



DISEASE PREVALENCE AND SEVERITY IN *Melocactus conoideus* BUIN. & BRED. 1973 (CACTACEAE) POPULATIONS IN UNPROTECTED HABITAT PATCHES AT SERRA DO PERIPERI, VITÓRIA DA CONQUISTA, BAHIA, BRAZIL.

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INTRODUÇÃO

Parasitic interactions are pervasive over ecological systems, and parasite pathogenicity depend on triadic interactions between host, parasite and the environment (Holmes, 1996). In the current biodiversity crisis context, when habitat fragmentation and resource overexploitation result in smaller populations increasingly isolated, pathogenic relations can potentially be significant drivers of biodiversity extinctions (McCallum ad Dobson, 2002). Yet, despite recent studies pointing to unusual high rates of infectious diseases in wildlife, conclusive empirical evidence of the importance of pathogens on endangered species extinctions is lacking (Smith; Sax and Lafferty, 2006). Plant pathogens are a phylogenetically diverse group of organisms, of which approximately 75% are fungi, and most plant species are susceptible to infection by multiple pathogen species (Mitchell and Power, 2006). According to Smith, Sax and Lafferty (2006), infectious plant diseases are usually listed at World Conservation Union (IUCN) Red List of Threatened and Endangered Species (IUCN 2004) and Science Citation Index Expanded (ISIWeb of Science) databases as causes of critical endangerment and not species extinction. However, this trend do not apply to rare and limited geographical distribution plant species, which are less studied. The family Cactaceae is regarded as one of the most threatened plant families, being characterized by high levels of endemism (Global Cactus Assessment, 2013). Among its genera, the *Melocactus* genus comprise small globose cacti, highly appreciated for its ornamental value, with extensive geographical distribution. *Melocactus conoideus* is a critically endangered endemic cactus species, restricted to a narrow habitat of 10km² in the southwest region of Bahia state, Brazil. This species is facing intense habitat destruction due to extraction of its substrate, composed by quartzite gravel, for use in civil construction, alongside infection by an unknown parasite, or parasites. The absence of any previous information about this infection motivated concerns that this host-parasite relationships is relatively new in *M. conoideus*' evolution, and so could be understood as a natural disturbance. In some habitat patches at Serra do Periperi, (Vitória da Conquista, Bahia, Brazil) in which mining activities have ceased, resident *M. conoideus* populations that supposedly could be on recovery process may be suffering negative parasitism effects. Henceforth, characterization of disease's prevalence and severity in natural populations is necessary to evaluate pathogen impacts on population dynamics, and its potential to act as extinction driver.

OBJETIVOS

To assess disease prevalence, defined as the number of *Melocactus conoideus* infected individuals in the population, and disease severity, defined as extent of plant tissue affected by disease (McRoberts, Hughes and Madden, 2003) on three habitat patches populations at Serra do Periperi.

MATERIAL E MÉTODOS

Study areas are quartzite gravel outcrops along Serra do Periperi hills range, located in Vitória da Conquista, Bahia, Brazil. The region is characterized by elevations of 900 to 1000m, sub-humid climate with highly variable pluviometry, mild temperatures throughout the year and main vegetation physiognomy is seasonal semideciduous forest. Three different areas were studied: outcrop patch 21, patch 22 and patch 23. In each area a 20 x 20 m sampling grid, divided in 16 quadrat plots of 5x5 m, was established from a randomly origin point. All individuals larger than 5mm stem were examined for presence of exudates and darkened spots on stems or cephalia, which were regarded as qualitative evidence of symptoms, indicating disease prevalence. Disease severity on individuals affected was recorded categorizing lesion extension on an ordinal scale through visual evaluation: category 1, no symptoms; category 2, symptom area <25% total stem; category 3, symptom area from 25% to 50% total stem; category 4, symptom area from 50% to 75% total stem, and category 5, symptom area > 75% total stem; category 6, symptom area <25% total cephalium; category 7, symptom area from 25% to 50% total cephalium; category 8, symptom area from 50% to 75% total cephalium, and category 9, symptom area > 75% total cephalium. Visual assessment was performed by the same trained collector. Prevalence was compared among populations in different patches with Pearson's Chi-squared test using R program.

RESULTADOS

Overall, population abundances were low in study sites. The three areas presented 90 individuals in patch 21 (0.23ind/m² density), 53 individuals in patch 22 (0.13ind/m² density) and 93 individuals in patch 23 (0.23ind/m² density). Prevalence and severity data for patch 21 population could be recorded only for 70 individuals due to field difficulties; following discussion will consider this abundance. Disease prevalence recorded on patch 21 was of 12 infected individuals, or 17.14% total population; prevalence on patch 22 was of 8 individuals, or 14.81% total population, and on patch 23, there were 17 infected individuals, or 17% total population. Patches 22 and 23 had a larger proportion of juveniles among infected individuals: 5 juveniles to 3 adults on patch 22 and 14 juveniles to 3 adults on patch 23. On patch 21, however, majority of infected individuals were adults: 10 adults to 4 juveniles with symptom signs. The majority of affected individuals in all areas presented mild disease symptoms: 41.67% of individuals in category 2 and 25% in category 3 in patch 21, 57.14% of individuals in category 2 in patch 22; 58.8% of individuals in category 2 and 35.29% in category 3 in patch 23. Difference of disease prevalence among populations was not statistically significant (p-value = 0.9212).

DISCUSSÃO

Based on previous personal communications, we expected higher prevalence and stronger severity. Even so, impact on populations ought to be evaluated at least only after mortality rates due to parasitic infections are recorded; thus, our results can be considered the necessary preliminary stage in such a research program. Other investigations by our group aimed at researching parasite identity, characterization of transmission, morbidity and immunity and occurrence of synergistic effects on pathogen prevalence and severity by various disturbances will further contribute to evaluate pathogen impacts on survival of this endangered cactus species.

CONCLUSÃO

Disease prevalence and severity were considered relatively low, in comparison with expectations from previous personal field reports. Further studies are being carried to investigate pathogen biology and its influence in *M. conoideus* survival, growth, fecundity and other relevant demographic parameters for longer periods, in order to assess parasitic cycles of infection spread and remission.

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