composite of different levels of organization (Oss, 1990), and also groups of taxonomically related species (Holloway & Jardine, 1968). The majority of programs for conservation of natural systems have been concerned primarily with the maintenance of species diversity, ecosystem function, and the preservation of genetic variation within populations (Thompson, 1997; Oliveira & Del-Claro, 2005). Thus, a more landscape-level view of biodiversity has prevailed. However, in a more recent and realistic perspective, biodiversity should be viewed and evaluated also in ways that embrace the extremerichness inherent in plant-animal interactions, including not only trophic relationships (Price, 2002), but also aspects of life histories, biology and behavior of related species (Oliveira & Del-Claro, 2005). In this sense, the ant-plant-herbivore systems can be pointed out as good models for gaining a better understanding of biodiversity through the ways of interactions or “interaction biodiversity” (Thompson, 1997; Del-Claro, 2004).

The ant-plant-herbivore interactions occur in all terrestrial ecosystems, ranging from facultative to obligate associations (Beattie, 1985; Davidson & McKey, 1993; Bronstein 1998). In general, despite the abundance of mutualisms (mainly facultative), the majority of studies consider the relationships up to the third trophic level. The influence of other species and other trophic levels on mutualisms has received little attention, particularly in contrast to other types of interactions (Bronstein & Barbosa, 2002). Extrafloral nectary-bearing plants are good models to study multitrophic effects on mutualism and biodiversity. In these types of plants, visiting ants that exhibit aggressive behavior towards herbivores can positively affect plant fitness by decreasing herbivore damage to vegetative and reproductive plant parts (Koptur, 1992; Oliveira & Pie, 1998). The variation in diversity of associated species through time is an important source of variability in the relationships between ants, plants and herbivores as previously discussed, however; spatial variability may be just as important in generating conditionality and diversity in mutualisms as temporal variation. Ecological forces that cause mutualism to vary in space and time are termed “conditional mutualism” (Herre et al., 1999). To understand this phenomenon it is particularly important to know multitrophic interactions and how they can affect biodiversity. In this sense, relationships involving ants visiting plants and tending insects, such as treehoppers, aphids, butterfly larvae and also the relationships with other plant partners, are important models for studying conditional mutualisms (Bronstein & Barbosa, 2002; Billick & Tonkel, 2003; Del-Claro, 2004). Additionally, these examples can act as a basis for a better comprehension of how coevolutionary relationships as ant-plant interactions will present similar or distinct outcomes in terms of regional variation. Thompson (1997, 2005) suggested that they will maintain the same basic outcomes in his “Geographic Mosaic Theory”.

In the present talk we will present examples enabling each one to perceive that the multitude of interactions in the ant-plant-herbivores systems shows us not only, how conditional they are (both temporary and spatially), but also some more specific points related to the ecology of ant-plant-arthropod interactions in tropics and specially on Cerrado. Species that comprise a community may be linked directly through interactions between resources and consumption (Polis & Winemiller, 1996). In systems involving three (or more) trophic levels, such as plants, herbivores, and predators, a trophic cascades describes the positive top-down effects of the third trophic level on the biomass, richness, or composition of the producer species (Hirston et al., 1960; Polis et al., 2000). Thus, the ant action reducing herbivores densities on plants can reduce chances of competitive exclusion between species having an additional and complementary effect to maintain the typical great diversity mainly of arthropods in Cerrado vegetation (Price et al., 1995). Predators frequently have an impact on the density, spatial distribution, and diversity of herbivore assemblages, thereby altering the patterns and levels of herbivory in plant communities (Heads & Lawton, 1984; Schmitz & Suttle, 2001; Romero & Vascencellos-Neto, 2004). Predator like ants can have the same impact on other predators and parasitoids.
of herbivores, also causing directly and indirectly effects on vegetal communities (Del-Carlo & Oliveira, 2000; Del-Carlo, 2004). Thus, these studies reported here have shown in various ways that interspecific interactions can shape the organization of communities, and therefore act as links between species and ecosystems. Biodiversity should be viewed and evaluated also in ways that embrace the extreme richness inherent to plant-animal interactions, including the species ecological roles, the kinds of interactions and their outcomes, trophic web structure, selection pressures, habitat heterogeneity, temporal and geographical variation (Price, 2002; Thompson, 2005).

**Reference**


