

The background of the entire page is a photograph of several ants on a sandy surface. Each ant is carrying a large, bright green fragment of a leaf. The ants are scattered across the frame, some moving towards the right and others away. The lighting creates soft shadows on the sand.

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In this presentation, we report on activities and its fruits of the unique network for capacity building of ant researchers and contributing to biodiversity conservation in Asian region.

139 - ANTS AND THEIR ROLE IN INTERNATIONAL ENVIRONMENTAL PROJECTS

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Ants have a great potential in international environmental projects because of their omnipresence in most terrestrial ecosystems, their sensitivity to environmental changes and their relative use of collection all year round. The standardized ALL protocol for sampling ground dwelling ants, designed in 1996, has set the basis to allow the comparison of results among biodiversity inventory and monitoring programmes. The main collection method or the minimum number of samples required to obtain a representative image of the local ant community may vary depending on the habitat characteristics. As an illustration, we will focus on the international programme IBISCA. This programme studies the spatio-temporal distribution of both ground and arboreal-dwelling arthropods in tropical forests. Preliminary results of the ant project from IBISCA-Panama will be presented. The ALL protocol was combined with other methods which allowed to collect simultaneously ants and termites from the ground and the canopy. Perspectives include the design of a standardised protocol to collect arboreal-dwelling ants and the calibration of the use of ants as monitoring agents in forest observatories.

140 - NICHES NOT ENOUGH: NON-EQUILIBRIAL PROCESSES PROMOTING CO-EXISTENCE IN ANT COMMUNITIES

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Explanations for species co-existence in ant communities have traditionally focussed on niche separation, particularly relating to differences in diet, foraging times and nesting requirements. Although such 'equilibril' factors are undoubtedly important, it seems clear that they are insufficient to account for the high levels of local species richness that are commonly observed. For example, semi-arid Australia routinely packs per hectare 100 or more species, most of which are dietary generalists nesting in the ground, and similarly high species densities routinely occur within leaf litter of lowland tropical rainforest. Such species density within a single family is unparalleled, and is all the more noteworthy because of the high levels of interspecific competition characteristic of ant communities. Very high species densities require two conditions to be met: (i) a large number of species must successfully establish; and (ii) there must be a high rate of local species survival once established. A strong relationship often exists between local and regional ant diversity, but otherwise little is known about the supply-side ecology of ant communities. It is easier to see why ant species can be so locally persistent once established, beyond effects of niche partitioning. First, ant sociality and modularity buffer against adversity due to confinement of the perennating apparatus (the queen) within a protective nest, and by enabling a response through reduced colony size rather than death. Second, although ants show very high competitive interactions at a point scale (e.g. at a particular food item), it is very difficult for point-scale behavioural dominance to scale-up to site-scale competitive exclusion, because particular ant species usually cannot control resources comprehensively.

141 - LINKING TEMPERATURE AND INVASIBILITY: CRITICAL THERMAL LIMITS AND ANT COMMUNITY ORGANIZATION

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In some previous works, the authors have shown the importance of temperature on the organization of Mediterranean ant communities and how species-specific critical thermal limits may influence competitive relationships (Cerda et al. 1997, 1998a,b, Retana & Cerda 2000). The present work aims at examining more carefully the effect of temperature as a key factor determining ant communities at the Doñana National Park

(southwestern Spain). A total of 23 sites (encompassing human settlements, forests, isolated trees and shrublands) were sampled using baits (to observe the activity pattern and interspecific interactions) and pitfall traps (to estimate relative abundance of species). The observed community pattern is similar to those of other Mediterranean communities (Retana and Cerda 2000). These communities have no equivalent to the territorial species found in other areas of the world, because dominant species can dominate food resources but do not defend continuous territories. High temperatures control the organization of ant communities because daily temperature fluctuations reduce the potential dominance of dominant species in open habitats, while in forests they are active throughout the day. Because Doñana soils are mostly sandy, ground temperatures often exceed 50°C and may reach 70°C. These conditions favours the endemic and thermophilic species *Cataglyphis floricola* but disadvantage the invasive Argentine ant *Linepithema humile*. The presence of the later is always linked to human settlements, and during the last five years its expansion has been neglectable. Extreme temperatures may act as a barrier against the invasion of *L. humile* but a long-term survey is needed to confirm this hypothesis.

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142 - MICROHABITAT-DEPENDENT EFFECTS OF A DOMINANT ANT ON RESOURCE USE IN A PATCHY HABITAT

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Behaviourally and ecologically dominant ants are thought to structure ant communities through resource monopolisation. However, in patchy habitats, the effect of the dominant ant is also likely to be patchy and depend on microhabitat suitability. We removed dominant meat ants, *Iridomyrmex purpureus*, from sandstone outcrops with patches of heath to determine their effects on resource use of ant communities in south-eastern Australia in 2000-2002. The success of ants at honey and mealworm baits placed in rock and leaf litter microhabitats was measured before and after meat ant removal. Despite their aggressive behaviour and numerical dominance, removal of meat ants resulted in an increase only in ecologically similar *Iridomyrmex* spp., with no effects on other common species in abundance surveys. Baits were discovered more rapidly when meat ants were present. However, other ants were less successful, particularly on rock substrates. *Iridomyrmex* spp. were more successful on rock than in litter, but success on rock substrates was significantly lower where meat ants were present. Camponotine and myrmicine ants had low success at baits but were generally more successful at removal sites. In contrast, the opportunist *Rhytidoponera metallica*, which collected baits predominantly in litter, was not affected by the presence of meat ants. While most ants discovered the different bait types at similar rates, it was more common for mealworms to be removed than for honey baits to be occupied within the observation period. Patterns were generally similar for different bait types, although *Iridomyrmex* spp. was almost absent from honey baits when meat ants were present, while it had some success at mealworm baits. Honey baits are more defensible than the ephemeral mealworms and may therefore favour aggressive dominance. Effects of meat ants on ant resource use depended on microhabitat, suggesting that small-scale habitat partitioning promotes coexistence in this ant assemblage.

143 - NEW APPROACHES TO THE STUDY OF TROPICAL RAINFOREST ANT MOSAICS

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The notion of a tropical arboreal ant mosaic has been intensively investigated, but what generates these mosaics remains poorly understood. I tested if the recently developed concept of "ontogenic succession" can aid in gaining a better knowledge of the dynamics of arboreal ant mosaics by using three African pioneer tree species as biological models. *Lophira alata* (Ochnaceae) is a long-lived species that does not furnish any reward to ants, *Anthocleista vogelii* (Gentianaceae) bears extremely well developed extrafloral nectaries (EFNs), and *Barteria fistulosa* (Passifloraceae) is an EFN-bearing long-lived myrmecophyte (a plant housing ants in hollow branches). For both *L. alata* and *A. vogelii*, a succession of different associated ants according to plant size/age was noted.

Ground-nesting, arboreal-foraging ant species were the first associates, followed by arboreal species that use host tree leaves to build their nests plus some opportunistic species nesting in pre-existing cavities, and then carton-building *Crematogaster* species. This ontogenic succession is slower on *A. vogelii*, showing that the first occupants tend to remain on a plant when a reward (EFNs) is at stake. Therefore, from one stage to the next in the succession of associate ants a form of territorial competition probably exists, but the question of how the incipient colonies of later species are accepted by their predecessors remains unanswered. The comparison with *B. fistulosa* that generally remains associated with the same plant-ant species during its entire ontogeny (but competition exists all the same) highlights the importance of the selective attractiveness of the trees for their associated ants.

144 - ARE ABUNDANCE AND OPPORTUNISM THE KEYS FOR A SUCCESSFUL LIFE IN AN ANT COMMUNITY?

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We studied the ant community of a natural grassland in NE Argentina by sampling across summer daylight hours for three consecutive years. Our goal was to determine the role of *Camponotus punctulatus* in an undisturbed community in order to understand why this species successfully invades abandoned rice-fields and becomes a pest. *Camponotus punctulatus* had the greatest nest density and presence according to proportion of pitfall traps and baits. *Camponotus punctulatus* discovered first between 67 to 82% of baits first, monopolized 32 to 43% of these, interacted at 79-84% of baits, and finally kept a total of 53 to 67% of all the baits. No other species in the community can reach these numbers. This community was not organized in a linear hierarchy. A multiple logistic regression analysis for baits monopolized or dominated by *C. punctulatus* showed that the single explanatory variable was its number of individuals at baits. The removal of first arrivals of *C. punctulatus* benefited some of the other species' arrivals and dominance of the bait, except *Camponotus rufipes*, which is the only big species and always dominated *C. punctulatus*. Mass recruiting species depended on their recruitment and nest proximity to keep a bait. *Pheidole* species were more active early in the morning and late in the afternoon, *S. invicta* mainly in the afternoon, while *C. punctulatus* was found at the greatest proportion of baits throughout the day. These results were in agreement with their tolerance to high temperature: *Pheidole* < *Solenopsis* < *Camponotus*. *Camponotus punctulatus* nests were segregated from the rest of the ants of the community, although its scouts were always present throughout the study plot. We discuss how these characteristics can help explain *C. punctulatus* success in the abandoned rice fields.

145 - ANT COMMUNITY ECOLOGY IN THE COFFEE AGROECOSYSTEM

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This talk summarizes our research on ant community ecology in coffee agroecosystems of Northern Latin America over the last 15 years. During this period of time, many coffee agroecosystems in this region were intensified from diverse agroforests to simple shade systems and coffee monocultures. Here we summarize studies on the community ecology of ground, leaf-litter and arboreal ants along this coffee intensification gradient. Studies from Colombia, Costa Rica and Mexico all show a reduction of ant diversity and simplification of the ant community associated with the intensification process in coffee agroecosystems. We also discuss the possible mechanisms responsible for the loss of ant diversity along the intensification gradient including microclimatic changes, changes in competitive hierarchies, loss of nesting sites, and enigmatic preference of ants for biodiversity. Finally we discuss possible implications of ant diversity reduction for the sustainability and function of the coffee agroecosystem.